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The
COMMERCIAL VEHICLE
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
Horace M. Swetland, President
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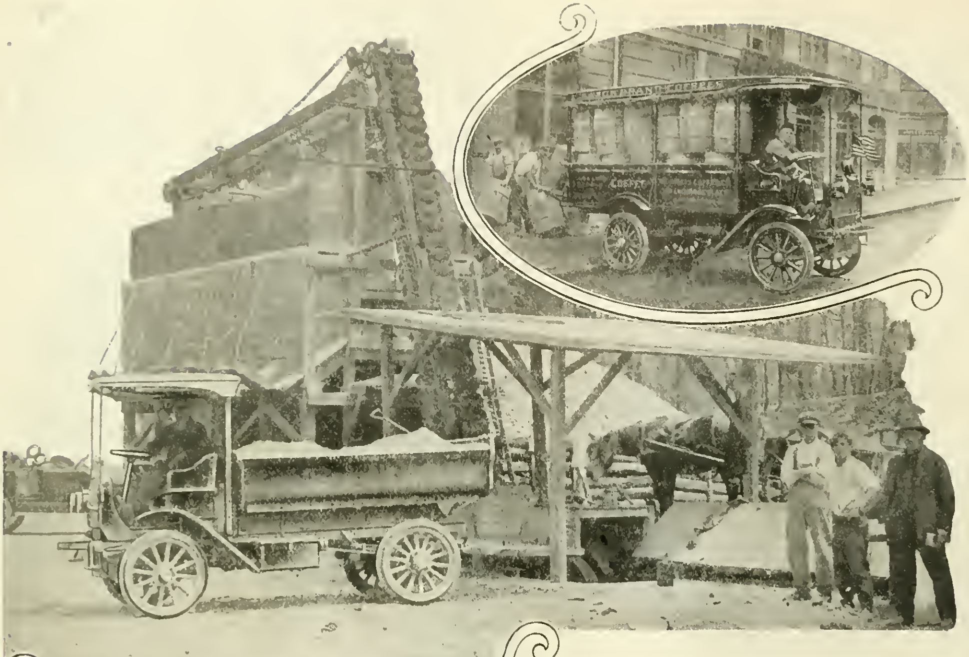

After the War Readjustment Facts

DURING the first nine weeks after the Armistice was signed, The Autocar Company of Ardmore, Pa., received repeat orders for Autocar Motor Trucks from three hundred and fifty-six different concerns.

These business houses realize that increasing their transportation facilities is one of the main essentials in getting back to a peace basis.

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THE AUTOCAR COMPANY
ARDMORE, PA. *Established 1897*

Autocar

The Commercial Vehicle
Read by Business Men
Vol. XX February 1, 1919 No. 1

Revival of Exclusive Motor Truck Shows Presages Banner Year in 1919

Resumption of Exhibitions in Chicago and in New York by Dealers Indicates Great Interest in Highway Motor Transportation of All Kinds

THE resumption of exclusive motor truck shows in Chicago and New York during the month of February indicates the wide interest in motor trucking and presages a banner year for the motor truck industry in 1919. The war has undoubtedly brought home to the American business man—the manufacturer, the wholesaler, the retailer and even the farmer—the great advantage of motor truck transportation.

As a result of the breakdown of our railroad system because of the tremendous war burdens placed upon it, these men were brought to realize that no matter whether their goods were moved by the railroads or not, a large percentage of the selling cost is consumed in moving the goods over the highways. These charges may consist of the cost of hauling the material from the point of origin to the railroad, from the rail destination to the factory or place of business of the buyer, or the final delivery to the consumer.

Reduces Cost of Highway Transportation

The motor truck aids in reducing the cost of this highway transportation, and because it does, its use will increase as its ability becomes more generally known and salesmen point out how it can serve in each prospective purchaser's own particular business. The many remarkable feats performed by the motor truck in the 4-year world war have brought home to the average purchaser the advantages of the motor truck in a more rapid manner than perhaps would have been the case during 10 or 15 years under ordinary peace conditions.

It has been a period of 6 years since any exclusive motor truck exhibitions have been held either in New York or in Chicago. The last such show held in New York was staged at Madison Square Garden during the week of Jan. 20 to 25, 1913, and at the Coliseum in Chicago during the week of Feb. 10 to 16, 1913.

Both of the shows held during 1913 were under the auspices of the motor truck manufacturers' association, while the Chicago show in 1919, which opens at the Coliseum on Feb. 3 and closes on Feb. 6, and that at New York, which opens on Feb. 10 and closes on Feb. 15, are both to be held under the direction of the dealers' organizations in both cities. So far as the motor truck owner is concerned it makes little difference whether the show be held by the maker or the dealer, provided a good representation of the various models offered on the market is included among the exhibits. The user wants to find out what new improvements have been made in motor truck construction, and obviously these remain the same whether the vehicles are exhibited by maker or dealer.

New York and Chicago Exclusive Motor Truck Shows

1—First exclusive motor truck shows held in either city since 1913.

2—Both shows will be held under the auspices of the dealers' organizations in the two cities.

3—Each of the two exhibitions will be smaller in the number of makes exhibited than the shows held in the respective cities in 1913.

4—Forty-two makes will be shown at Chicago and forty-six makes at New York.

5—Big increase in the number of motor truck parts to be exhibited at both shows. The number of accessory exhibits is also large.

Benefits of Show to Purchaser

For the past 6 years prospective truck purchasers in New York and Chicago have had to content themselves with viewing the new models by either visiting the salesrooms of the various truck companies in their respective cities or going to exclusive or combined truck shows held in large nearby centers of population.

In years gone by, when truck shows were held during successive years, it was not difficult to point out the engineering progress made between shows. It is of course impossible to do this for 1919, since the last truck show in either city was held almost 6 years ago to the day in each case. There have been marked improvements in commercial vehicles during this 6-year period, but most of these are well known by the present-day truck owners and prospective buyers. The purchaser of to-day is more interested in knowing how the 1919 trucks differ from those of 1918.

In this respect the man who visits the truck shows of February, 1919, will not find any great number of engineering developments, although of course there will be several models of trucks at either show which are made by new companies who never exhibited before. The year 1918 was not replete with engineering advancements in truck design for the reason that our war demands for trucks, coupled with the needs of our civilian users, made it a year in which every ounce of effort was devoted to production rather than to bringing out any new models.

At the Chicago show there will be a comprehensive display of several models of the standardized and special military trucks as used at the Great Lakes Naval Training Station. Many a user will undoubtedly get some good ideas from these vehicles as to special types of bodies and equipment which will enable him to effect greater economies in the operation of his own trucks in commercial service.

The number of parts and accessories to be exhibited at either show is greater than ever before, and these, with other labor-saving devices designed to increase motor truck efficiency, will send away many a showgoer interested in motor transportation with concrete examples of how the efficiency of his own trucks may be increased.

Both the Society of Automotive Engineers and the National Automobile Chamber of Commerce will hold meetings in the two cities during the weeks of the truck exhibitions, at which programs of interesting topics for the motor truck user, dealer and manufacturer will be discussed.

Taking it all in all, the motor truck shows of 1919 mark a step forward in the industry, and one which may result in the holding of exclusive motor truck shows annually in the years to come as one of the best means of acquainting the American business man with the many advantages of motor truck transportation over the highways.

Forty-Two Truck Makes to Be Seen at Chicago

Parts, Accessories and Bodies Featured at Windy City Show

FORTY-TWO makes of motor trucks and forty-three makes of motor truck parts and accessories will be exhibited at the exclusive motor truck show which opens in Chicago on February 3 and closes on February 6. The exhibits will be held at the Coliseum and Annex. The big demand for truck show space has made it necessary to take over the First Regiment Armory as well. Any overflow will be housed in the Greer Building, where the show will be in charge of C. P. Warner.

New Truck Exhibitors

Brand new motor truck companies or concerns in existence during 1918 which never exhibited at any previous motor truck show, will include the Dearborn Motor Truck Co., Chicago; the Mutual Truck Co., Sullivan, Ind.; the Paige-Detroit Motor Car Co., Detroit, and the Winslow Motor and Engineering Co., Chicago.

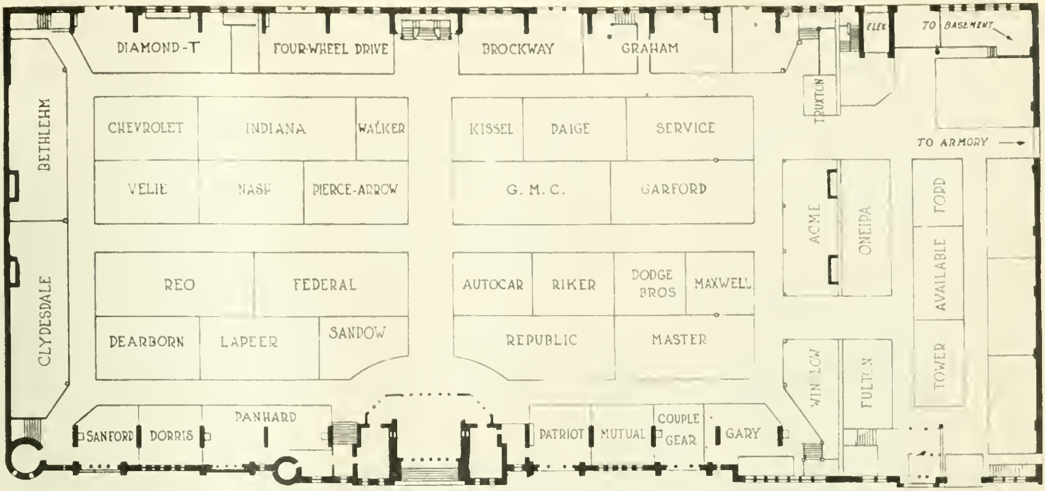
The following companies will also exhibit new models of trucks as described more fully further on in this article: Available Truck Co., Chicago; Brockway Motor Truck Co., Cortland, N. Y.; Master Trucks, Inc., Chicago; Panhard Motors Co., Grant Haven, Mich., and the Republic Motor Truck Co., Alma, Mich. The Chicago branch of the Service Motor Truck Co., Wabash, Ind., will also exhibit several special body designs.

The 1919 exclusive motor truck show in Chicago will be smaller than the last such event staged at the Coliseum from February 10 to February 15, 1913. At that show seventy-six makes, nineteen of them new at that time, were shown as compared with the forty-two makes which will be exhibited at this year's show, according to the latest information now available.

Chicago Show Ahead of N. Y.

For the first time in many years, the Chicago motor vehicle shows this year precede the similar exhibitions held in New York City. Because of this fact many of the new models to be shown at the Coliseum exhibition will be offered to the public in Chicago before being revealed to the eastern truck buyers in New York City. The New York show will not be a duplicate of that held in Chicago, in that there are many exhibitors at Chicago who will not show in New York. This is especially noticeable this year on account of the fact that both shows are being staged by the dealers' organizations in the two cities instead of the makers. The last exclusive truck show in Chicago was featured by the

The Coliseum, where the Chicago motor truck show will be held



Plan view of the Chicago Coliseum, showing the location of the various makes of truck exhibits

great variety of the body designs exhibited. This was due to the fact that many of the bodies mounted on the truck chassis shown were made in Chicago. Several of these were of unusual character in that they were designed for a particular work with a view toward increasing the truck efficiency in that work. Undoubtedly the 1919 truck show will contain as many bodies of merit as were shown in 1913. These bodies will vary considerably from those to be shown later at the New York show, so that the visitor at the Chicago show will not find any monotony in attending the similar show held in New York.

Four-Day Show

It is to be noted that the show will be held for only 4 days instead of a week, as previously, the idea being that the exhibition should be short and snappy with a view toward keeping the public interest at its highest pitch throughout the show.

Among the new makes of trucks to be exhibited for the first time or those which were not offered on the 1918 market are the Dearborn 1½-ton worm-driven truck selling at $1,980. That new vehicle is equipped with a unit-power plant made up of a Continental 3½ by 5 engine, a Fuller multiple-disk dry clutch and a Fuller three-speed selective gearset. The rear axle is made by the Chicago-Standard Axle Co., Chicago. In addition, the Dearborn company will offer 1- and 2-ton chain-driven units now produced as a result of the recent purchase by the Dearborn company of all of the materials of the Smith Motor Truck Corp. and the Smith Form-a-Truck Co., Chicago.

The Mutual Truck Co., Sullivan, Ind., is a new concern which will exhibit its vehicle for the first time. The Paige-Detroit Motor Car Co., Detroit, will exhibit two sizes of trucks at the show. These will be the first vehicles that the Paige company has ever shown at a truck show. One of them, the 3½-tonner, is a brand new truck with final worm drive using a Timken rear axle. The Paige company plans to bring out shortly two additional new models of 1½- and 5-ton capacity. The new 3½-tonner to be seen at Chicago is equipped with a Continental 4½ by 5½ engine; a Brown-Lipe multiple-disk dry clutch and a four-speed Brown-Lipe selective gearset. The Winslow Motor and Engineering Co., Chicago, is a new company just starting in business. It will exhibit its first truck, a steam vehicle, at the show.

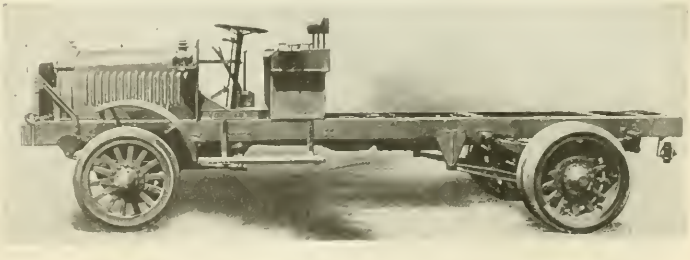
Among the established makers of trucks who will show new vehicles for the first time is the Available Truck Co., Chicago, which will bring out new 2- and 3½-ton models selling respectively at $2,950 and $4,200. Both models employ Continental Red Seal engines, Brown-Lipe dry-disk clutches and Brown-Lipe four-speed selective gearsets driving to Timken worm-driven rear axles. Radius rods are fitted on the two new models, which also have heavier frames, larger radiators with more water capacity and radiator guards.

Perhaps one of the most interesting trucks which may be seen at the Chicago show will be a modified Class B military truck just brought out for sale on the commercial market by the Brockway Motor Truck Co., Cortland, N. Y. It is rated at 5 tons capacity and, as told on pages 22 and 23 of this issue, is made by the only one of the seventeen assemblers who put together the first 18,000 Class B trucks for the government who intend to include such a modified chassis in their regular line.

Brockway Semi-Class B Unit

The Brockway vehicle is fitted with a Class B truck motor with a 3¾ in. bore and a 6 in. stroke; an Eisemann high tension magneto, with impulse starter; a Schebler carbureter; a Gemmer steering gear of the worm and worm wheel type; a Brown-Lipe four-speed gearset mounted amidships; a Brown-Lipe dry-disk clutch; Spicer propeller shafts; Timken front and rear worm-driven axles; a Parish frame; tires 36 by 5 in. front and 40 by 6 dual in the rear and metal wheels. The vehicle is fitted with radius rods and has a wheelbase of 172 in. with a 15 ft. length aft of the rear of the driver's seat for a body. It will also be fitted with the military type of radiator guard and front towing hooks as used on the Class B truck and chain hooks will be fitted on the rear wheels. The radiator guard, towing hook and chain hooks on the rear wheels will be standard equipment.

The Brockway company has also brought out a new 1½-ton internal-gear-



Side view of the modified Brockway commercial model of the Class B war truck driven truck to sell at $2,050. It is equipped with a Continental engine, 3¾ in. bore and 5 in. stroke; Eisemann high-tension magneto; Schebler carbureter; Gemmer steering gear; Brown-Lipe dry-disk clutch and Brown-Lipe selective gearset; Spicer two-piece propeller shaft with an oversized S. K. F. bearing in the center; Parish frame; 36 in. wheels and tires and an M. & S. differential. The vehicle has radius rod drive and is furnished in a wheelbase of 140 in. with 10 ft. 6 in. of clear body space aft the driver's seat.

The Master Trucks, Inc., Chicago, will exhibit a complete line of four models of 1½-, 2-, 3½- and 5-ton capacity. Of these the 1½- and 5-tonners are new models in addition to those whose specifications were published in the November 1, 1918, issue of THE COMMERCIAL VEHICLE. The 1½-tonner is offered at $1,890 with a Torbensen rear axle and at $1,990 with a Timken worm-driven axle. In each case the vehicle has a wheelbase of 144 in.; a Buda 4⅛ by 5½ engine; an Eisemann high-tension magneto with an impulse starter and a Fuller dry-disk clutch and Fuller gearset. The 5-ton model is offered at $4,890 in a 170-in. wheelbase or at $4,990 with an extra long wheelbase. The units employed include a Buda 4½ by 6 engine; Brown-Lipe dry-disk clutch; Brown-Lipe four-speed gearset, and an Eisemann high-tension magneto with automatic spark advance.

The Panhard Motors Co., Grand Haven, Mich., will exhibit one of its 2½-ton internal-gear-driven trucks employing a Torbensen rear axle. It is fitted with a Buda 4¼ by 5½ engine; a Bosch high-tension magneto; a Fuller dry-disk clutch and a Fuller three-speed gearset mounted in a unit powerplant.

The Republic Motor Truck Co., Alma, Mich., will offer two improved models with practically new specifications, details of which are not yet available.

The W. W. Shaw Livery Co., Chicago, better known through its taxicab activities, will exhibit its two commercial truck models, which are of ¾- and 2-ton capacity. The 2-ton vehicle sells at $2,750.

Novel Body Exhibits

The Service Motor Truck Co., Chicago, will exhibit 1-, 2- and 3½-ton chassis, the latter being shown complete with a combination body suitable for carrying ice, ice-cream materials and kindred merchandise. The special body is so arranged that it can be divided into sections by means of removable panels so that four compartments are available for carrying chopped ice or ice-cream containers. The body is made of rust-proofed steel. The floor is made watertight and has a slight pitch toward the center with a drain running the full length of the body to carry off the salted ice water. In addition, the body slopes to the rear so that the drain empties back of the rear axle, thereby keeping the motor truck free from the corrosion and rust which might otherwise take place.

The same company will also exhibit a portable or removable body on one of the Service 3½-ton chassis. It is mounted on small wheels with roller bearings and is carried on the frame of the chassis. When the driver backs his truck up to the loading platform, he simply turns the lever which operates gears in the frame below the body so that it rolls off onto the loading or unloading platform with ease. Two bodies are used with an installation of that type, one being loaded while the other is mounted on the truck. The loaded body is pulled from the platform onto the truck chassis by means of a gear and hand lever device. The Service company will also exhibit a 5-ton coal and material body with a side chute for delivering the coal either at the front or rear end of the body, on the side, or the entire load at the rear end of the truck.

In addition to the exhibits to be held in the Coliseum and Annex or in the First Regiment Armory, several of the Chicago dealers will stage smaller shows of their own products in their salesrooms.

The Clark Equipment Co., Buchanan, Mich., which manufactures metal wheels, internal-gear axles and locking differentials for motor trucks, will give the show an interesting series of industrial films portraying the actual processes of manufacture in its plant. These films will be shown during the Chicago motor truck show week at the Hotel La Salle.

The large size of the Chicago truck show as compared with the other local

Chicago Truck Show Exhibits

TRUCK	NO. TO BE SHOWN	MAKER	MAKER'S ADDRESS	EXHIBITOR	EXHIBITOR'S ADDRESS
1. Acme	—	Acme Motor Truck Co.	Cadillac, Mich.	Acme Motor Truck Co.	Chicago, Ill.
2. Autocar	—	Autocar Co.	Ardmore, Pa.	Autocar Sales & Service Co.	Chicago, Ill.
3. Available	—	Available Truck Co.	Chicago, Ill.	Available Motor Sales Co.	Chicago, Ill.
4. Bethlehem	—	Bethlehem Motors Corp.	Allentown, Pa.	Bethlehem-Chicago Bethlehem Sales Co.	Chicago, Ill.
5. Brockway	—	Brockway Motor Truck Co.	Cortland, N. Y.	Brockway-Wilcox Franklin Co.	Chicago, Ill.
6. Chevrolet	—	Chevrolet Motors Co.	Flint, Mich.	Chevrolet Motor Co.	Chicago, Ill.
7. Clydesdale	—	Clyde Cars Co.	Clyde, Ohio	Clydesdale-Schnett Motors Co.	Chicago, Ill.
8. Couple Gear	—	Couple Gear Power Truck Co.	Chicago, Ill.	Couple Gear Power Truck Co.	Chicago, Ill.
9. Dearborn	3	Dearborn Truck Co.	Chicago, Ill.	Dearborn Truck Co.	Chicago, Ill.
10. Diamond-T	—	Diamond-T Motor Car Co.	Chicago, Ill.	Diamond-T Louis Geyler	Chicago, Ill.
11. Dodge Bros.	—	Dodge Bros.	Detroit, Mich.	Dodge-Dashiell Motor Co.	Chicago, Ill.
12. Dorris	—	Dorris Motor Car Co.	St. Louis, Mo.	Dorris Motor Car Co.	St. Louis, Mo.
13. Federal	—	Federal Motor Truck Co.	Detroit, Mich.	Federal Motor Truck Co.	Chicago, Ill.
14. Ford	—	Ford Motor Co.	Detroit, Mich.	Fordson Rue Motor Co.	Chicago, Ill.
15. Four Wheel Drive	—	Four Wheel Drive Auto Co.	Clintonville, Wis.	Four Wheel Drive Auto Co.	Clintonville, Ill.
16. Fulton	—	Fulton Motor Truck Co.	Farmingdale, L. I.	Fulton Motor Truck Co.	Farmingdale, L. I.
17. Garford	5	Garford Motor Truck Co.	Lima, Ohio	Garford Motor Truck Co.	Chicago, Ill.
18. Gary	—	Gary Motor Truck Co.	Gary, Ind.		Chicago, Ill.
19. G. M. C.	—	General Motors Truck Co.	Pontiac, Mich.	General Motors Truck Co.	Chicago, Ill.
20. Indiana	5	Indiana Truck Co.	Marion, Ind.	Indiana-Chicago Truck Co.	Chicago, Ill.
21. Kissel	—	Kissel Motor Car Co.	Hartford, Wis.	H. P. Branstetter	Chicago, Ill.
22. Lapeer	—	Lapeer Tractor-Truck Co.	Lapeer, Mich.	Lapeer Tractor-Truck Co.	Lapeer, Mich.
23. Master	4	Master Trucks, Inc.	Chicago, Ill.	Master Trucks, Inc.	Chicago, Ill.
24. Maxwell	2	Maxwell Motor Co.	Detroit, Mich.	Maxwell-Harry Newman Stratton Co.	Chicago, Ill.
25. Mutual	—	Mutual Truck Co.	Sullivan, Ind.	Mutual Truck Co.	Sullivan, Ind.
26. Nash	—	Nash Motors Co.	Kenosha, Wis.	Western Motor Car Co.	Chicago, Ill.
27. Oneida	—	Oneida Motor Truck Co.	Green Bay, Wis.	Oneida Motor Truck Co.	Green Bay, Wis
28. Paige	3	Paige-Detroit Motor Car Co.	Detroit, Mich.	Bird Sykes Co.	Chicago, Ill.
29. Panhard	—	Panhard Motors	Grand Haven, Mich.	Panhard Motors	Grand Haven, Mich.
30. Patriot	—	Hebb Motors Co.	Lincoln, Neb.	Hebb Motors Co.	Lincoln, Neb.
31. Pierce-Arrow	—	Pierce-Arrow Motor Car Co.	Buffalo, N. Y.	H. Paulman	Chicago, Ill.
32. Reo	—	Reo Motor Car Co.	Lansing, Mich.	Reo Motor Car Co.	Chicago, Ill.
33. Republic	2	Republic Motor Truck Co.	Alma, Mich.	Republic Truck Co.	Chicago, Ill.
34. Riker	1	Locomobile Co.	Bridgeport, Conn.	Locomobile Co. of America	Chicago, Ill.
35. Sandow	—	Sandow Motor Truck Co.	Chicago, Ill.	Sandow Truck Co.	Chicago, Ill.
36. Sanford	2	Sanford Motor Truck Co.	Syracuse, N. Y.	Sanford Motor Truck Co.	Syracuse, N. Y.
37. Service	3	Service Motor Truck Co.	Wabash, Ind.	Service Motor Truck Co.	Chicago, Ill.
38. Shaw	2	W. W. Shaw Corp.	Chicago, Ill.	W. W. Shaw Corp.	Chicago, Ill.
39. Tower	—	Tower Motor Truck Co.	Greenville, Mich.	Tower Motor Truck Co.	Greenville, Mich.
40. Velie	3	Velie Motors Corp.	Moline, Ill.	R. C. Cook	Chicago, Ill.
41. Walker*	3	Walker Vehicle Co.	Chicago, Ill.	Walker Vehicle Co.	Chicago, Ill.
42. Winslow†	—	Winslow Motor & Engineering Co.	Chicago, Ill.	Winslow Motor & Engineering Co.	Chicago, Ill.
	38**				

*Indicates an electric truck. **Data on number of vehicles incomplete.
†Indicates a steam truck.

FORD ADAPTERS

1. Graham	—	Graham Bros.	Evansville, Ind.	Graham Bros.	Evansville, Ind.

shows held within a radius of 100 miles will make it an attraction for prospective truck buyers in the four states of Indiana, Illinois, Iowa and Wisconsin. With no accurate figures available as to the number of motor trucks in use in Illinois, Indiana and Iowa, it is difficult to estimate the progress made in motor transportation in those states during the past year and the effect which the Chicago show will have upon the continued increase in the use of trucks in those states. Wisconsin, however, gained 14 per cent during the year, increasing its number of trucks from 6000 to 6861, an increase of 861 in number. Heavier trucks of more than 1-ton capacity increased 25 per cent in the City of Chicago for the year ending September 30, 1918. At that time there were 5924 trucks as compared with 4724 as of September 30, 1917. In addition to the 5924 trucks of over 1-ton capacity in use on September 30, 1918, there were 8752 of under 1-ton size as compared with 8073 on the same date of the year previous. This is a gain of about 8 per cent. The total number of trucks registered in the City of Chicago on September 30, 1918, was 14,676.

At this writing the alphabetical list of the exhibitors of motor truck parts and accessories is as follows: Ahlberg Bearing Co., bearings; Alemite Die Casting & Mfg. Co., die castings; American Bronze Corp., bearings; American Chain Co., Inc., chains; American Taximeter Co., taximeters and odometers; Anderson Forge & Machine Co., forgings; Arrow Grip Mfg. Co., chains; Buda Co., engines; Budd Wheel Corp., wheels; Buell Mfg. Co., whistles; Challoner Co., chains; Champion Ignition Co., spark plugs; Chicago Mfg. Co., radiators; Clark Equipment Co., axles; Corbin Screw Corp., odometers; Dixon, Jos., Crucible Co., Jersey City, N. J., graphite; Electric Storage Battery Co., batteries; Hassler, Robert H., Inc., shock absorbers; Inland Machine Works, piston rings; Morand Bros., Martin Cushion Wheel Co., cushion wheels; National Refining Co., oil; Pantasote Co., body material; Parry Mfg. Co., bodies; Pratt, William E., Mfg. Co., jacks; Rowe Calk & Chain Co., chains; Sewell Cushion Wheel Co., wheels; Sherman & Ellis, Inc., parts; Simms Magneto Co., magnetos; Sparks-Withington Co., horns; Splitdorf Electrical Co., magnetos; Stromberg Motor Devices Co., carbureters; Taft-Pierce Mfg. Co., tools; Titeflex Motor Hose Corp., hose; Trindl Machine Works, parts; Tuthill Spring Co., springs; Vesta Accumulator Co., batteries; West Steel Casting Co., metal wheels; Wheeler-Schebler Carburetor Co., carbureters; Williams, J. H., Co., wrenches, and Waukesha Motor Co., engines.

Over 142 Chassis to Be Exhibited at New York

Is First Exclusive Show Held in the City Proper Since 1913—Many New Models

ONE hundred and forty-two chassis of forty-six different makes will be exhibited at the New York motor truck show to be held in Madison Square Garden and the Sixty-ninth Regiment Armory from February 10 to 15. The 1919 truck show will be the first exclusive truck exhibition held in New York City proper since January 20 to 25, 1913, although exclusive motor truck shows have been held during the past two years in Brooklyn, N. Y., and combined truck and passenger car shows in nearby cities in New Jersey and Connecticut.

This year's show will be smaller than the similar show held in Madison Square Garden during 1913, when a grand total of sixty-seven makes of commercial vehicles were exhibited.

Held by Dealers

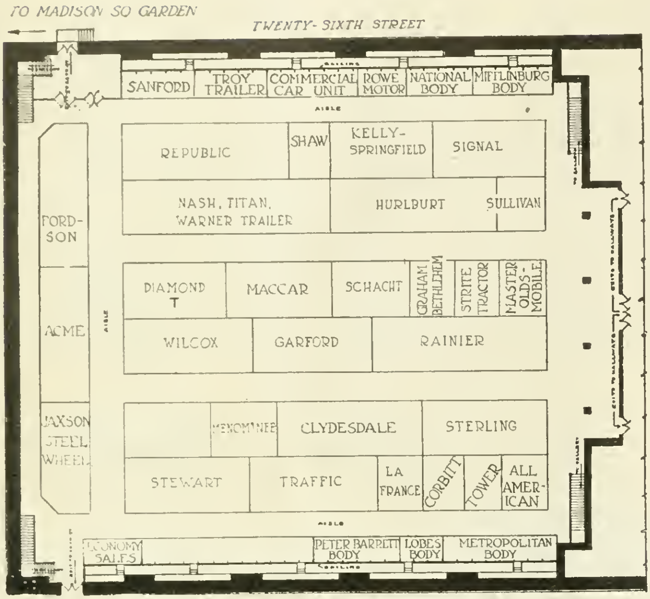
As in Chicago, the show will be held under the auspices of the New York dealers' organizations for the first time in the history of such shows in New York City. There will be several brand new makes of trucks shown for the first time and several other new models of well-established lines. While the Packard line will be seen at the show, the vehicles of the White and Pierce-Arrow companies are conspicuous by their absence.

Among the brand new makes of trucks and new makes which were not previously shown at any New York show will be the La France, made by the Ward La France Co., Elmira, N. Y.; the Oldsmobile, made by the Olds Motor Co., Lansing, Mich.; the Shaw, made by the W. W. Shaw Corp., Chicago; the Traffic, made by the Traffic Motor Truck Corp., St. Louis, Mo., and the West, a new electric being turned out by the West Motor Truck Co., New York City.

The Fulton Motor Truck Co., Farmingdale, L. I.; the Paige-Detroit Motor Car Co., Detroit; the Rainier Motor Corp., New York City, and the Stewart Motor Corp., Buffalo, N. Y., will also exhibit one or two new models of vehicles added to the 1919 lines previously announced in the specification number of THE COMMERCIAL VEHICLE for Nov. 1, 1918.

The new Oldsmobile chassis is a light job of ¾ - 1-ton capacity, to sell at $1,495,

The famous Madison Square Garden, scene of the 1919 truck show



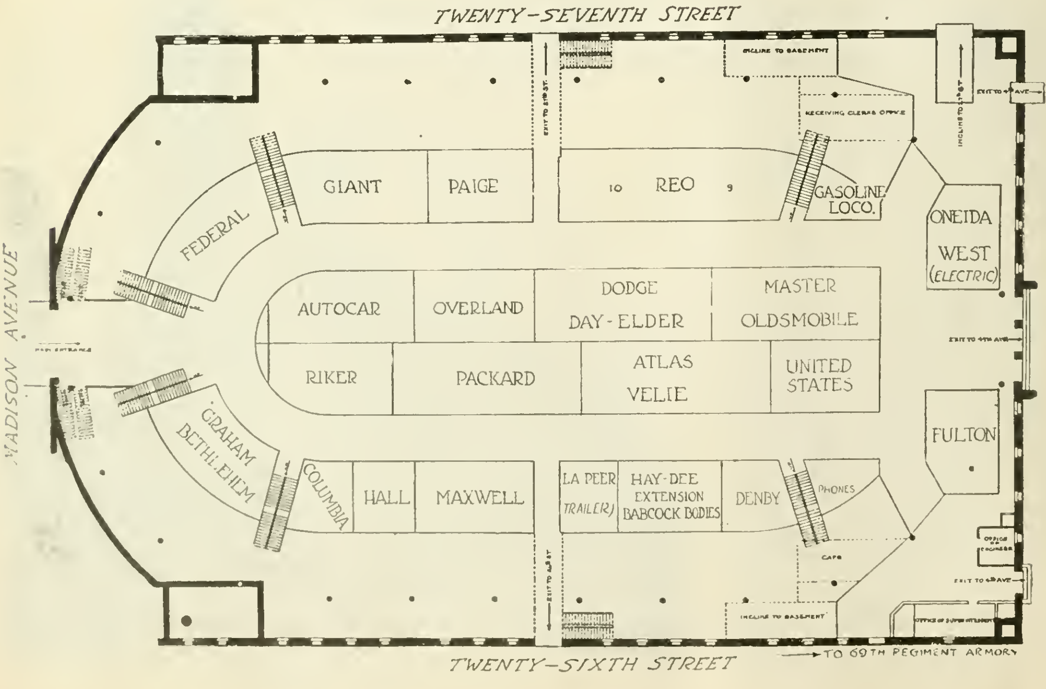
Floor plan of the Sixty-ninth Regiment Armory, where the overflow trucks will be seen at the spaces as indicated

complete with an express type body. It is a bevel-driven vehicle, which is mounted on a chassis entirely different from that of the passenger cars made by the same company. It is fitted with an Olds unit power plant, and may be had with panel or other types of bodies at an extra charge. The La France and Traffic trucks to be shown in this year's exhibition were not previously seen in any show staged in the Metropolitan district. The Shaw truck, made by the W. W. Shaw Corp., Chicago, which has heretofore manufactured only taxicabs, will exhibit one of its new 2-ton commercial models.

West a New Electric

The West electric is a new vehicle employing the Krohn form of internal and external gear drive, in which the electric motor is carried in the housing of the rear axle. The vehicle to be seen at New York, a 2-tonner, was designed for and approved by the American Express Co. in Chicago. The patents on the drive were taken over by the West Motor Truck Co., in New York City, and will be manufactured there in three sizes. These will include 3½- and 5-ton models, in addition to the 2-tonner. The West company also handles the Oneida gasoline truck in New York and territory adjacent to that city.

The Fulton Truck Co. will offer a new 3½- to 4-ton tractor model complete with a semi-trailer and body. The trailer is equipped with brakes and is fitted with a



Plan of Madison Square Garden, giving the location of the various truck exhibits special form of collapsible standing gear by means of which the trailer can be left in an upright position when disconnected from the tractor. The tractor wheelbase is 110 in. and the trailer wheelbase is of the same length, giving an overall length of wheelbase of 220 in. The Paige company will exhibit one of its 2-ton chassis, one 2-ton Paige unit with a stake body and one 3½-tonner. The latter is a brand new model and will be on exhibition for the first time. It has a Continental engine, a Brown-Lipe clutch and a Brown-Lipe gearbox mounted amidships and drives through a Timken worm-driven axle.

The Rainier Motor Corp. will exhibit a complete line of seven models, of which two are brand new units. One of these is a ¾-ton special and the other a 2-tonner, both worm-driven. The ¾-ton special has a 3½ by 5⅛ Continental engine; Brown-Lipe dry-disk clutch and gearset; Simms magneto; zenith carbureter; Stewart vacuum fuel feed; Monarch governor and a Timken rear axle. It is offered in a 125-in. wheelbase, is mounted on 34 by 4 pneumatic tires, all around, and lists at $1,550 in the chassis. The 2-tonner has a wheelbase of 147 in. and sells at $2,250. It employs a Continental motor; Brown-Lipe clutch and gearset; Simms magneto; Zenith carbureter; Monarch governor; Stewart vacuum fuel feed system and Wisconsin worm-driven rear axle. It is mounted on solid tires all around, 34 by 3 in. front and 34 by 5 in the rear.

The Hermann Motor Truck Co. will exhibit five models of Stewart trucks as made by the Stewart Motor Corp., Buffalo, N. Y. Of these the 3½-tonner is a brand new model which lists at $3,500. It is equipped with a 4½ by 5½ Continental engine; Eisemann high-tension magneto; Zenith carbureter; a dry-disk clutch and four-speed selective gearset mounted in a unit power plant and an internal-gear-driven rear axle.

Several of the motor truck dealers in New York will display their lines in separate shows held in their own salesrooms. Among these are the Colt-Stratton Co., which will exhibit the Dodge Bros. light delivery vehicle and the Day-Elder line in its own salesrooms and the Selden line, which will be shown at the salesrooms of the Manhattan Motors Corp., New York.

This is not the 1919 truck show in New York, but the last exclusive truck show held in Madison Square Garden in January, 1913. Many of the names seen on the exhibitor signs are memories in the truck industry of to-day

Closed Cab on Hall

The 3½-ton worm-driven Hall truck to be exhibited will be equipped with a convertible type of cab which may be opened and closed on all sides without the driver having to leave his seat. The side doors are made of fabric, which eliminates noise and rattling. The door rolls up in the roof of the cab, where it is out of the way during pleasant weather.

Three makes of trailers, the Lapeer, Troy and Warner units, will be exhibited. In the way of bodies the Economy Body Sales Co., New York City, will exhibit a patented combination steel dump and express body which can be applied to almost any one of the 1- to 2-ton truck chassis offered on the market. It has a capacity of 35 cu. ft., with the material level to the top of the body sides. The body is made of steel and comes integral with the hoist, which is of the worm-gear type. The entire outfit sells at $250, f.o.b. Providence, R. I.

In addition to the motor truck parts and accessories which will be shown as listed at the end of this article the Clark Equipment Co., Buchanan, Mich., which manufactures metal wheels, locking differentials and internal-gear axles, will show moving picture films of the processes used in the manufacture of its

Increase in Motor Truck Registration Around New York

State	Number of Trucks				Increase, 1917-1918	
	1915	1916	1917	1918**	Number	Per Cent
New York	23,288	34,653	55,402	92,979	37,577	40.0
New Jersey	3,616	5,000†	9,662	15,601	5,979	62.0
Connecticut	4,847	7,759	9,702	15,051	5,349	55.0
	31,751	47,412	74,766	123,631	48,905	40.0

**1918 registrations to Dec. 1, 1918, all others to Jan. 1 of each year. †Estimate.

New York Truck Registration for 7 Years

Year	1912	1913	1914	1915	1916	1917	1918
Motor trucks	7,606	9,000	14,864	23,288	34,653	55,402	92,979
Increase, number	....	1,394	5,864	8,424	11,305	20,749	37,577
Increase, per cent	....	18	65	56	48	60	68

products. These will be exhibited at the Waldorf-Astoria Hotel during the truck show week. They picture the electric furnaces, forges and giant hammers as used in the plants of the Clark company. Complimentary tickets of admission to the film display may be obtained at the company's booth at the show or will be mailed direct from the factory upon request.

Meetings of Interest

There will be several meetings of particular interest to motor truck users and dealers and manufacturers during the week of the truck show. The N. A. C. C. will hold a 1-day conference at the offices of the organization at 7 East Forty-second Street, at which subjects pertinent to the motor truck industry will be discussed.

The Society of Automotive Engineers will hold a special meeting devoted largely to motor truck subjects at the Automobile Club of America on Feb. 10. B. B. Bachman, chief engineer of the Autocar Co., will present a paper on the use of pneumatic tires for trucks. The meeting just referred to is in addition to the other meetings of the S. A. E. to be held during the week of the passenger car show. Among the various papers to be presented will be one on "Tanks" by Lieut.-Col. Herbert W. Alden, and on "Automotive Ordnance Apparatus," by Lieut.-Col. W. Guy Wall, of the Ordnance Department. Both of these papers will be read on Wednesday morning, Feb. 5. On Wednesday afternoon J. G. Utz will talk on "Historical Notes on Military Truck Standardization." On Thursday morning, Feb. 6, the entire meeting will be devoted to a discussion of the various aspects of the fuel problem.

Some of the makers of motor truck parts and accessories which will be shown are as follows: American Pump & Tank Co., tanks; American Taximeter Co., taximeters and odometers; American Traction Ring Co., Inc., traction wheel rings; Conservo Sales Co., Inc., scales; Derf Mfg. Co., spark plugs; Dorr Miller Differential Co., differentials; Double Seal Ring Co., piston rings; Eastern Rubber Co., tires; Electric Storage Battery Co., batteries; Essenkay Products Co., tire filler; Metropolitan Body Co., bodies; National Chain Co., chains; Taft, Pierce Mfg. Co., tools; M. Geo. Tigar Bearings Co., bearings; West Steel Casting Co., metal wheels; Joseph Dixon Crucible Co., graphite; Gray & Davis, Inc., electrical equipment; Simms Magneto Co., magnetos.

As we go to press the following additional parts and accessory makers have secured space and will exhibit their products: Edward G. Budd Mfg. Co., bodies; Budd Wheel Corp., metal wheels; Clark Equipment Co., axles; Globe Chemical Co., parts; Dayton Steel Foundry Co., metal wheels; R. G. Granville, Inc., parts; Lauraine Magneto Co., Inc., magnetos; Rowe Calk & Chain Co., chains; Veeder Mfg. Co., speedometers, and Westinghouse Air Spring Co., air springs.

The New York Truck Show Exhibits

Truck	No. to be Shown	Maker	Maker's Address	Exhibitor	Exhibitor's Address
1. Acme	4	Acme Motor Truck Co.	Cadillac, Mich.	Commercial Repair Co., Inc.	Brooklyn, N. Y.
2. Atlas	4	Martin Truck & Body Co.	York, Pa.	Garland Auto Co.	New York City
3. Autocar	5	Autocar Co.,	Ardmore, Pa.	Autocar Sales Co.	New York City
4. Bethlehem	4	Bethlehem Motors Corp.	Allentown, Pa.	Graham Bros. Sales Co., Inc.	New York City
5. Clydesdale	4	Clyde Cars Co.	Clyde, Ohio	Arlington Motors Corp.	New York City
6. Columbia	3	Columbia Motor Truck & Trailer Co.	Pontiac, Mich.	A. Elliott Ranney Co.	New York City
7. Corbitt	—	Corbitt Motor Truck Co.	Henderson, N. C.	Corbitt Motor Truck Co.	New York City
8. D-E	3	Day-Elder Motors Co.	Newark, N. J.	Colt-Stratton Co.	New York City
9. Denby	3	Denby Motor Truck Co.	Detroit, Mich.	Denby Eastern Distributor, Inc.	New York City
10. Diamond-T	3	Diamond-T Motor Car Co.	Chicago, Ill.	Diamond-T Motor Truck Co. of N. Y., Inc.	New York City
11. Dodge Bros.	5	Dodge Bros.	Detroit, Mich.	Colt-Stratton Co.	New York City
12. Federal	4	Federal Motor Truck Co.	Detroit, Mich.	Morton W. Smith Co.	New York City
13. Fulton	3	Fulton Motor Truck Co.	Farmingdale, L. I.	New York Fulton Truck Co.	New York City
14. Garford	4	Garford Motor Truck Co.	Lima, Ohio	Garford Motor Truck Co.	New York City
15. Giant	5	Chicago Pneumatic Tool Co.	Chicago, Ill.	L. W. Mulford Co., Inc.	New York City
16. Hall	—	Lewis-Hall Iron Works	Detroit, Mich.	Lewis-Hall Iron Works	Detroit
17. Hurlburt	3	Hurlburt Motor Truck Co.	New York City	Hurlburt Motor Truck Co.	New York City
18. Kelly-Springfield	3	Kelly-Springfield Motor Truck Co.	Springfield, Ohio	Kelly-Springfield Motor Truck Sales Co.	New York City
19. La France	1	La France Motor Truck Co.	Elmira, N. Y.	Ward La France Co.	Elmira, N. Y.
20. Maccar	3	Maccar Co.	Scranton, Pa.	Pitts Motor Car Co.	Brooklyn, N. Y.
21. Master	4	Master Trucks, Inc.	Chicago, Ill.	Cutting-Larson Co.	New York City
22. Maxwell	4	Maxwell Motor Co.	Detroit, Mich.	Maxwell Motor Sales Co.	New York City
23. Menominee	2	Menominee Motor Truck Co.	Menominee, Mich.	Menominee Motor Truck Co. of New York	New York City
24. Nash	7	Nash Motors Co.	Kenosha, Wis.	Kaufmann-Stowers Co.	New York City
25. Oldsmobile	1	Olds Motor Works	Lansing, Mich.	Cutting-Larson Co.	New York City
26. Oneida	1	Oneida Motor Truck Co.	Green Bay, Wis.	West Motor Car Co.	New York City
27. Overland	4	Willys-Overland Co.	Toledo, Ohio	Willys-Overland, Inc.	New York City
28. Packard	4	Packard Motor Car Co.	Detroit, Mich	Packard Motor Car Co. of N. Y.	New York City
29. Paige	2	Paige-Detroit Motor Car Co.	Detroit, Mich	Paige-Detroit Co. of New York	New York City
30. Rainier	7	Rainier Motor Corp.	New York City	Rainier Motor Corp.	New York City
31. Reo	6	Reo Motor Car Co.	Lansing, Mich.	Reo Motor Co. of New York	New York City
32. Republic	2	Republic Motor Truck Co.	Alma, Mich.	W. J. B. Motor Truck Co.	New York City
33. Riker	3	Locomobile Co.	Bridgeport, Conn.	Locomobile Co. of America	New York City
34. Sanford	1	Sanford Motor Truck Co.	Syracuse, N. Y.	Lawrence Motor Sales Corp.	New York City
35. Schacht	2	G. A. Schacht Motor Truck Co.	Cincinnati, Ohio	Schacht Motor Truck Co.	New York City
36. Shaw	—	W. W. Shaw Corp.	Chicago, Ill.	Walden W. Shaw Co.	Chicago
37. Signal	3	Signal Motor Truck Co.	Detroit, Mich.	R. E. Taylor Corp.	New York City
38. Sterling	5	Sterling Motor Truck Co.	Milwaukee, Wis.	Sterling Motor Truck Co.	New York City
39. Stewart	5	Stewart Motor Corp.	Buffalo, N. Y.	Hermann Motor Truck Co., Inc.	New York City
40. Sullivan	2	Sullivan Motor Car Co.	Rochester, N. Y.	Sullivan Motor Car Co.	Rochester, N. Y.
41. Titan	1	Titan Motor Truck Co.	Milwaukee, Wis.	Kaufmann-Stowers Co.	New York City
42. Traffic	3	Traffic Motor Truck Corp.	St. Louis, Mo.	Traffic Truck Sales Co.	Baltimore, Md.
43. United States	2	United States Motor Truck Co.	Cincinnati, Ohio	Poertner Motor Car Co.	New York City
44. Velie	2	Velie Motors Corp.	Moline, Ill.	Garland Auto Co.	New York City
45. West*	1	West Motor Truck Co.	New York City	West Motor Truck Co.	New York City
46. Wilcox	4	H. E. Wilcox Motor Co.	Minneapolis, Minn.	Taylor Motors Corp.	New York City
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*Indicates electric truck.

FORD ADAPTERS

Truck	No. to be Shown	Maker	Maker's Address	Exhibitor	Exhibitor's Address
1. Graham	3	Graham Bros.	Evansville, Ind.	Graham Bros. Sales Co.	New York City
2. Truxt	1	Commercial Car Unit Co.	Philadelphia, Pa.	Hayes-Diefenderfer Co.	New York City
	4				

TRAILERS

Truck	No. to be Shown	Maker	Maker's Address	Exhibitor	Exhibitor's Address
1. Lapeer	1	Lapeer Tractor-Truck Co.	Lapeer, Mich.	Owen Magnetic M. S. Corp.	New York City
2. Troy	1	The Troy Wagon Works Co.	Troy, Ohio	Troy Trailer Sales Co.	New York City
3. Warner	4	Warner Mfg. Co.	Beloit, Wis.	Kaufmann-Stowers Co.	New York City
	6				

BODIES

Truck	No. to be Shown	Maker	Maker's Address	Exhibitor	Exhibitor's Address
1. Economy	—	Economy Mfg. Co.	Indianapolis, Ind.	Economy Sales Co.	New York City

Scene in the basement of Mechanics Building during the combined passenger car and motor truck show of March 2 to 9, 1918. The basement space is now occupied by privately owned goods which the Boston truck dealers are trying to have removed so that the 1919 truck show may be staged in March as usual

Boston Should Have Motor Truck Show

Basement of Mechanics Building Stored with Private Goods

AT this writing, Jan. 30, Boston's motor truck show is still undecided. Boston's commercial vehicle exhibition, held as an exclusive truck show in 1914, and as a part of the passenger car show from 1915 to 1918 inclusive, has been the only truck show of anywhere near national importance held since the discontinuance of the two exclusive truck shows in New York and Chicago after the exhibition of 1913 in those two cities.

The Boston commercial vehicle show has always served as the big motor truck attraction of the year for all New England. That there is a need for the show this year is indicated by the great interest in motor trucks as determined by their increased use in the New England States. The registration compilations shown in the table given below indicate that the average gain in the increased use of trucks during 1918 was 32 per cent for all of New England, with individual gains of 55 per cent for Connecticut and 48 per cent for Vermont.

Everyone Wants to See Trucks

The difficulties now standing in the way of holding the motor truck show in the basement of the Mechanics Building during the week of the passenger car show are that the basement is now filled with goods owned by the Quincy Market Cold Storage Co. At first it was said that the goods stored in the basement were owned by the Government and could not be removed.

The truck dealers' organization, which is anxious to hold the show, took up the matter of removing the goods with the Washington authorities, when it was found that the goods were privately owned. Some of the dealers have pointed out that a big storage warehouse has just been completed in South Boston and that the goods should be moved there. These same dealers intend to make a last appeal to the Boston Chamber of Commerce to try to induce the owners of the goods to remove them so that the annual truck show can be staged by Manager Chester I. Campbell as usual.

Increase in Motor Truck Registration in New England, 1918

	Number of Trucks				Increase, 1917-1918**	
State	1915	1916	1917	1918**	Number	Per Cent
Massachusetts	11,960	18,194	26,964	33,011	6,047	22.0
Connecticut	4,847	7,759	9,702	15,051	5,349	55.0
Rhode Island	1,620	2,855	4,065	5,626	1,561	38.0
Maine	1,000	1,991	3,382	4,200	818	24.0
New Hampshire	550	*	*	*	*	*
Vermont	358	728	1,262	1,870	608	48.0
Total	20,335	31,527	45,375	59,758	14,383†	32.0†

*Truck and passenger car registrations not separated. †For five states only. **1918 registration to Dec. 1, 1918, all others to Jan. 1 of each year.

MASSACHUSETTS REGISTRATION FOR 7 YEARS

								Total Increase	
Year	1912	1913	1914	1915	1916	1917	1918	Number	Per Cent
Motor trucks	4,087	5,948	8,236	11,960	18,194	26,964	33,011	22,877	559
								Average Increase	
Increase, number	....	1,861	2,288	3,724	6,234	8,770	6,047		
Increase, per cent	....	45	38	45	52	48	22	4,575	45

The Editor's Viewpoint

The 3 Per Cent Tax on Trucks

THE 3 per cent tax on motor trucks, parts and trailers has been put back in the revenue bill which is now before Congress. Of course this is preferable to the 5 per cent tax first proposed, then taken out of the bill and now put back again on the grounds that motor truck makers made money during the war because truck production was not curtailed as compared with 1917 and because the trucks in use were responsible for damage to the roads.

The tax is unjustifiable on these grounds because the tax will, of course, have to be borne ultimately by the truck user and not the manufacturer, not that we advocate placing a tax on the truck maker for supplying a means of transportation essential to the winning of the war.

Every individual in these United States must expect to pay his or her share of the cost of the war and our Congress has a tremendous task in fairly raising the stupendous sums that have been spent and will be expended before our war debt is wiped out. The main question about the 3 per cent tax on trucks is whether or not other forms of transportation have also been taxed in an equitable manner. Are there to be taxes on horse wagons, railway locomotives and freight cars and on work boats?

If these other means are not taxed in their due proportion the tax on trucks is decidedly unfair from any angle, for the truck owner is already paying a tax on income, excess profits, the high cost of living and what not.

Auctioning Off Army Trucks

TO offset wild rumors that surplus military motor trucks are being sold by the War Department, the Motor Transport Corps has stated that with the possible exception of one make, no motor trucks have been or will be sold at auction, with the further exception that some vehicles entirely unfit for use may be sold for junk or salvage.

Perhaps the 226 motor trucks owned by the United States Spruce Corp., and offered for sale under sealed bids at Portland, Ore., as we go to press, will come under the heading of "trucks entirely unfit for use." The trucks in point were employed to get the airplane spruce out of the Washington and Oregon forests and are known to have seen much hard service, including overloading and operation over some of the worst possible kinds of roads.

It is not likely that any of our war trucks abroad will be brought back to this country and sold, according to a letter from C. C. Hanch, Chief of the Automotive Section of the War Industries Board, under date of January 27, 1919, to the motor truck makers, in which he says: "From the best information available, it is the opinion of this Section that none of the motor vehicles now overseas will be returned to this country."

In any event, the time is propitious for a note of warning to truck owners who may have an opportunity of bidding on other trucks which have seen military service and have served their usefulness in that work. If the trucks are sold "as is," the inexperienced or new motor truck owner who bids on them with the idea that he will get more than his money's worth is very likely to be sadly disillusioned. It must be remembered that most of the army trucks were operated by several sets of drivers, some more experienced than others, and that they were not run with the idea of making them last as long as possible, but rather to get the work done in the quickest possible manner.

Unless he has the trucks thoroughly examined by experts the new truck owner will undoubtedly get greater satisfaction from a brand new truck than he will from a second-hand army vehicle. Even if they are gone over by experts and pronounced a good second-hand buy, many defects not discernible on the surface or by a cursory examination may develop as soon as they are put into active use again. If the trucks are sold for junk or salvage that, of course, is another matter, in which the judgment of the bidders is determined by the materials in the vehicles and the ability of each to dispose of it in a rising market. If the trucks are to be put into service hauling goods, even the experienced truck owner should go slow and the new owner, double slow.

A. E. F. Had Only Half Enough U. S. Trucks

Official Figures Vary, But All Agree on Serious Shortage

WASHINGTON, D. C., Jan. 25—Shortage of motor trucks in the American Expeditionary Forces last May was 50 per cent of the required needs, according to a statement in the *Washington Post* to-day. Criticism of the Liberty truck program is included, and it is said that the program was regarded as a failure. Twenty-eight different kinds of trucks were in use in the A. E. F., it is said, and added to the troubles there was a great scarcity of spare parts. When the armistice was signed there were 6177 trucks under 1½ tons in France with the A. E. F., according to the *Post* statement; 5475 ambulances, or 51 per cent; 12,781 3- to 5-ton trucks, or 45 per cent; 3626 1½- or 2-ton trucks, or 43 per cent; 68 truck equipment outfits, or 31 per cent; 108 machine shop trucks, or 22 per cent; 420 machine gun trucks, or 19 per cent; 274 gas tank trucks, or 19 per cent; 448 artillery supply trucks, or 18 per cent; and 3710 munition trucks, or 15 per cent. These figures, as stated in the *Post*, are reported to have been secured in France.

It is also said that when the first American division of 27,000 men landed in France they found themselves with only "two or three trucks" as their sole transportation.

This statement of figures contrasted with the official report of the Motor Transport Corps equipment floated to the A. E. F. up to and including Dec. 1, 1918, as given in THE COMMERCIAL VEHICLE of Jan. 1, 1919, as follows:

	Reported in France	Official Report of Quantity Floated
Ambulances..........	15,475	7,603
Under 1½ tons........	6,177	11,134
1½ to 2-ton trucks ..	3,626	5,204
3 to 5-ton trucks......	12,781	18,826

It should be considered, in contrasting these figures, that those reported from France were up to Nov. 11, while the official report is to Dec. 1. It appears, by making comparisons, that the report from France is approximately correct in so far as the number of vehicles reported from there is concerned.

It is anticipated here that any investigation as to the cause of the shortage of motor vehicles in France will reveal delay caused more by internal difficulties and disturbances in the Army organization at home rather than by the Liberty truck program.

Direct information obtained by THE COMMERCIAL VEHICLE from the Director of Motor Transport Corps, Overseas Division, through our correspondent on the ground, W. F. Bradley, is to the effect that on Dec. 15, 1918, the A. E. F. had 32,500 motor trucks made up of forty-nine different makes, twenty-three of the 1½-ton size, twenty-one of the 3-ton size, and five of 5-ton size. In addition, there were 4300 trailers, made up of thirty-four foreign makes and twenty American makes, or fifty-four makes in all. At one time, shortly after we entered the war, the A. E. F. had 214 makes of trucks, embodying 600 types, according to A. A. Gloetzner, Chief Engineer of the Covert Gear Co., who was sent abroad by Gen. Chauncey B. Baker to study truck conditions. Mr. Gloetzner also is authority for the statement that more than 4,000,000 parts were included in the American Army Vehicle equipment. It was thus almost impossible to supply good repair service. Trucks in great numbers were always laid up waiting for bolts, springs and other parts. Thousands of trucks that were shipped over on boat decks broke loose, smashed and were landed badly damaged. Others were ruined by ignorant drivers placed on them after one pantomime lesson.

The need at one time for parts was so great that 250 Fords and many Packards and Pierce-Arrow trucks were disassembled for the parts. Our special trucks, such as ammunition trucks, were used as straight cargo carriers and troop trucks. Because of the great truck scarcity, England, France and Spain were scoured for trucks, many of which had to be overhauled before they could be used. For some time it was impossible to get parts, and these were made from salvage. The motor truck, said Gloetzner, played a very important and vital part in winning the war, particularly at Chateau-Thierry, where 81,000 men were hauled 175 miles by motor trucks in 32 hours and in convoys of as many as 500 trucks each.

NO ARMY CARS OR TRUCKS SOLD

WASHINGTON, Jan. 28—No passenger cars or motor trucks have been or are being sold by the Army despite all rumors and reports to the contrary. THE COMMERCIAL VEHICLE makes this statement authoritatively, based upon information secured directly from the Motor Transport Corps. Various reports have been current throughout the East to the effect that passenger cars are being offered to the public by the Army in lots varying from twelve to 100 at ridiculous prices, ranging from $300 to $700. Many of the reports even include the name of an imaginary army officer who is credited with offering the vehicles for sale. Army officials here have thoroughly investigated the rumors, probing deeply into the matter, but have been unable to determine their origin.

BOSCH AMERICANIZED

NEW YORK CITY, Jan. 23—American Bosch Magneto Corp. is the new name of the entirely reorganized Bosch Magneto Co., which on Dec. 7 was sold by Alien Property Custodian A. Mitchell Palmer. Under the new regime the Bosch company is 100 per cent American. The new company has taken over the entire holdings and property of the old, including the Springfield plant and all American and foreign patents and trade-marks under which the old company operated.

3% Tax Is Put Back on Trucks and Parts

Trailers Included—Road Wear and Profits Reasons Given

WASHINGTON, D. C., Jan. 20—The Conference Committee of the Senate and House of Representatives has put back in the new War Revenue Bill a tax of 3 per cent on motor trucks, trailers and parts. The action of the committee was altogether unexpected, for the vote of the Senate in eliminating the 5 per cent tax from the original bill was very close. Thirty-three voted for its elimination as against twenty-eight for its retention in the measure.

In deciding definitely the tax for the motor trucks, the Conference Committee appears to have been guided by three principal ideas. These are:

1—That motor truck manufacturers were not really limited in their production prior to the signing of the armistice but instead were permitted to expand considerably.

2—That during this period of only slightly restricted production and expansion manufacturers made considerable money; and

3—That commercial motor trucks have done considerable damage to the public highways and are continuing to do damage to them.

TRUCKS AT GRAND RAPIDS SHOW

GRAND RAPIDS, MICH., Jan. 20—Local truck, accessory and motorcycle men have been assigned their spaces at the annual automobile show to be held in the Klingman Building, Feb. 17-22.

ANOTHER PACKARD CONTEST

DETROIT, MICH., Jan. 17—The Packard Motor Car Co. has started another efficiency test for Packard trucks to begin Feb. 1, for which prize money aggregating $17,600 has been set aside.

WILCOX BACK WITH COMMERCE

DETROIT, Jan. 29—George D. Wilcox has returned from government service to his former position of Director of Sales and Advertising for the Commerce Motor Car Co., Detroit. He has appointed the following district sales managers for the Commerce company, and each man has left Detroit for his respective territory: W. H. Brinkerhoff, W. B. Wood, William J. Ward, N. R. Horner, S. Wier and L. J. Stevenson.

226 SPRUCE TRUCKS TO BE SOLD

PORTLAND, ORE., Jan. 22—The United States Spruce Corp. is asking sealed bids for the sale of 226 motor trucks which have served their usefulness in getting airplane spruce out of the Washington and Oregon forests. It is said that the trucks to be sold include twenty-three Packards and some Denbys, Standard of Detroits and other makes.

How France Will Sell Its War Trucks

Total Number on Hand, 54,774—Makers May Repair Them

PARIS, Dec. 23, 1918—A definite policy has been taken by the French Government on the method of handling the trucks it has in its possession, and which will no longer be required when the armies are disbanded. The total number of trucks is 54,774, composed as follows:

French-built trucks:	
Trucks	34,385
Tractors	4,812
	39,197
Foreign-built trucks:	
Trucks	13,360
Tractors	2,217
	15,577

All the French-built trucks will be returned to their respective manufacturers in order to be repaired at government expense, and then to be sold through the usual dealers. If the manufacturer refuses to take back his trucks for this repair work, they will be turned into the army repair shops for the necessary work. When the vehicles are returned to the manufacturer for repair and sale it is understood that a price will be fixed by mutual agreement, and also the commission which the manufacturer and the dealer will be allowed for their part in the transaction.

Foreign-built trucks will all be repaired in the army shops. It is intended to form a company in which all the big transportation organizations will have a part, which will take over all foreign-built trucks now in the French Army and such French vehicles as the manufacturers refuse to handle. That company will thus have to receive a minimum of 20,000 vehicles, but in case the manufacturers do not care to handle their own makes, it may have to receive more than 50,000. The company will rent the vehicles placed in its possession to whatever organizations are in need of transportation. These will include many of the local railroad companies, the various municipalities in the devastated and other regions, builders undertaking reconstruction work, etc. The holding company will be responsible for the maintenance of these trucks so long as it is possible to keep them in service. As the vehicles wear out they will be scrapped, and the importance of the holding company will gradually decrease.

Although not forming a part of the Government scheme, it is known that many American manufacturers having trucks now in the service of the French Army will establish supply depots in order to help keep these trucks in service. Without such depots it is obvious that the cost of maintenance will soon run so high that the trucks will have to be abandoned at an early date.

An impression has got abroad in France that the vehicles owned by the British and American armies would be left behind, and would have to be absorbed by the French nation. This is quite incorrect. The British authorities have arranged for all English Army trucks to return to England, and it is said on good authority here that the American Army will send across the Atlantic the 81,000 motor vehicles it now possesses in France—or at any rate as many of them as are worth shipping home.

OHIO SUGGESTS USE OF WAR TRUCKS FOR ROAD WORK

COLUMBUS, OHIO, Jan. 25—The Ohio Assn. of County Commissioners, in session in Columbus last week, asked that the War Department donate one or more army motor trucks to each of the counties in the country to carry on the work of road improvement and for general utility purposes. The resolution pointed out that the trucks were no longer needed by the War Department and could be put to excellent use by the various counties.

Coming Events

Jan. 27-Feb. 1	Toledo, Ohio, Toledo Motor Truck Show, Terminal Auditorium.
Feb. 3-6	Chicago, Ill., Motor Truck Show, Coliseum.
Feb. 4-6	New York City, Meeting of S. A. E., Engineering Societies Bldg., 29 W. 39th St.
Feb. 10-15	New York City, Motor Truck Show, Madison Square Garden.
Feb. 11	New York City, Motor Truck Convention, National Automobile Chamber of Commerce.
Feb. 15-22	Newark, N. J., Motor Truck Show, First Regiment Armory.
Feb. 15-22	Albany, N. Y., Albany Motor Truck Show, State Armory.
Feb. 17-20	Chicago, Delivery Conference.
Feb 17-20	Philadelphia, Pa., Motor Truck Show, Auspices of Motor Truck Assn., Commercial Museum.
Feb. 17-22	Grand Rapids, Mich., Motor Truck Show, Klingman Bldg.
Feb. 18-22	Oklahoma City, Okla., Motor Truck Show.
Feb. 19	New York City, Monthly Meeting Motor Truck Assn. of America, Automobile Club of America, 247 West 54th St., at 8 p. m.
Feb. 20	Cleveland, Ohio, Meeting Automotive Metal Wheel Assn., Hotel Statler.
Feb 24	Springfield, Mass., Motor Truck Show, Municipal Auditorium.
Feb 24-27	South Bethlehem, Pa., Motor Truck Show.
Feb. 25-28	New York City, Sixteenth Annual Convention American Road Builders' Assn., Hotel McAlpin.
March 1-8	Detroit, Motor Truck Show, Crosstown Garage.
March 12-15	St. Joseph, Mo., Motor Truck Show, Auditorium.
March 15-22	Harrisburg, Pa., Motor Truck Show, Overland Bldg.
April 1-5	Brooklyn, N. Y., Motor Truck Show, Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory.
April 5-12	Montreal, Can., Motor Truck Show, Victoria Rink.
	Wilmington, Del., Motor Truck Show, Hotel du Pont.
April 24-26	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.

British Import Embargo Not Yet Lifted

Export of Trucks to Italy and France Still Restricted

WASHINGTON, D. C., Jan. 22—On Dec. 19 the Government restrictions on the importation of motor trucks were removed.

Many export limitations have also been lifted. It is understood that motor car, truck and accessory exporters have no difficulty in shipping to South America or to Spain. Permits from the Danish Government must still be obtained when making shipment to Denmark.

The embargo prohibiting the importation of motor vehicles into England, France and Italy has not yet been lifted, so that no space is obtainable for such vehicles on outgoing steamers to those ports, although some accessories are being shipped. The necessity of procuring export licenses from the Shipping Board is still in effect.

WANTS TO RAISE PENNSYLVANIA TRUCK FEES

PHILADELPHIA, PA., Jan. 21—Owners of motor trucks and passenger cars are to bear the burden of the interest and sinking fund charges on the recently authorized bond issue of $50,000,000 for the improvement of state highways, if the new legislature can bring it about. E. J. Berlet, president of the Stability Motors Co.; Harold S. Shertz, executive secretary of the association, and others told of the impending plan to add to the motor truck men's difficulties. Confirmation now appears in a bill which Senator Clarence J. Buckman of Bucks County asserts he will introduce in the State Senate within a few days.

The proposed Buckman measure increases the license cost for operating motor trucks and passenger cars, with the idea that the state may derive $8,000,000 from motor licenses, instead of approximately $4,000,000, which comes into the State Treasury under the present license rates. The bill, Buckman says, is not the measure proposed by the Pennsylvania Motor Federation, which would increase the license fees only on motor trucks.

Under the Buckman bill the license fees for motor trucks are to be raised from 50 to 100 per cent.

LAST OF PENNSYLVANIA TOLL ROADS MADE FREE

LEWISTOWN, PA., Jan. 16—When Deputy State Highway Commissioner Hunter of Harrisburg to-day delivered the deeds for the Lewistown & Reedsville Turnpike Co. to the registrar for record that section of toll road that has been under litigation for 2 years was made free. The state immediately will put it in repair at a cost of $10,000 per mile. The road is the last of the toll roads in this section of the state. It makes the Big Valley route across the state all free road.

May Spend 300 Million on Roads in 1919

One Bill to Spend 600 Million in 5 Years Before Congress

WASHINGTON, D. C., Jan. 20—About $300,000,000 will be put into road building this year, according to estimates by experts of the Department of Agriculture, submitted to the Division of Public Works and Construction Development of the Department of Labor. It is estimated that about half this amount will go to labor.

The $300,000,000 of construction estimated will not be sufficient to make up deferred war construction, it is believed, for normally the amount spent on roads in the United States is not far below $300,000,000, and during war times road building came almost to a stop in many localities.

Estimates prepared for the following States are considered accurate within 1 or 2 per cent, according to officials of the Department of Agriculture: Maine, $1,500,000; Rhode Island, $90,000; Connecticut, $4,000,000; New York, $12,000,000; New Hampshire, $175,000; Kentucky, $1,500,000; Alabama, $1,000,000; West Virginia, $16,000,000; Illinois, $9,000,000; Iowa, $15,574,000; Louisiana, $4,674,000; Texas, $20,000,000; Nebraska, $1,657,089.07; North Dakota, $3,000,000; Wyoming, $653,000; Colorado, $3,900,000; California, $20,000,000; Arizona, $900,000; Nevada, $1,148,849.80; Idaho, $1,000,000. New Jersey, Maryland and Montana are also expected to make considerable expenditures on roads this year. The Senate Committee on Post Offices and Post Roads is considering an amendment to the rural post roads bill of 1916, which will appropriate $600,000,000 between 1919 and 1924 for development of the rural post roads. The amendment was offered by Senator Bankhead, and calls for appropriations of $50,000,000 immediately; $75,000,000 July 1, 1919; $75,000,000 July 1, 1920; $100,000,000 July 1, 1921; $100,000,000 July 1, 1922; $100,000,000 July 1, 1923, and $100,000,000 July 1, 1924, to be used in the construction of highways under House bill 7617, which was passed in July, 1916.

The bill authorizes the Secretary of Agriculture to co-operate with the variour State highway departments in the construction of rural post roads. The bill allows the Secretary of the Department of Agriculture to apportion funds to each State. The original bill appropriated $75,000,000 between 1917 and 1921 for this purpose. A large part of this sum—more than $60,000,000—is still available under the original act due to the delay in highway construction caused by the war.

Three measures are pending before Congress on highway matters which are designed to increase the national highways mileage and to improve those roads now in existence, as follows:

"A joint resolution, 200, authorizing the transfer from the War Department to the Department of Agriculture of all available dispensable and suitable war material for distribution to the highway departments of the several States for use on the highways.

"Senate bill 5088, increasing the present unexpended appropriation of about $60,000,000 for road purposes by the addition of $125,000,000 for expenditures to June, 1920, and $100,000,000 a year thereafter for four years. It also is proposed to increase the appropriation for national-forest roads of $1,000,000 a year on the present 10-year road building program by a sum sufficient to construct 17,000 miles of forest roads which the Government has already planned and which are necessary in order to utilize the vast resources of the national forests. The estimated cost of these roads is $50,000,000. Senate bill 5088 has the approval of President Wilson and Secretaries Houston and Baker.

"House bill 13,308 carries an appropriation of $1,000,000 for an extension of motor truck parcels post service. This is an increase from the $300,000 provided in the last post office appropriation bill, which also authorized the War Department to transfer to the Post Office Department motor trucks for which it had no further use. Under last year's appropriation 27 motor truck routes were established, all but one of which were operated east of the Mississippi River. The results, even in the initial stage, are such as to warrant an increase in the number of routes and their extension to the trans-Mississippi region, where rail and water facilities of transportation are altogether inadequate.

BLAKSLEE WANTS $8.975.000

WASHINGTON, D. C., Jan. 16—Establishment of motor truck routes as a means of reducing the cost of living by transporting farm produce to the cities was advocated yesterday by Fourth Assistant Postmaster General Blakslee, in asking the Senate Post Office Committee to appropriate $8,975,000 in the post office bill for that purpose. Under the House bill $1,000,000 is provided to be used in extending the plan.

WANT MAIL TRUCKS IN MISSOURI

FULTON, MO., Jan. 21—Negotiations are under way between the Postmaster General's office and the Fulton Commercial Club for the establishment of motor truck mail service in Calloway County, Mo. Fred D. Williams, president of the club, has been asked for detailed information regarding the need for such service in that part of the state.

RURAL EXPRESS ROUTES FOR MICHIGAN

LANSING, MICH., Jan. 24—The executive committee appointed by Governor Sleeper to arrange for establishing rural motor truck routes in every county in the state met Wednesday, Jan. 22, and adopted a resolution favoring the Senate bill for amending the state constitution to allow state appropriations for good roads and appointed chairmen of the counties.

Liberty Fuel Is Benzol and Kerosene

Tests Show Gumming—Used in Milwaukee Trucks

WASHINGTON, D. C., Jan. 15—Liberty Fuel, which was first announced in these columns and which the inventor, Captain E. C. Weisgerber, claimed to be a substitute for gasoline, has been tested by the United States Fuel Administration. According to the Administration, the fuel is 65 per cent benzol, 25 per cent kerosene and the remainder a small percentage of amyl acetate and naphthalene and alcohol, together with some quantities of dissolved solids.

On this analysis, it was pointed out, the available supply of the fuel must depend on the available supply of benzol, its chief constituent. Investigation in this direction showed that if the total production of benzol (3500 bbl. a day) were so used, the total production of Liberty Fuel would be about 2 per cent of the present output of gasoline, which is approximately 90,000,000 bbl. a year. Benzol, however, has other uses, notably in grease extraction, and is employed as a solvent for rubber.

A gumming and corrosion test, also conducted in the aeronautic laboratories of the Army, showed no perceptible corrosion, but "a tremendous amount of gumming, i.e. 0.4 per cent, accompanied by extensive fuming and penetrating odor." The tendency of the gummy residue in the fuel would be to plug up carbureters, Fuel Administration experts said.

In the same army laboratory test, crystallization was found to set in at 18 deg. (Fahr.) and to be "practically complete" at 15 deg. (Fahr.). Boiling started at 175 deg. (Fahr.) as against an initial boiling point of not more than 140 deg. for motor gasoline, thus indicating better starting qualities for motor gasoline.

Notwithstanding the adverse reports mentioned above, Liberty fuel has been used in Milwaukee for months with success, declared A. R. Ross, of Solvay Coke Co. That company's trucks have been operated with a mixture of benzol and gasoline, which Mr. Ross asserts is more powerful than gasoline. Mr. Ross says:

"We have been using benzol and gasoline in our trucks for some time, and in addition to furnishing more power it is clean, forming hardly any carbon. Any one acquainted with the engine of his truck could easily make adjustments to use the composition. The price of benzol probably would be as low if not lower than gasoline. At present it has a disadvantage of freezing at about 38 degrees. This is because war demands have extracted another ingredient known as toluol, which is the basis of T N T. Toluol sold for $3.50 a gallon. If the ending of the war leaves toluol in benzol then the latter will not freeze. Even gasoline does not prevent the distilled benzol from freezing."

Expect Big Drop Soon in Gasoline Price

Mexican Supply Made Available by Return of 145 Tankers

WASHINGTON, D. C., Jan. 22—A considerable decrease in the price of gasoline may be expected in the near future as a result of the United States Shipping Board's action in turning back 145 tankers which had been commandeered for war purposes and which are now returned to their owners. The majority of these vessels will be employed soon to transport oil to this country from Mexican fields. The total dead weight tonnage of the ships returned to their owners is 1,140,000.

The oil reserve of the United States has been drained of approximately 25,000,000 bbl. by war demands. Figures published recently here show that despite popular belief that the greater part of British oil was derived from Mexico, all but 3 per cent in reality came from the United States, which was obliged to supply the British as well as the American armies with oil.

It was stated here yesterday that importations of oil from Mexico will probably exceed 80,000,000 bbl. during the next 12 months. And this, it is expected, will result in a decrease in the price of gasoline and oils in this country.

OHIO ROAD CONGRESS MEETS IN COLUMBUS

COLUMBUS, OHIO, Jan 20—Many and varied topics were discussed at the second annual Ohio Road Congress which was held in Columbus last week. The attendance, stimulated by the fact that many of the allied organizations held their annual meetings at the same time, was much larger than last year. After-the-war problems were discussed freely and many recommendations were made.

A resolution was adopted urging the state authorities, in co-operation with federal officials, to start the improvement of sixty-two gaps of roads, ranging in length from 1 to 10 miles. When these improvements are completed they will hook up a total of 2415 miles of improved roadway in the Buckeye State. It was recommended that the present law be changed in order to require the Ohio Highway Commission to consider applications for improvements and grant applications in order of their importance to the public.

It was suggested that a law be enacted taxing motor trucks on the basis of horsepower. This suggestion has been offered frequently and has always been defeated by the combined support of the motor vehicle interests. It was suggested that the license fee be 25 cents per horsepower on all motor-driven vehicles.

Fourth Assistant Postmaster General James I. Blakslee in addressing the congress said he was in favor of an expenditure of $50,000,000 for road improvement in all parts of the United States.

HORSEMEN OPPOSE CLEANING SNOW OFF ROADS

NEW YORK, Jan. 27—The New York State Association of Horsemen has issued a statement calling on all users of the horse to oppose the campaign directed to keeping the state highways open for motor truck operation through the winter. According to the horesmen the truck, if enabled to operate through the winter months, will drive the horse from the roads. The horsemen use the argument that if the roads are kept clear of winter's snow the farmers' horses will be unable to keep their footing on the slippery surface and therefore it will be impossible to use them.

At the Los Angeles, Cal., truck show, pictured above with its unusual Chinese decorations, fifty-one models of trucks of nineteen different makes were exhibited. The show was held under tents

Plans of the Highways Transport Body

Uniform Traffic Laws and Snow Removal Part of Its Work

WASHINGTON, D. C., Jan. 18—Post-war plans for highway development by the Highways Transport Committee are being completed. They include uniform State traffic laws and police traffic regulations; stimulation of food production by food distribution via motor truck; a survey of facilities available for highways transportation and city marketing; transportation facilities for soldier farms, including movements to open up large tracts of grounds for settlements; development of transportation facilities for resources other than agricultural; co-operation with railroads and waterways taking in feeder extensions; co-ordination of highways transport with rail and electric line freight or express; standardization of highway shipping methods; and the placing of returned soldiers experienced in highways transport.

Campaigns for snow removal in the various States are being undertaken through the regional and district organizations. New Jersey has initiated definite plans for handling snow, with each individual county working in its unit capacity. Other States, such as Pennsylvania, New York, Michigan and Ohio, are working in co-operation with the Highways Transport bodies through the Highway Commissioners' offices. Raymond Beck, field engineer of the committee, is compiling bulletins dealing with the causes of snowdrifts, methods of prevention and methods of fighting snow and removing it. These bulletins will be distributed to the various interested agencies.

INCREASED REGISTRATION DELAYS TAGS

HARRISBURG, PA., Jan 21—A further extension of time within which 1918 motor vehicle license plates may be used has been granted by the State Highway Commission. Police authorities throughout the state have been notified that they must recognize 1918 tags until Feb. 1.

This is due to the fact that motor vehicle registrations, as well as licensing, in Pennsylvania for the first three weeks in January have exceeded the anticipated volume so overwhelmingly that it has been a physical impossibility for the automobile division to ship all tags and cards immediately, notwithstanding the force has been increased and is working on day and night shifts.

REDUCED PRICE FOR G. M. C. ¾-TON TRUCK

PONTIAC, MICH., Jan. 16—The General Motors Truck Co. has lowered the price of its ¾-ton truck, model 16, from $1,775 to $1,495, a reduction of $280.

974 Trucks Exported in November, 1918

Increase of 237 Over October, 1918—Value $2,709,362

NEW YORK CITY, Jan. 27—In November 974 trucks, valued at $2,709,362 were exported. This shows a gain of 237 trucks in number, and $516,806 in valuation over October, 1918, during which month 737 trucks, valued at $2,193,556 were exported.

The figures for November, 1918, show a big loss over the number of trucks exported in November, 1917, at which time 1435 trucks, valued at $3,430,162, left our ports. This is a loss of 461 trucks in number and $720,800 in valuation.

SALES MANAGERS MEET AT CINCINNATI

CINCINNATI, Jan. 26—The fourth meeting of the National Assn. of Motor Truck Sales Managers was held at the Hotel Gibson on Jan. 24-25. The sales managers of nearly forty of the leading truck companies were present. The convention was held at Cincinnati at the request of W. P. Barnhart, sales manager of the U. S. Motor Truck Co., and arrangements were made by the U. D. Motor Truck Co., the Armleder Motor Truck Co. and the G. A. Schacht Motor Truck Co. to entertain the members of the association. The address of welcome was made by F. J. Alvin, general manager of the U. S. Motor Truck Co., and the response by J. E. Tracy, president of the association and sales manager of the Sterling Motor Truck Co.

A. R. Fernald, sales manager of the Willys-Overland Co., spoke on "Direct and Indirect Advertising as a Help to Dealers." L. C. Rockhill, of the Goodyear Tire & Rubber Co., talked on the subject of "Pneumatic Tires for Motor Trucks." He predicted that pneumatic tires will be used extensively on all trucks up to 3½-ton capacity, and that their use will contribute to the additional sale of motor trucks, owing to the fact that in certain sections of the country and certain periods of the year it is impossible to secure 365 days of truck operation on solid tires.

A. C. Burch, sales manager of the Clyde Cars Co., spoke on the subject of "Financing Companies as Applied to Motor Trucks," and Mr. Hall, of the Continental and Guarantee companies, on the "Principles of Time Payments."

On Friday evening a banquet was given by the three Cincinnati truck companies. J. Fred Cast, assistant manufacturer's sales manager of the Firestone Tire & Rubber Co., spoke on the subject of "Trucks and the Future"; Hon. Frank B. Willis, ex-Governor of Ohio, on "Good Roads," and C. A. Musselman on "Highway Transport."

On Saturday the subject of "Transportation" was taken up by J. D. Potter, sales manager of the American Motor Truck Co., and the members.

"Foreign Trade Mark Protection and the Future of Export Business as Applied to American Motor Trucks" was the subject of the talk given by L. W. Mida.

PHILADELPHIA TRUCKMEN MERGE

PHILADELPHIA, PA., Jan. 18—There have been several changes made in three intercity trucking companies of Philadelphia during the past few weeks. The Beam-Fletcher Corp. has sold its Reading, Pa., business to the U. S. Auto Shipping Co., with offices in Philadelphia and New York. The Beam-Fletcher will operate its other lines as usual. The directors of the Beam-Fletcher Transportation Co. have reorganized the company and elected A. T. Owen president and general manager. Mr. Owen is experienced in transportation work, being supervising agent of the Philadelphia & Reading Railway.

8-HOUR DAY IN MICHIGAN

LANSING, MICH., Jan. 18—Eight hours is made a day's work in any mill, mine or factory in Michigan under the terms of a bill introduced this week in the Michigan House of Representatives by John Holland of Gogebic County.

Big Truck Day Planned in Macon, Ga.

April 3 Is Set as Date—More Than 250 Vehicles in Line

MACON, GA., Jan. 21—Plans for a Motor Truck Demonstration Day which promises to be the greatest event of the kind the South has ever witnessed are rapidly being completed. On April 3 the Macon Chamber of Commerce will assemble in Macon 250 or more motor trucks. Following a parade through the business section of the city, they will be divided into six trains and will go out in as many directions to terminal points of about an equal distance from the city.

On the outgoing trip the trucks will be loaded with merchandise and on the return with live stock and farm products. Stops will be arranged along each route and a demonstration rally will be held at each terminal point. The personnel of each train will include specialists whose duty it will be to record every phase of the test concerning mechanical operation and cost, highway and bridge conditions, tonnage, time, etc. The most enthusiastic assurance of co-operation from motor truck dealers and manufacturers, merchants and farmers, city and county officials and others interested in the movement has been assured.

PRECAUTIONS TAKEN AGAINST TRUCK THEFTS

LANCASTER, PA., Jan. 21—Thefts of merchandise from motor trucks in certain localities have become so seriously persistent that some of the long-distance hauling companies and the private installations of the larger textile plants are operating their trucks under heavily armed guard. For instance, the motor trucks of the Derry Silk Co. and of Follmer, Clogg & Co. are running between Lancaster and New York with two men, besides the driver, armed with both rifles and revolvers. It is reported that attempts have been made to hold up some of these trucks.

Twenty-nine makes of trucks were exhibited at the Commercial Vehicle show held in the basement of the Auditorium at Milwaukee, Wis., from Jan. 24 to 30

Incompleteness of 1918 Truck Registrations Shows Necessity for Separate Count

Only 23 States Give Accurate Truck Figures—New York Leads with 92,979—Pennsylvania Makes Greatest Gain of 140 Per Cent

THE necessity for some kind of Federal law requiring the different states to register their motor trucks separately from passenger cars is strikingly shown in the truck registration figures up to Dec. 1, 1918. These indicate that there are only 322,857 commercial vehicles in use in the United States to-day, whereas THE COMMERCIAL VEHICLE estimates from reliable sources of information that the total number of motor trucks in domestic use on Jan. 1, 1919, was 480,000. The figures totaling the 322,857 are correct as far as they go, the trouble being that they give the registration for only twenty-three out of the forty-eight states.

While the total motor truck and passenger car registrations are available for each of the forty-eight states, there is no accurate manner of determining which are passenger cars and which are trucks. The great growth in the use of the motor truck in the United States now makes it imperative that the two classes of vehicles be separated in so far as registrations are concerned in order that accurate data may be had on the number of trucks actually in use.

Truck License Money Important

The difference in the license fees charged for trucks and passenger cars will undoubtedly help in segregating the registration figures, especially since the motor truck license costs a great deal more than the passenger car license in a large number of states. The motor truck industry should know the total amount of money paid into the treasuries of the various states for truck licenses so that this fact can be brought out when new license charges considered unfair are proposed. This segregation of license should also be made on account of the wholly utilitarian work of the truck as compared with the partially business work of the passenger car.

Aside from the incompleteness of the figures which are given on this page and the necessity they show for a separation of the truck and passenger car registrations, they give some very interesting sidelights on the total growth and the use of the truck during the past year and in what states the increases were greatest. As will be seen from the accompanying compilation, which also gives the registration for 1917, the number of motor trucks increased 132,395 in the twenty-three states for which figures are available. This was a growth from 190,462 in 1917 to 322,857 in 1918, an increase of 70 per cent.

	1917*	1918†	Increase Number	Increase Per Cent
Alabama		5,516		
Arizona	1,439			
California	10,765	20,141	9,376	87
Colorado		4,600		
Connecticut	9,702	15,051	5,349	55
District of Columbia		4,780		
Georgia	3,100	7,010	3,910	126
Iowa		7,500		
Louisiana	3,165			
Maine	3,382	4,200	818	24
Maryland	4,156	7,359	3,203	77
Massachusetts	26,964	33,011	6,047	22
Michigan	20,313	26,328	6,015	30
Minnesota		6,000		
Mississippi		2,000		
Nevada	225	324	99	44
New Jersey	9,622	15,601	5,979	62
New York	55,402	92,979	37,577	40
Oklahoma	3,688			
Oregon		3,200		
Pennsylvania	12,952	31,145	18,193	140
Rhode Island	4,065	5,626	1,561	38
Utah	2,500	5,069	2,569	100
Vermont	1,266	1,870	604	48
Washington	11,656	16,686	5,030	43
Wisconsin	6,000	6,861	861	14
	190,462	322,857	132,395	70

*1917 registrations as of January 1, 1918.
†1918 registrations as of December 1, 1918.

While this increase holds good for the twenty-three states for which the registrations are available, it is misleading since it is far greater than the average increase for the whole country. According to the estimate of THE COMMERCIAL VEHICLE, there were 351,000 trucks in domestic use on Jan. 1, 1918, and 480,000 on Jan. 1, 1919. This gives an increase of 129,000 for the past year, which is equivalent to a growth of 37 per cent as compared with the 70 per cent increase for the twenty-three states for which figures are shown in the accompanying tabulation.

New York Leads With 92,979

It is interesting to note the order in which the states are placed according to the number of commercial vehicles in use and that New York, which heads the list, is close to the 100,000 mark with a registration of 92,979. With no records available from Illinois, Massachusetts stands second with a registration of 33,011; Pennsylvania third with 31,145; Michigan fourth with 26,328; California fifth with 20,141, and Washington sixth with 16,686.

It is also interesting to know in what states the greatest gains for 1918 were made. An analysis of the table given herewith shows that in this respect Pennsylvania stands first with a gain of 140 per cent, representing an increase of 18,193 trucks; Georgia second with a gain of 126 per cent, representing 3910 trucks; Utah third with a gain of 100 per cent, representing 2569 trucks; California fourth with a gain of 87 per cent, representing 9376 trucks; Maryland fifth with a gain of 77 per cent, representing 3203 trucks, and New Jersey sixth with 62 per cent gain, representing 5979 trucks.

37,577 New Trucks in New York

While not among the first six states in the percentage of gain during the past year, New York leads all of the states in the number of trucks put into service during the past year. In all 37,577 new trucks were registered in the Empire State during 1918. This is a gain of only 40 per cent, since 55,402 were already in service on Jan. 1, 1918. While a large number of the motor trucks registered in New York State are listed from New York City, great numbers of new commercial vehicles went into service during the year in the large up-state industrial centers such as Rochester, Syracuse and Buffalo.

Six New England States Show Increases

Grouping the registrations of some of the states shows, for instance, that the six New England states of Massachusetts, Connecticut, Rhode Island and Vermont, with no records available from New Hampshire, showed a total increase of 14,383, equivalent to a percentage gain of 32. In this gain, Connecticut leads the way with an increase of 55 per cent, followed by Vermont with 48 per cent, Rhode Island with 38 per cent, Maine with 24 per cent and Massachusetts with 22 per cent. In point of numbers, Massachusetts stands first with a gain of 6,047, followed by Connecticut with 5,349, Rhode Island with 1,561, Maine with 818 and Vermont with 608.

Grouping the three states of New York, New Jersey and Connecticut shows that the increased number of trucks at the end of 1918 as compared with 1917 was 48,905, equivalent to a gain of 40 per cent.

In this grouping New Jersey made a gain of 62 per cent represented by 5,979 increase in number. As told above, Connecticut's gain was 55 per cent and New York's 40 per cent. With no accurate figures available from Illinois, it is impossible to show the increases in that state and the three surrounding states of Indiana, Wisconsin and Iowa, although as shown, Wisconsin, with an increase of 861 from 6,000 to 6,861, gained 14 per cent during the year.

Chicago Gains 15 Per Cent

Although figures are not available for the city of Chicago as of January 1, 1919, comparative figures as of September 30, 1917 and 1918, show that 12,797 and 14,676 trucks respectively were registered during the 2 years. This is a gain of only 1,879 in number, or approximately 15 per cent. These registrations may be further sub-divided according to whether the trucks are over or under 1-ton capacity. On September 30, 1917, there were 8,073 trucks registered under 1-ton capacity and 8,752 on the corresponding date of 1918. This is an increase of only 679, or about 8 per cent, which indicates that the number of small trucks used in the city of Chicago did not increase materially during 1918. Trucks over 1-ton capacity increased to a much greater degree, however, 4,724 being registered on September 30, 1917, and 5,924 on the corresponding date of 1918. This is an increase of 1,200 in number, equivalent to 25 per cent.

21-Year-Old Kansas Truck Owner Gets $25 a Day for a 2-Ton Truck

THERE are dozens of truck owners in Kansas who every week make trips of 25 to 50 miles—and frequently of 100 miles—with truck loads. There are hundreds of truck owners who do little except long distance business. Some of them are in direct competition with railroads; others are giving service to communities that are poorly served by railroads or have no service of that kind at all.

H. Gover, 21 years old, has been doing it for three years—his "trade territory" being in a radius of 200 miles from Ottawa, Kan. He has just finished paying for his third truck, a 2-ton Service. About once a week he makes a trip between Kansas City and Ottawa. Every day one or another of the trucks is on the country roads, except when roads are too muddy.

Mud is the bane of the Kansas truck owner. It scares off many a man who would like to establish scheduled service and get into the highway transport game. But mud hasn't seriously interfered with the prosperity of the hundreds of truck owners who do give rural highway service. Gover, for instance, has been caught in only three rains in 3 years—in each case being delayed half a day, without damage to loads. His weather eye guards against starting when a storm threatens, and he hasn't lost any business through not traveling in all kinds of weather. He has lost some time—but the truck wasn't eating its head off while he waited for skies to clear.

> What the country chiefly needs is that all possible means of transportation should be developed, its railways, its waterways, its highways and its countryside roads. — PRESIDENT WILSON, from address to Congress Dec. 2, 1918.

Gover's business illustrated well the condition in Kansas that seems to call loudly for a thorough state organization to promote return-load bureaus and highway transport. Here is a sample week out of his work this summer:

Loaded Ottawa to Topeka, 62 miles; reloaded, Topeka to Emporia, 72 miles; empty Emporia to Eureka, 56 miles, loaded Eureka to Burlington, 54 miles; empty Burlington to Iola, 68 miles; loaded Iola to Ottawa, 52 miles.

Gets $35 for 70-Mile Haul

A large proportion of Gover's business is between other towns in the territory. It is to be noted that he charges for the run from Ottawa to the town where the load is. His basic charge is 25 cents a mile for the truck's running, or 50 cents a haul. His regular rate for a load between Kansas City and Ottawa—something less than 70 miles—is $35. Here is the way the charge works out when the load does not originate or arrive in Ottawa: He received an order from a man in Burlington to take two loads to Eureka. Burlington is 60 miles from Ottawa; Eureka is 50 miles further on. Gover charges $55 for the first load from Burlington to Eureka—giving him the 25 cents a mile to Eureka and back to Ottawa. He charges $25 for the second load from Burlington to Eureka—all dirt roads.

Gover's father established a truck business, with teams, 45 years ago; and Gover specializes in household goods moving. His truck has no top; he carries tarpaulins and 500 pounds of packing material.

"My trucks are rated at $25 a day; unless they are earning $25 a day they stay at home," said Mr. Gover. The only instances in which he cuts the price are when he splits the 25 cents a mile among customers whose jobs can be arranged on a route.

Mr. Gover's decision to keep his trucks in the garage rather than let them go out to do work at cut prices has played a large part in his success. When trucks are rented out at cut rates the truck owner generally loses money and at the same time loses the confidence of his customers, who later, when business is more brisk, demand that he perform the work at the cut-rate price under the threat of giving it to some other truckman.

H. Gover, a 21-year-old truck owner of Ottawa, Kan., and his 2-ton Service truck. He carries on a haulage business within a 200-mile radius of his home city. He owns three trucks, all 2-tonners, and makes them bring him $25 a day or else they stay in his garage. This action eliminates cut-rate prices

Little Likelihood of Class B War Trucks Being Offered for Commercial Service

Only One of Seventeen Makers Who Assembled First and Second Orders Planning to Bring Out Modified Unit to Sell at $4850

THERE seems little likelihood of the Class B military truck being offered on the commercial market by any except one or two of the seventeen truck manufacturers who assembled the 18,000 trucks ordered on the first contract for 10,000, let Dec. 10, 1917, and the second order for 8000, closed May 25, 1918. Of the seventeen makers, twelve say they will not offer the truck on the commercial market under any circumstances; three are undecided, one has not been heard from, and only one, the Brockway Motor Truck Co., Cortland, N. Y., plans to market a slightly modified Class B truck to sell at $4,850.

Class B Truck Assemblers Questioned

THE COMMERCIAL VEHICLE wrote to each of the Class B war truck assemblers following the announcement made on pages 18 and 19 of its issue of Jan. 1, 1919, to the effect that the Government had given permission to the assemblers of Class B war trucks to sell those vehicles and their parts on the commercial market providing certain restrictions were adhered to. The answers of the manufacturers are summarized above.

Questions Asked Assemblers of Class B Trucks

1—Do you intend to offer the Class B truck on the commercial market?

2—Will it be a regular model of your line?

3—If you intend to market the Class B truck, what proportion of your output will be of the Class B type?

4—Will you guarantee the Class B truck, and if so, will the guarantee be the same as for the other models of your regular commercial line?

5—What capacity in tons will the Class B truck be rated?

6—At what price will you offer the Class B truck?

7—Will the Class B truck you offer be identical with that furnished to the Government? If not, in what particulars will it differ?

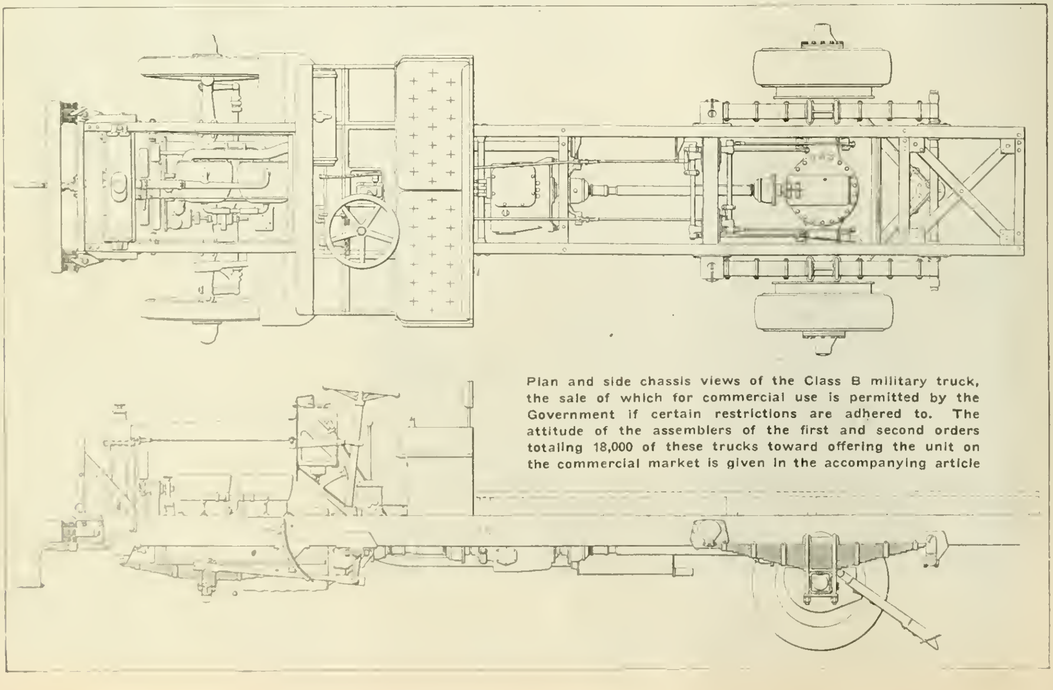
8—Will the Class B truck you offer be equipped with the same lighting and ignition systems originally furnished on such trucks delivered to the Government?

The attitude of THE COMMERCIAL VEHICLE as expressed in many previous issues has always been that the Class B war truck was a special truck designed solely for war purposes, and that it was very doubtful if it could compete with the ordinary models of the same capacity offered exclusively for service in the commercial field. This attitude has been vindicated by the replies to the questionnaire sent to each of the concerns which assembled the first two orders of the Class B trucks. The list of questions asked each manufacturer is given in the box on this page.

Summary of Answers to Questionnaire

Taken alphabetically, the answers to the questionnaire now on hand indicate that the Bethlehem Motors Corp., Allentown, Pa., has not formed any opinion as yet of the adaptability of the Class B truck for commercial purposes, and at the present time does not think it will manufacture it as a commercial product, according to its chief engineer, L. K. Gordon.

R. S. Reed, chief engineer of the Brockway Motor Truck Co., Cortland, N. Y., states that his company is now



Plan and side chassis views of the Class B military truck, the sale of which for commercial use is permitted by the Government if certain restrictions are adhered to. The attitude of the assemblers of the first and second orders totaling 18,000 of these trucks toward offering the unit on the commercial market is given in the accompanying article building an experimental 5-ton truck which follows closely the lines of the Class B vehicle. It intends to use the Cass B engine but will substitute standard Timken front and rear 5-ton axles and Brown-Lipe gearset and clutch. The engine will have magneto ignition only, and oil lights instead of those of the electric type will be furnished as standard equipment. The selling price of the truck will probably be $4,850. The average price of the 5-ton truck offered on the 1919 market is $4,647, according to the specifications published in THE COMMERCIAL VEHICLE of Nov. 1, 1918. It is thus seen that the proposed price of the modified Brockway Class B truck is approximately $200 greater than the average price of the other 5-ton truck offered on the 1919 market.

Those That Say "No"

The Diamond-T Motor Car Co., Chicago; the General Motors Truck Co., Pontiac, Mich.; the Gramm-Bernstein Motor Truck Co., Lima, Ohio; the Hurlburt Motor Truck Co., New York City; the Kelly-Springfield Motor Truck Co., Springfield, Ohio; the Packard Motor Car Co., Detroit, and the Pierce-Arrow Motor Car Co., Buffalo, N. Y., all state that they have no intentions of offering either the Class B war truck or a modified unit of it upon the commercial market.

The Republic Motor Truck Co., Alma, Mich., under the signature of E. F. Paepper, states that at the present time no decision has been made as to whether or not it will place the Class B military truck on the commercial market for the year 1919.

Selden Says Good for War

The Selden Motor Vehicle Co., Rochester, N. Y., advises under the signature of John R. Coleman, assistant general manager, that it believes the Class B military vehicle is the best truck made in this country for the purpose for which it was intended. However, the company does not believe that it is a commercial proposition and does not appear to be desirable from the standpoint of a manufacturing investment.

Charles Guernsey, chief engineer of the Service Motor Truck Co., Wabash, Ind., who was intimately associated with the engineering of the Class B truck from the time the first samples were delivered until the armistice was signed, is of the opinion that for military purposes the Class B truck is superior to any vehicle yet developed. He does not, however, consider the Class B truck as feasible for commercial work, the reasons being that the requirements of war and peace are entirely different and that the relative importance of various factors, such as the first cost, economy of operation, reliability, etc., are equally entirely different in the two cases. He does not believe that the Class B truck will be very generally adopted in the commercial field, even though offered by reputable manufacturers.

Sterling Will Not Market B Truck

Arthur C. Wollensack, chief engineer of the Sterling Motor Truck Co., Milwaukee, Wis., states that his company does not contemplate placing the Class B truck on the commercial market at this time. The Velie Motors Corp., Moline, Ill., has not decided as to whether or not it will offer the Class B truck on the commercial market.

The Garford Motor Truck Co., Lima, Ohio, and the Indiana Truck Co., Marion, Ind., have also stated that they do not contemplate offering either the Class B truck or a modification of it upon the commercial market. The only one of the seventeen assemblers who had the first two orders for these vehicles who has not been heard from as we go to press is the United States Motor Truck Co., Cincinnati, Ohio.

Southern Negro Cotton Growers Buying Light Trucks

WITH 35-cent cotton as the stimulant, the small farmers of Georgia have suddenly found themselves with more money than ever before. This condition, together with the shortage of cotton pickers and farm labor generally, due to the war drafts, has caused them to purchase motor equipment for the haulage of their goods into the nearby market centers.

S. G. and C. S. Zipperer, who own the Ford truck shown in the accompanying illustration, operate a farm at Marlow, Ga., on the share-and-share plan, with the middle-aged darky shown driving the truck.

Marlow is about 15 miles from Savannah, and before the truck was purchased it used to take almost a full day for a team of mules to make the trip into Savannah and back to the farm.

Ford Increases Transportation Work

With the Ford three and even four trips have been made in the same time. All sorts of green goods, potatoes, corn and even occasionally cattle and livestock are hauled in addition to cotton during the picking season of that crop.

In the accompanying illustration, the Ford is shown loaded with an equivalent of two bales of seed cotton. It is pictured waiting its turn at Floyd's ginnery in Savannah. At the time this is written the truck had been waiting its turn at the gin for over 4 hours because one of the gins at the plant had broken down and thus made all the waiting vehicles shift their line to one gin in operation.

This condition of long waits at the ginneries is general in Georgia and throughout the South, and must be improved before there will be any radical increase in the number of motor trucks handling seed cotton. When a truck has to wait in line 2 or 3 hours, it losses all its advantages of speed as compared with the mule. When there is plenty of hauling to be done it obviously does not pay to allow the truck to stand idle for such long periods.

The greater use of light trailers with light-weight bodies of large volumetric dimensions which can be hauled to the ginneries, placed in line and then maneuvered by hand under the pneumatic tubes which automatically suck up the cotton and deliver it to the gins, may help to solve the problem by taking the motor truck out of the waiting line and permitting it to do other hauling while the cotton on the trailer is being ginned. The truck could collect other goods to be carried on the return trip back to the farm territory during the ginning period and call for the trailer later in the day. At the present time what trucks are used in the work are mostly of 1 to 2-ton capacity. The lower priced trucks in this classification are the most popular.

Waiting behind a mule is a thankless job. Delays of trucks at the gin prevent their greater use in hauling local cotton by the Southern negro farmers

Three Small Trucks Enable Savannah Owner to Enter New Business and Increase Income

Experience of Cord Wood Dealer Indicates How Crackers, the Yankees of the South, Must Be Educated Before Buying Trucks

By Joseph Husson

THE use of three trucks has enabled B. S. Wells of Savannah, Ga., to enter a new business and increase his yearly income by from 33 to 50 per cent. He was originally engaged in selling cord wood to householders in the city of Savannah, and employed mules to haul his wood from the railroad sidings to his saw-mill in the city, where it was cut into commercial lengths and finally delivered to his customers on order.

As far back as July, 1917, he began to feel the pinch of the labor shortage in the South due to general war conditions but more particularly on account of the establishment of two shipyards above Savannah on the Savannah River. Niggers who in pre-war days earned $2 a day have doubled their income to $4 a day as common laborers in the shipyards. To do more work with a smaller number of men, he purchased a Ford 1-ton worm-driven truck during the latter part of 1917 and has since increased his fleet by the purchase of another Ford truck in 1918 and one 1-ton Garford truck in August, 1918.

Farm Now Profit Maker

While Mr. Wells had for several years owned a 35 acre farm at Tatesville, Ga., about 3 miles out of Savannah on the Middle Ground Road, he had never paid much attention to it as a business proposition and it served only to supply a part of his own family's needs in green goods products. With the increase of the price of cotton to 35 cents a pound, it became evident that he could make his farm a profit producer provided he had some ready means to get his products into Savannah.

Speed of Trucks Great Advantage

He accordingly planted 20 acres of cotton which has produced twenty bales during this season, or at the average of 1 bale to the acre. By the substitution of his three motor trucks for the eight head of mules previously owned, he has been able to handle all of his wood business in Savannah and besides haul all of his own cotton into town. When the trucks are not fully occupied in either of these two classes of work, they are used to haul manure on a contract basis. The trucks are used from November to April principally in wood haulage and delivery, from April to August on manure, and from August to November on cotton.

As an example of the great work ability of his trucks as compared with mules, one of his Fords recently hauled between 2800 and 3000 pounds of seed cotton from his farm to Floyd's gin and was back to his saw mill in Savannah in 2 hours. Due to the speed of his truck, this trip was made after the usual working hours, beginning at 5.30 p. m. and ending at 7.30 p. m. It would have taken one man and a pair of mules a full day to have done the same work on account of the slow pace of the mules.

The cost of doing the work by truck was only one-third as much as by mules. The cost of doing the work by mules would have amounted to about $7.06 and was only $2.47 by truck, excluding overhead charges in each case. The mule cost is made up of $2 to feed two mules a day; two men at $2.50 a day each or $5 and 6 cents for interest and depreciation on the mules at a cost of $300 for the two mules and the wagon. By truck it cost 27 cents for gasoline at 6 miles per gallon on the 6-mile trip; $1 for 2 hours' work for two men; 15 cents for oil and 5 cents for interest and $1 for depreciation on the truck, giving a total truck cost of $2.47 as compared with the $7.06 by mule power.

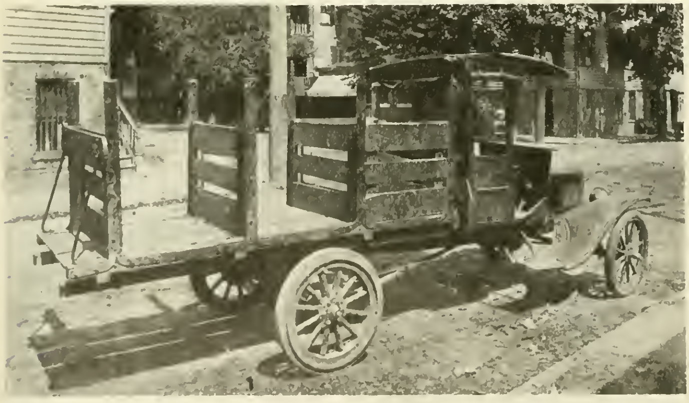
Crackers Must Be Educated

While Mr. Wells has realized the benefits of motor truck transportation for hauling seed cotton to the Savannah gins, his neighbors, commonly called "Crackers," have not. This is amusingly indicated by a recent incident where Mr. Wells offered to haul the seed cotton for one of his "Cracker" neighbors who lives 17 miles out of Savannah on the Ogeechee Road. He offered to do the work at cost merely to have return loads for his trucks, but the farmer could not be convinced, notwithstanding the fact that he agreed to deliver it to the gin within 3 hours.

Instead he hitched up one of his own mules and left his farm at midnight Friday, arrived at the gin 7 hours later; waited all day Saturday to have the cotton ginned and finally got back to his farm Sunday at 5 p. m., after having to stand the expense of hiring a room Saturday night and paying for the stabling of his team. This farmer practically took 2 full days out of his productive farm time to do a job with mules which by truck would have taken only 3 hours.

While Mr. Wells is now receiving his lumber in carload shipments from other parts of the State of Georgia, the fact that he owns his trucks will protect him in his supplies should the railroad cars generally used for the work be diverted to other essential material hauling.

Mr. Wells may eventually have to use his trucks to haul in the unsawed lumber from within a radius of 25 miles of Savannah. Already there are indications



The three compartments of this body enable three different kinds of cord wood to be carried at once without mixing. If long lengths of wood are to be handled, all three of the crosswise stake members are removed. The body was worked out by B. S. Wells of Savannah, Ga., and is mounted on a 1-ton Ford truck that the railroad service will not be as good during the winter of 1918-1919 as it was last year. Should these conditions of car shortages become serious, Mr. Wells will have gained a great advantage over his competitors who have not motorized and who had intended to utilize the railroads as heretofore for getting their wood into the city.

Special Bodies Used

Each of the trucks is equipped with a special body, which is divided into three compartments in those fitted on the two Ford trucks and divided into eight compartments on that fitted on the 1-ton Garford. Each body is made up of permanent cross members with removable stake sections which fit between the cross members and form compartments, each of which is capable of holding one-eighth of a cord of cut wood. In case 6- to 8-ft. lengths of wood are carried in place of the sawed variety, the side stakes are removed and the wood laid crosswise in the body and extending out beyond the body edges on both sides.

These bodies were designed particularly for wood delivery but serve almost as well for carrying the seed cotton hauled in from Mr. Wells' farm to the Savannah ginnery. When the cotton is carried, it is packed down compactly into each of the sections so that approximately 3000 lb. of seed cotton, which is equivalent to two bales of compressed cotton, can be handled at one time. Not as great a weight of wood can be accommodated, since each of the divisions only holds one-eighth of a cord, which weighs about 350 lb. On the Ford, with the three compartments, the weight of wood usually carried is 1400 lb., while on the Garford with its eight compartments the average wood load is 2800 lb.

Field for Trucks of Great Tractive Ability

Ordinary Trucks Work Only Seven Months a Year in Montana

FOR ordinary city conditions, the traction afforded by the two rubber-shod rear wheels of the average motor truck is sufficient. Occasionally it is necessary to resort to the use of skid chains during snowy or muddy weather, but it is seldom that the trucks are seriously impeded by climatic conditions.

New England, for example, has an enormous fleet of thousands of motor trucks that travel from city to suburb, delivering goods. Department stores deliver by motor truck within a 20-mile radius from the city of Boston. It is not generally realized by those who enjoy this service just how essential the splendid modern highways are, for they are fundamentally what make such splendid service possible.

Ordinary Trucks Fail in Montana

Boston's splendid fleet of motor trucks would be useless in the State of Montana from December to May. The winter snow from December to March, and the spring thaw, followed by rain nearly every day in June, put the roads in such shape that with the exception of the immediate city roads a motor truck is of little commercial value.

It is very improbable that Montana and other states where similar conditions exist will consent to wait until the highways are improved, similar to those of New England, before enjoying the year-round use of motor trucks. It would be much less costly to build a machine to meet the present conditions than to attempt to even partially macadamize Montana.

What then must and will be the outcome of this condition? Surely a new type of truck will be developed with superior tractive qualities.

Government Makes Tests

Already a few steps have been taken in this direction. The government has made exhaustive tests in order to determine what type of truck or tractors are most suitable for heavy artillery work. All sorts of machines were tried under variable tractive conditions. The four-wheel driven truck proved to operate very well on roads in muddy condition, still with a good, powerful motor this type, in some cases, spun its wheels until the frame rested on the ground.

Wide steel wheels were tried with chains or cleats attached. These also did well, but it was still possible to spin the wheels into the soil until the machine became mired in the soft muddy roads.

The most successful experiments during the government tests were those made with truck-laying machines. Owing to the great amount of traction area continuously applied, these machines were able to pull the big guns through bog holes that were impassable for horses.

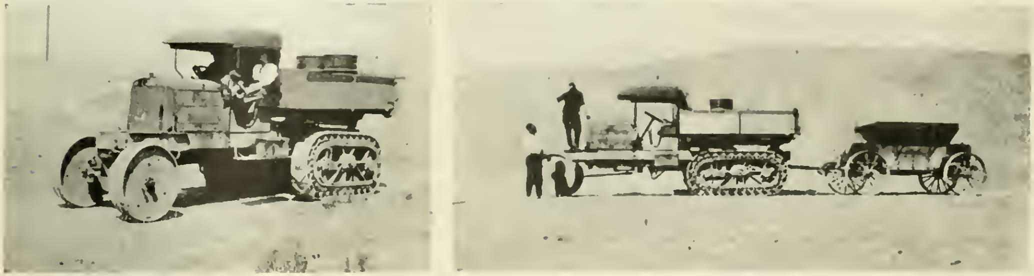
To date these machines, which are built mostly for farming purposes, seem to be the only type that have superior traction to that possessed by a horse. However, most of these machines are designed chiefly for farming purposes, and are too wide and much too slow for practical hauling.

Another type of machine recently manufactured is one that combines the track laying machine and standard truck features. This type should be very useful and should be able to operate very satisfactorily under conditions impossible for commercial use of trucks, standard equipped. Although enjoying the full benefit of the track-laying type drive, this machine is able to obtain a speed of 6 to 8 miles per hour with a 7-ton load. The price of the machine is very high owing to its being manufactured in comparatively small quantities.

Field for Future Use

Trucks of this, or some other type with superior tractive qualities, will no doubt be manufactured in large quantities and at a moderate figure in the near future.

The field for this new type of truck is almost as large as, if not larger than, that enjoyed by the high-speed city truck. Thousands of tons of road freighting and ore hauling, etc., are awaiting a truck with the necessary tractive abilities to work the year round in such states as Montana, Utah and Idaho, and many other districts.



Trucks of this type, with track-layers in place of the ordinary rear wheels, can be used all year around under all kinds of road conditions in such States as Montana, Utah and Idaho, where the mining industries offer great possibilities for further sales

Trucks Solve California Chrome Ore Problem

Fleet of Twenty-Four 2½-Ton Fageols Hauls Ore from Mines to the Nearest Railroad Siding About 65 Miles Away

One of the chrome-hauling Fageols off the runway. The old mountaineer is about to suggest his "hosses" as a means of getting it out of its difficulties, but it extricated itself

HAULING 7 tons of chrome ore at a time over a 65-mile haul from the mines to the railroad before the winter snows block the road is the tremendous task set by the government authorities for a fleet of twenty-four 2½-ton Fageol motor trucks used in upper California.

The fleet of Fageol trucks, under the direction of Contractors Benjamin H. Maddox & Co. of San Francisco and H. W. Rohl of Sacramento, has been operating on this haul from the Seiad Valley chrome mines, near the California-Oregon line in Siskiyou County, to Hornbrook on the main line of the Southern Pacific Railroad. Since about the middle of last August these trucks have performed a large part of the task set them by the government, but there still remains a tremendous amount of ore yet to haul.

Chrome Ore Big War Need.

Before the war chrome ore was imported into the United States, being shipped as ballast at a comparatively low freight rate, and reached the Eastern smelting centers at a low cost without a long rail haul. Now, because of the tremendous demands for shipping bottoms, this practice has been discontinued. Valuable supplies such as sugar and wheat are being shipped in all bottoms available beyond those used in the army transportation service, and for carrying food stuffs to our Allies and the Belgian sufferers. The result is that there has been a favorable development of our own chrome ore deposits in process.

The United States used 150,000 tons of chrome ore last year. Domestic mining operations had acquired sufficient headway to produce only 48,000 tons annually. There are, however, chrome ore deposits in the United States capable of filling the entire need of the mineral. Probably two-thirds of the chrome ore needed last year was mined in the United States.

California Supplies Need

As in so many instances, California again stepped to the fore as a leader in the solution of this problem. Three-fourths of the entire production of chrome ore needed for Government purposes came from California and southern Oregon, and of this Pacific Coast production about 90 per cent came from Siskiyou County, California, in which the Seiad Valley properties are located. All of that tremendous tonnage will be transported over a 65-mile road of the very roughest sort by the fleet of 24 Fageol 2½-tonners.

There are three important mines in the Seiad Valley district. Two of these are being operated by J. F. Reddy of Medford, Ore. These mines are generally known as the Black Beauty Mines in the Seiad Valley and the Lucky Boy Mines out of Hamburg. The other mine of important capacity in the Seiad District is operated by Samuel H. Dolbear.

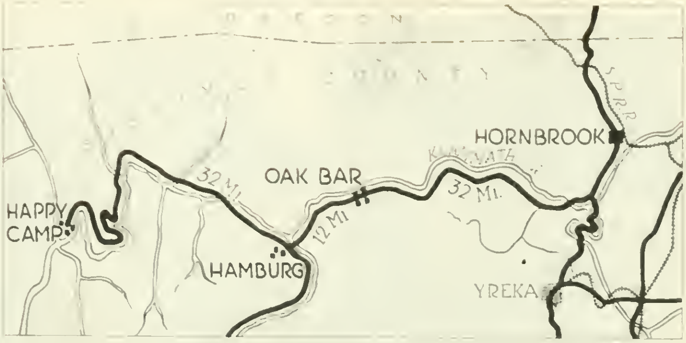
Chrome ore is ordinarily found in small pockets. A deposit that would produce more than 2,000 or 3,000 tons of high grade ore is quite unusual, although there are in this Siskiyou County mineral belt deposits that already have produced more than this amount, and are still apparently far from being exhausted.

Chrome ore deposits are invariably located high up in the mountains. The ore is mined by hand. Mining operations are comparatively simple—more in the nature of quarrying than the customary gold mining operations. The ore is piled on the dumps at the mine, and is either trammed or sledded down the steepest places to bunkers or loading platforms from which the trucks receive it. The higher the grade of ore, the greater its weight.

Transportation Vital Need

The most vital need in the production of chrome ore at present is transportation, because practically every important chrome ore deposit in the United States is far removed from the nearest railroad lines. As indicated, the mining operations are relatively simple, but the ore is of comparatively no value unless it can be transported to a railroad and shipped East to the smelters.

Several attempts have been made by other contractors operating motor trucks to solve this transportation problem. It meant hauling a minimum tonnage of ore per day at a cost that would not be prohibitive to miners, and would show fair profit to the contractors. Apparently the reason for failure on the part of other contractors has been the total absence of a business organization for handling the trucks between the mines and the railroads. Benjamin H. Maddox, who owned fifteen heavy-duty motor trucks before he took this chrome ore hauling contract, is one of the best known trucking contractors in California. His success is largely due to the carefully planned system of handling his work, and the perfect working of that system under the personal supervision of trusted truck operators, dispatchers and mechanics.



Map showing the location of the chrome ore mines in California near the Oregon line. The roads the trucks use in bringing out the ore are shown in black

The transportation of several thousand tons of chrome ore in a period of approximately 100 days over a mountain road of 65 miles means that those trucks will register 455,000 ton-miles before they will have completed their task. It means also that it will be necessary to haul 75 tons per day, in order to get the required amount out beore snows make the roads impassable.

Largest Fleet in Ore Work

So far as known there is no other trucking operation in the United States of this character or of this magnitude. It is believed that the twenty-four Fageol trucks operating on the haul comprise the largest fleet of the same make hauling ore any place in this country, which probably means in the world. Aside from the hauls conducted by the government, it is believed that it is the largest and the most comprehensive motor trucking operation ever undertaken in the United States. Both the distance traversed by the trucks, the road conditions and the value of the material to be transported make it a herculean task.

The road conditions are serious and hazardous because the road follows up the canyon of the Klamath River. It is an old post road that reached from Hornbrook to the coast and was originally an Indian trail. According to reports it is not so much more than that now. It is narrow for practically its entire distance, except the upper 8 miles leading into Hornbrook station which is a section of the Pacific Highway to Portland. As an indication of the condition of the road, it takes 5 to 7 hours for a passenger car to traverse the entire distance of 65 miles.

Road Conditions Severe

The river road had been used by wagon and passenger cars for many years, and there are well defined ruts quite close together as a result. The rear wheels of the trucks being broader than the ruts, are forced to ride on the sides of the tires. Very serious tire wear and greatly increased expenses of operations are a consequence. The ordinary solid tire makes about fifteen round trips or 1950 miles before it falls off. With trucks formerly used by other contractors on this haul, no such mileage was obtained.

Some of this additional tire mileage is attributed to the patented spring oiling system of the Fageol trucks, which feeds the lubricant automatically from the reservoir spring suspension castings by wick and capillary attraction and thus keeps the springs up to the highest degree of flexibility. This, of course, means that the load rides more easily, and the road shocks are absorbed by the springs rather than being transmitted through the wheels to the frame and motor mechanism. The trip-hammer action of the chrome ore load on stiff and unlubricated springs is more nearly eliminated and the trucks are handled more easily on the narrow roads.

Unloading the chrome ore from one of the Fageol trucks into freight cars on the Southern Pacific Railroad at Hornbrook, Cal., the location of which is shown in the map at the top of this page

The contractors get approximately $75 per round trip of 130 miles. They are operating day and night and one truck makes three round trips in 2 days. This, of course, is accomplished by the continual relay of drivers.

Contractors Operate on System

The business-like system with which Contractors Maddox and Rohl are making a success of the Hornbrook-Seiad Valley chrome haul is illustrated by the careful way in which they have planned the haul. A camp was established at Oak Bar, a little settlement about midway between the mining district and Hornbrook. Trucks are operated in trains of five to ten, and the dispatch is so timed that one section leaves Oak Bar camp for the mine as the other leaves for Hornbrook.

No truck driver is permitted to operate a truck for more than 8 hours. This is because of the extreme danger of the narrow river canyon road. Only a narrow margin exists between the almost perpendicular bank of the river and a quick drop into the water below. One instant's glance at the surrounding scenery almost invariably results in a headlong splash into the rushing waters of the Klamath River. A drowsy driver is almost certain to get a long rest or a permanent sleep by going over the bank. Consequently the business organization maintained by Maddox and Rohl centers on the control and attention that the drivers must give their driving at all times, and for the entire distance. If such attention is given there is no excuse for a truck leaving the road.

Drivers Work on Schedule

System in trucking operations is an essential part in the handling of drivers and care of the truck. Both Mr. Maddox

The first two Fageol trucks over the route from the Seiad Valley mines to the Hornbrook railroad station. Each of the trucks is of 2½-ton capacity and each carried a full load of ore

and Mr. Rohl have made careful observations in this regard. At Oak Bar Camp, there are, in addition to the fifty truck drivers employed, the camp boss, who is in charge of all mechanical work and truck inspection, and a train boss for each group of trucks on the road.

Before being permitted to leave on a trip, each truck is given a careful inspection. The drivers are allowed 1 hour a day for the purpose of keeping up the general condition of their trucks. As nearly as possible the drivers are made up in relay teams, operating one particular truck. A bonus system, in addition to their regular wage, has been arranged and it is possible for these drivers to make as much as $1 per day extra for bringing their trucks into camp on schedule and in the best mechanical condition.

When actual mechanical repairs are necessary or the tires must be replaced, etc., such work is taken care of by the mechanics who form an important part of the contractors' organization. However, each truck is inspected by the camp foreman before it leaves. If it is not in perfect condition to make the trip, it is not permitted to leave, and the driver is then required to put it in condition on his own time. Most of the drivers have attained a high degree of efficiency and take pride in maintaining their trucks in the best operating condition.

Sixteen Hours Per Trip

The round trip requires 16 hours, and it is usual practice to make three round trips in 2 days. The haul is up-grade from the Seiad Valley mines to Hornbrook and requires 8 hours from the Oak Bar Camp to the mine and return with a load, and 8 hours from the camp to Hornbrook, returning to camp empty. When it is possible the trucks are given a back haul of supplies, important mine machinery and other equipment. Drivers are glad to get such a load, as it makes the trucks ride much easier over the rough road.

The ore bodies on the trucks are 4 feet wide, 12 feet long and 14 inches deep. The full load of chrome weighs from 2½ to 4 tons, and because of the character of the road, the trucks must necessarily operate at a low rate of speed. It has been deemed advisable by Contractors Maddox and Rohl to operate their Fageol trucks on this haul with a load of more than the factory rated capacity, and they carry 3 tons of chrome ore each in addition to the weight of the body.

While none of the grades on the road are prohibitive, there are many sharp pitches for distances of 200 or 300 yards. These are stiff grades and are very rough rutted, and try the truck's power to the utmost.

Passing is extremely difficult because of the narrow road. Loaded trucks have the right of way, and frequently a truck driver must back for the distance of ½ mile or more to let a load of chrome go by.

At present the government authorities have forty men working on the road in an endeavor to make it suitable for winter hauling, and it is understood that an appropriation of $15,000,000 to improve the road has been made.

Advantages of the Motorized Mails

POSTMASTER BURLESON, in his annual report to Congress, stated clearly the many advantages of the motor truck in mail service in the following terms:

"The act making appropriation for Postal Service for the fiscal year ending June 30, 1919, having provided a specific appropriation with which to conduct experiments in the operation of motor vehicle truck routes, the expenses of operating the eight existing routes previously operated under the appropriation for the inland transportation of the mails by star routes, is now paid from the specific appropriation.

"While a portion of the revenues derived from mail matter carried on these routes, particularly transit mail, should properly be credited to other branches of the service, yet due to the fact that a quicker dispatch and more direct and expeditious delivery can be effected, patrons are expressing a preference for this service in forwarding mail matter of all classes, hence a considerable portion of the revenues should properly be credited to the motor vehicle mail service.

"Owing to the experimental nature of the motor vehicle truck service, it was deemed best to await the stabilization of the service before discontinuing other existing mail routes or mediums of applying mail, which it could supplant; hence the economies effected in this direction are not as great as they otherwise would have been.

"However, during the period Dec. 1, 1917, to June 30, 1918, an annual saving has been effected of $4,478.12 by the discontinuance of star, railway mail service, mail messenger and electric car service, which it has superseded.

"A total number of 105 trucks is required to serve the patrons of routes already established.

"A standardized truck has been adopted for use on these routes, which is also adapted for use in all mail branches of the Postal Service, and four of these trucks have been constructed and are ready for delivery.

"As provided in section 8 of the current appropriation act, the War Department has turned over to this department the chassis of two army trucks, Type

AA, and they are now in service. A further extension of this service will provide use for a large number of vehicles when no longer necessary for military purposes, and other chassis will be supplied by the War Department, no doubt, from time to time.

Supplies Patrons with Data

"An essential feature of this service is the commercial convenience of the patrons, supplying them with data and information concerning points where they can secure the best products and commodities at the least cost. Postmasters at offices on the routes are reporting to the department each week the local retail prices received by farmers and producers for their commodities. These data are compiled and disseminated through the public press weekly.

"In the light of this experience, it is proposed to establish through or trunk line routes of an approximate length of 50 miles each—to connect one with the other—extending out from the larger consuming centers, through productive territory contiguous to such centers and removed from direct established lines of transportation, and to then connect with the trunk-line routes lateral or feeder routes.

There are, approximately, 150,000 miles of improved highways now available for trunk-line routes, and several thousand localities in which lateral or feeder routes in productive territory can be operated throughout the year. It has been instrumental in creating a coalition of all of the work of the Postal Service, making a directly connected collection, distribution and transportation system which was not possible under the old contract system. The contract system in the larger cities also developed a constant friction between the contractor and the local postal officials which is now completely eliminated and which has been replaced by harmony and co-operation.

Giant Truck an Ice Saver

WASTE of some sort can be found generally in all forms of business. It is especially so in the ice trade, where the profits of many concerns are allowed to decrease considerably because of the meltage on their delivery vehicles between the loading depot and the house or place of business of the customer.

The Thomasville Ice & Mfg. Co., Thomasville, Ga., found that it was losing money due to the large volume of ice which melted on its horse delivery wagons in the hot Georgia climate. By applying ingenuity to the matter and by purchasing a 2,000-pound Giant truck, the company has reduced the value of losses of that character to an almost inappreciable amount.

Before the purchase of the motor truck it had been the practice of the company to load each of its horse wagons with its capacity load, have it deliver this on its regular route and then return to the railroad siding at which the ice was unloaded from freight cars for its next load. On the second, third or fourth trips of the day the wagon had to make a much longer run to its first delivery stop than in the first, and it was on the later trips particularly that a large portion of the ice meltage occurred.

Since the purchase of the truck none of the wagons are allowed to return to the loading platform for their second, third or fourth loads of the day, but instead the truck with a full load is sent out to meet them. Due to the greater speed of the truck as compared to the wagons, the ice meltage is not so serious and each wagon has a fresh supply whenever needed. The truck is shown receiving its load from railroad cars on a siding in the accompanying illustration.

Giant receiving its load direct from freight cars

Over 2,500 Motor Stages in California

By H. A. and H. P. Crafts

IN the short space of 3 years motor bus staging in California has developed to large proportions. To-day more than 2500 buses are employed in the business. Extensive lines of travel have been established within the boundaries of the State.

Taking the San Francisco Bay region as a central point, stage lines extend as far north as the town of Redding and south as far as San Diego, with Los Angeles as the center of the southern California traffic.

Two main parallel lines run up and down the state, one line following the coast and another through the valleys of the Sacramento and San Joaquin. Into the Sierras the stage lines penetrate as far as the Yosemite Valley.

The California motor bus had its origin in the jitney business. This latter industry rose and flourished for a time. But a determined fight was made against it by the street car interests, which brought strong pressure to bear upon the municipal authorities, and the latter, siding with the trolley lines, legislated the jitneys out of business.

The jitney owners still owned their machines, which had cost them much money, and which they did not fancy abandoning. So they sought new fields, and hit upon the stage business. They started out with a few machines to try out the experiment. They at first mapped out short runs, putting on the road a few Fords and Maxwells. The first line out of Oakland went down as far as Haywards, some fifteen miles.

Then certain railroad interests raised an opposition, and like the trolley people, endeavored to put the newly-started motor truck stage off the map. But the stage folks took their case before the State Railroad Commission, which proved to be not such a pliant tool of the corporations as had the average city council, and the stage men were given a full standing under the state laws as common carriers; but of course, were asked to conform to certain rules and regulations.

The motor stage owners thus won out over the vested interests; and what was more, they got a chance to play even with the trolley lines to a certain degree, as their lines in many cases paralleled those of the street cars. For instance, the line from Oakland to Haywards parallels for the entire distance the line of the Oakland Traction Co.

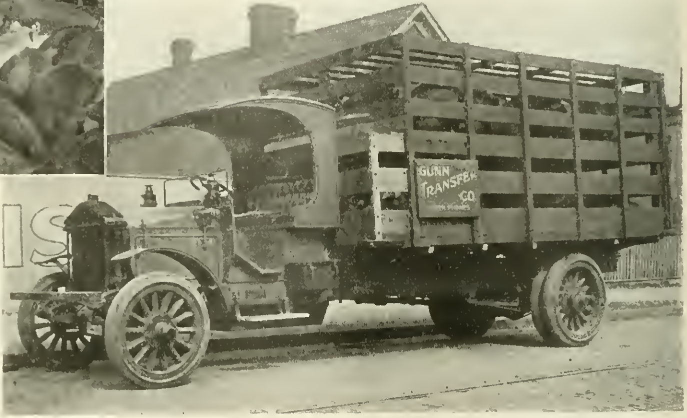
All the bus drivers are under bonds for good service and careful driving; consequently very few accidents occur. Care is taken to secure good drivers for all of the vehicles, and they are paid good wages, from $4.50 to $5 per day.

The average speed of these motor stages is about 30 miles per hour and while no attempt is made to beat railroad time, it is usually the case that the stage arrives first. The average fare is about 2½ cents per mile.

Trucks Save Money Hauling Hogs in St. Louis

Inter-City Movement of Live Porkers by Motor Quicker and Cheaper Than by Rail or Street

A few of the hogs raised in Carroll County, Miss., and formerly shipped to St. Louis by rail, but now carried by truck



One of the 5-ton Pierce-Arrows used in moving hogs in St. Louis. It has a double-decked body, with the porkers carried on two levels

ONCE upon a time little piggy went to his death on foot. He was driven through the muddy and slushy streets, in hot weather and cold, rain or shine. Not infrequently he would stampede from his brothers down some side street and had to be chased many blocks before he could be brought back, not without kicks and blows. Sometimes he could slip out of the herd unnoticed by his drivers and wander through the boulevards, streets and alleys. This, of course, meant a loss to the owner.

Other mishaps often occurred, such as taking a plunge into the Mississippi when, by accident, in crossing the bridge he would tumble in. The story is told of a North St. Louis man who, on retiring for the night, opened his front window, which was not far from the sidewalk. His home happened to be situated on a street where hogs were driven by during the night. About midnight an assignment of hogs came along. One of the animals, probably feeling gay on this last journey of his young life, strayed away from the rest, climbed over the window sill and deposited his 250 pounds on the floor of the gentleman's parlor. On awakening in the morning and perceiving the hog, Mr. St. Louisan was more pleased than surprised. As the packing house apparently did not miss the piggy, and no one claimed it, he immediately butchered it and had free pork for the next few months.

Later little piggy became more fortunate. He was sent from East St. Louis, Ill., to St. Louis, Mo., in a packed freight car. But that jolted him up so that when he was taken off the car and driven to his destination he could hardly keep up the pace that was set for him. Then, too, after he had arrived at market he had lost several pounds of his highly prized pork. He was hot and tired, and had to be kept at least a day at the expense of the packer until he was cool enough to slaughter.

Thus it was with the ancient porker, but no more. To-day little piggy rides to his death in a motor truck—a live-stock limousine as it were. He is gently loaded into a cool, comfortable double-decked motor truck at the stock yards without exertion on his part. All he has to do is to rest quietly until he is let slide down from either his upper or lower berth onto the floor of the death-chamber.

Saving 43 Cents Per Hog

But what has all this to do with the operation of a motor vehicle? Only this, that the new or motor truck method of transporting hogs saves 43 cents per hog, or a total of $13,760 a year in St. Louis alone.

The packing companies did not devise this new method of transportation for the convenience of the hog, but for important economic reasons. In the first place they had to. The necessity for a different system of delivering the hogs from the national stock yards of East St. Louis to the various packing firms in St. Louis arose when an ordinance prohibiting the driving of live-stock through the St. Louis streets was enforced.

In the second place, the enormous amount of pork saved by motor truck transportation induced the packers to make permanent what was begun more or less as an experiment.

Trailers and Double-Decked Bodies

Thirdly, the contrast between the dependability and regularity of the motor truck system and the old slip-shod method that seldom if ever delivered the goods on time showed to such an extent that there was no question in the minds of the packers as to which was the better and cheaper means of transportation.

The Packers' Transportation Co., which introduced the new method at St. Louis about 4 months ago, uses an 8-ton Fruehauf trailer, with a double-deck body 17 x 7 ft., connected by means of a Martin rocking fifth wheel to a Gary 3½-ton truck chassis. One such unit has been in operation for several months and two more are being arranged for by the Gary Motor Truck Sales Co. of St. Louis. The Packers' Transportation Co. confines its business to moving hogs. The Gunn Transfer Co. has come into the field also, with several double-decked Pierce-Arrow trucks on which are mounted crate bodies. These have been in operation for several months and have proven highly profitable successors to the rail and foot method of moving hogs.

Before this new method was introduced the hogs had either been driven over the Free Bridge and thence through the streets on foot to the slaughter houses, or were shipped by rail to the Bremen Avenue Yards in North St. Louis and then driven to the packing firms in the western or southern sections of the city. Under this system each hog lost about 2 lb. during this first and last Marathon run of his life. When the number of hogs shipped in a year and the price of pork are considered, this loss amounts to something worth thinking of. The number of hogs slaughtered in St. Louis alone amount to 32,000 a year.

43 Cents Saved by Truck

The saving on each hog that is moved by motor truck over the hog moved by the rail and foot route is exactly 43 cents. As 1000 hogs are moved across the Mississippi River each hog-slaughtering day the motor truck accomplishes a saving of $430 on each such day, or a saving of $13,760 in a year.

By the old method, the packer had to keep the hogs for a day or so at his expense because they could not be slaughtered immediately on arrival on account of the overheated condition of their bodies. This is another saving gained through use of the motor truck. The truck delivery system brings the hogs cool and in normal condition to the packing house floor.

The trucks make about 6 trips a day, and cover a little more than 12 miles each trip, making a daily average of more than 72 miles. One load consists of from 70 to 100 live hogs, or a full freight carload; a total weight of from 14,000 to 20,000 lb., or a value of from $248,500 to $355,000. The packers of St. Louis hope to see the commercial vehicle put into early use in transporting other live-stock, such as cattle, sheep, etc., which could be done at a similar saving.

These two Federals made it possible for two wagon mines in Kentucky to be operated when the car shortage was most pronounced

Kentucky Wagon Mines Saved by Trucks

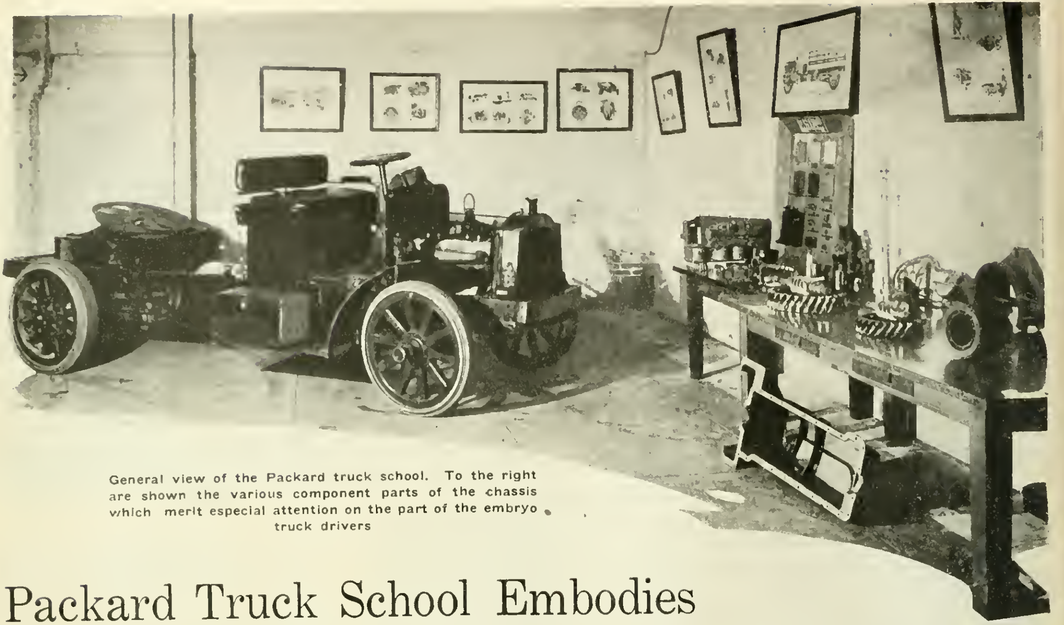
WHEN the Fuel Administration ordered the railroads to furnish no more cars to the wagon coal mines, or those that were located a distance from the railroad, necessitating a haul to the spur, the Dixie Bee Line Coal Co., Morton's Gap, Ky., would have been closed but for the purchase of a 2-ton Federal truck. The truck enables it to load a car promptly and it is getting its pro rata of cars along with the larger mines.

During the month of June, the truck loaded twenty-one cars. A 45-ton car can easily be loaded in 6 hours, hauling the coal about one mile. The record load is 60 tons loaded in 9 hours. The truck has shown a saving in actual cash over wagon loading. Teams loaded a car for 60 cents per ton or $30 per car. The truck loads for $11.43 per car, including all items. This saving of $18.57 per car amounts to $334.26 per month for eighteen cars.

O'Bryant, Browning & Medlock operate another such mine nearby, hauling to the same spur. They followed the Dixie company's lead and their 2-ton Federal is doing just as good work for them. It is shown at the spur with the Dixie Bee Line truck in the accompanying illustration. One day their truck hauled 1380 bushels, loading a car of 100,000 lb. capacity, notwithstanding they had heavy rains and had to use chains—"a thing you would hardly expect possible," adds Mr. Browning.

They Also Served Who Did Not Get Across

The army proved a great school for truck mechanics and drivers. Many such men, even though they did not get overseas, will be better citizens and will return to civil life ready to find their niche in the great development of the highway motor transportation which we are now entering. The boys seen above are being instructed at the ambulance depot in Allentown, Pa.



General view of the Packard truck school. To the right are shown the various component parts of the chassis which merit especial attention on the part of the embryo truck drivers

Packard Truck School Embodies Many Big Ideas

New York Packard Co. Is Conducting a Course of Practical Instructions of Great Value

WHEN more than a year ago T. H. Smith, manager of the Transportation Engineering Department of the Packard Motor Car Company of New York, conceived the project of a school for drivers of Packard trucks, he had a really big idea lying somewhere at the back of his brain. This idea has since taken definite shape and its practical accomplishment is embodied in the Packard Truck School.

Under normal circumstances the function of such a school is to teach men to drive, and when a man becomes a passable driver the school considers that its duty is at an end. The Packard school is something altogether different.

It is true that at the Packard truck school there are complete indoor and outdoor courses of instruction in mechanical construction and in the art of driving, but in addition to these, its possibilities as a medium for the more intensive cultivation of those things that tend to improve commercial relationships in the truck field, to make for greater efficiency not only on the part of the actual truck driver but on the part of those individuals with whom his work brings him in contact, are given full opportunity for development.

The Packard school course is primarily open to owners of Packard trucks, to Packard drivers who are sent by their owners and to mechanical superintendents having charge of Packard trucks. An exception is made in favor of drivers of concerns operating a fleet of trucks of which only a proportion are Packards. Any driver, even if he operates a truck of another make, who is sent to the school by the owner of such a fleet is perfectly welcome. There is no charge of any incurred either by the owner or the driver.

During the time the regular indoor lessons are proceeding periodical visits are paid by the principal executives of the Packard Company. These visits are in the pursuance of the policy of truck education along broad lines, and informal talks are given on such subjects as the possibilities of motor transport, the advantages to be obtained by the speeding up of road transportation, etc.

Packard Truck School High-Lights

Practical training by expert instructors free of charge to eligible men.

Periodical talks by executives on the broader matters of transportation problems and possibilities, etc.

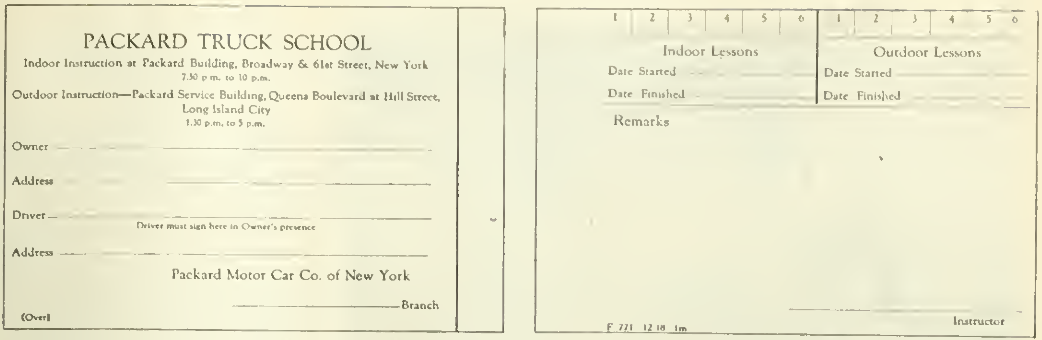
An insistence that no man shall receive the school's O.K. until he is absolutely proficient as a driver and can take intelligent care of his truck.

It is significant of the importance the truck school possesses in the eyes of the executive of the Packard company when it insisted that every one of its salesmen must attend until thoroughly proficient both from the mechanical and driving points of view.

Before a man can be accepted as a student he must have the card shown herewith properly filled in; before he can leave the school with the rank of a fully fledged and capable driver it is necessary that the obverse of the card (also illustrated) be filled in and countersigned by the instructor. When the Packard company is satisfied that a man will do credit to his teaching and therefore to his employer and his truck it obtains a license for him, but not until then.

The course is divided into two sections; an evening class consisting of five indoor sessions being followed by an outdoor class at which driving is taught. The indoor classes are designed primarily for men who can already drive, and the other class, which is optional for men who can drive to the satisfaction of their employers, is for novices.

It is noteworthy of the system that greater stress is laid on the actual maintenance and adjustment of mechanical units than on the constructional features of such parts. In other words, it is continually impressed upon the men that an absolute essential to good driving is a thorough knowledge of the whys and the wherefores of, say, carbureter operation, rather than a scientific acquaintance with the theories of vaporization of combustible mixture.



PACKARD TRUCK SCHOOL

Indoor Instruction at Packard Building, Broadway & 61st Street, New York
7.30 p.m. to 10 p.m.
Outdoor Instruction—Packard Service Building, Queens Boulevard at Hill Street, Long Island City
1.30 p.m. to 5 p.m.

Owner
Address
Driver
Driver must sign here in Owner's presence
Address

Packard Motor Car Co. of New York
Branch
(Over)

1	2	3	4	5	6	1	2	3	4	5	6

Indoor Lessons
Date Started
Date Finished

Outdoor Lessons
Date Started
Date Finished

Remarks

F 771 12 18 1m
Instructor

Before a man can gain admittance to the Packard school this card must be filled in (left). Before he can leave the school as a full-fledged and competent driver the obverse of the card (right) must bear the instructor's signature

The indoor course consists of lessons on fundamental principles, mechanical construction, periodical lubrication, carburetion, ignition, cooling system inspection, general lubrication, daily inspection, etc., and in connection with the lubrication lessons a remark of one of the Packard executives is indicative of the thorough manner in which practical knowledge is imparted. He said, referring to the truck chassis used in the school, "That chassis is more thoroughly lubricated than any other in America." The fact is that every man attending the class is given an oilcan and told to find and lubricate every part needing lubrication—moreover, he is kept at this job until he has learned the position of every oil cup, etc., so thoroughly that he simply cannot forget them.

Lessons Continued Till Mastered

Another feature of the indoor classes is that each man is expected to continue his indoor lessons until they have been thoroughly mastered, whether the feat be accomplished in five days or five weeks.

Outdoor lessons are given from the Packard service station at Long Island City. The course consists of teaching the control of levers and pedals, the control of the steering wheel, the rules of the road and driving in normal and congested traffic.

Giving a lesson on "the most thoroughly lubricated chassis in America." Charles Price is the chief instructor. On the walls are drawings and diagrams which serve to illustrate lectures on mechanical construction

During the outdoor lessons strong emphasis is placed on the necessity for not only the required skill, but the driver's confidence in his own ability to warrant the placing in his care of a valuable motor truck.

There has been a very serious shortage of skilled drivers during the war, owing to the absorption of practically all the efficient men by the army transport service. The fact that many men are now returning from overseas does not materially affect the situation for the reason that the transport service, from the nature of its duties, will undoubtedly be among the last to be demobilized. This state of affairs was undoubtedly one of the factors which prompted the Packard people to develop the school to the uttermost in order to relieve the tension by raising the driving standards of the semi-trained men who took the places of those who were called into service. Another reason undoubtedly was that of stimulating the interest and improving the records of the Packard test of transportation efficiency which commences to-day and in which $17,640 in cash prizes will be awarded to drivers, accountants and shipping clerks. Of course, the school is an established institution run in the interests of what is known among the Packard staff as "the big Packard family." It is equipped to give 400 lessons per week and its popularity keeps it busy.

There is nothing experimental in the Packard truck school; it has been in operation for over a year, and results have proved that it is established and operated along lines conducive to the full realization of its mission. A glance through the records amply proves its utility in a practical way. Less fuel used per mile, more attention to lubrication and adjustments and consequently reduced operating costs, all show that the graduates of the Packard school are individual advertisements of its efficiency.

One of the White truck units which received the Croix de Guerre

White Trucks Get Croix de Guerre from France for Great Endurance

FOR the first time in the history of warfare the transport equipment of an army has been commended in the orders of the day for the valuable service rendered under the stress of battle. This action is very gratifying to Americans in that the trucks so honored were American made and some had been in service almost from the beginning of the war.

The copies of the citations for the distinguished service performed by the French motor transport units using American-made motor trucks have recently been received in this country. Accompanying the citations was an award of the much-coveted Croix de Guerre to the First and Second Groupements, each operating 500 or more White trucks, made by the White Co., Cleveland, Ohio, and used in the service of the Great Headquarters Reserve No. 1. Later this entire reserve, operating 2500 Whites, was recognized by a similar citation.

The orders of the day read: "For the finest military spirit" and "the best qualities of endurance" in moving 200,000 troops to the front in a few days, many of them a distance of over 100 miles.

The task was tremendous, the crisis very grave. A supreme effort was necessary to stop the German advance last March on the British front. Without this unprecedented movement of French reserves right into the teeth of the fighting the issue might have been serious indeed for the Allies.

It was not uncommon for drivers to remain at their wheels 24 hours at a time. One groupement operated 200 hours out of 240. Another was on constant duty for 60 hours.

Most of the White trucks participating were war veterans, some of them having been in continuous field service since 1914. After 4 years of war these units performed feats which enabled their organizations to win the Croix de Guerre.

This is the first and only instance in French military history or any other of a truck formation receiving such a high honor. In forwarding copies of the citations the commanding officer made the following comment: "It is natural that the little White was ahead to merit a reward of this importance." The citations read as follows:

ARMIES OF THE NORTH AND NORTH-EAST

GENERAL HEADQUARTERS

Command of the Rear Automobile Service

Order No. 323 (Groupement No. 1)

Picked Unit having participated in all important transports of the motor truck service, in the course of which it has distinguished itself by its fine performance.

During the present operations, under the energetic and able command of Captain Guionin, the entire French and Indo-Chinese personnel showed proof of the finest military spirit and the greatest endurance, providing without interruption the transportation of troops up to the line of battle.

Order No. 349 (Groupement No. I)

The Regulation Unit of the Reserve No. 1, under command of Captain Arristin, has rendered conspicuous services in participating successively in the organization and the work of the Regulating Truck Commissions of Meaux, of Montidier, and of Clermont. Under the most trying circumstances, the entire personnel of the unit distinguished itself by its activity and self-sacrifice, fulfilling its mission to the extreme limit of its strength, and remaining till the end on the field of battle.

Order No. 374 (Groupement No. 2)

Matchless Unit, unequalled in discipline, endurance and enthusiasm, executed brilliantly the transportation of several divisions, pushing as far as the battle line.

Particularly it distinguished itself on March 20, 1918, in bringing at top speed on the very battle ground a division picked up at the railroad terminal. 2—On April 5, in bringing on another point of the battle line two fractions of divisions, although the Unit had already been working 36 hours without interruption. 3—Paraded on April 6, in perfect formation, after having been at the wheel 60 hours without relief.

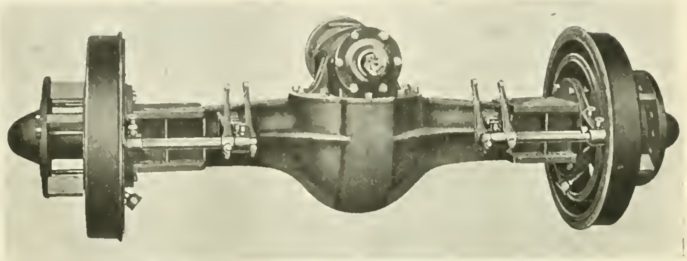
Citation (Truck Reserve No. I)

Picked unit which, since the beginning of 1915, participated in all the important transports of troops in Artois, in Champagne, at Verdun, on the Aisne and in Picardie. From March to June, 1918, under the direction of Commandant Stenbock, has given an example of endurance and coolness in providing on the very line of fire, with perfect order, the landing of more than twenty divisions.

The White trucks in the Great Headquarters Reserve No. 1. They were operated by Indo-Chinese drivers

Wisconsin Truck Axles Are Built in Six Sizes

All Are of Worm-Driven Type—Housings Are Single-Piece Malleable Castings—Worm Mounting Is Semi-Steel Casting, Which Also Carries Gear, Differential and Bearings in Unit



Wisconsin housings are ribbed to afford maximum strength. Brake shoes are semi-flexible and the concentric drums are practically contained within the wheel felloe. Service brakes are unusually large

A LINE of worm-driven truck axles, built by the E. B. Hayes Machinery Corp., Oshkosh, Wis., includes six models suitable for trucks of 1, 1½, 2, 2½, 3 to 3½ and 5 tons load capacity. These are all produced upon similar engineering and constructional principles, the variation between the different models being in the capacity of the several parts. Each part is designed to bear its correct relation to the truck for which it is designed to form an element.

Housings are single-piece ribbed malleable castings of tested strength and rigidity, and factory tests and inspections are conducted with such thoroughness that the manufacturers aver they have never had a housing crack or break in service.

The worm mounting consists of a massive semi-steel casting which carries the complete worm and gear set, the differential and the bearings. Owing to this unit form of construction permanent and accurate relative alignment of the various parts is assured, and the entire assembly can be lifted easily from the axle.

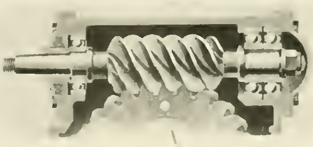
Worms are made of special steel, carbonized, ground and polished to a glass-smooth surface. An alloy of bronze, particularly adapted for the purpose, is used for the worm gear and is polished similarly.

Brown-Lipe-Chapin differentials are used in all axles, and the designer has in each case specified that this equipment be over-size in relation to the rated capacity of the axle.

Shafts are also over-size and are machined from forged chrome nickel steel. Under heat treatment, it is stated, they show an ultimate torsional strength of from 200,000 to 250,000 lb. to the square inch. Strom bearings are used throughout. These are of extra large capacity so that a fully adequate margin of safety is insured under all operating conditions. Shafts are mounted on four bearings, two opposed at each end, and may be removed easily.

Wisconsin axle brake construction possesses several features of interest. The drums are concentric and so are practically contained within the felloe of the wheel. For this reason it has been possible to provide service brakes of unusually large dimensions. The brake-shoes are semi-flexible, so that, when expanded by the cam, they press equally in all directions. For this reason they operate with maximum efficiency.

Other features of the line, each of which possesses an importance all its own for the truck operator, are the accessibility of the spring clip nuts, the separated and bushed brake-shafts, the special attention which has been given to the perfect operation of the lubricating system and the means taken to prevent the lubricant creeping out past the wheel bearings and onto the brake-shoes and tires.



Wisconsin worms are made of special steel and worm-gears are alloy bronze

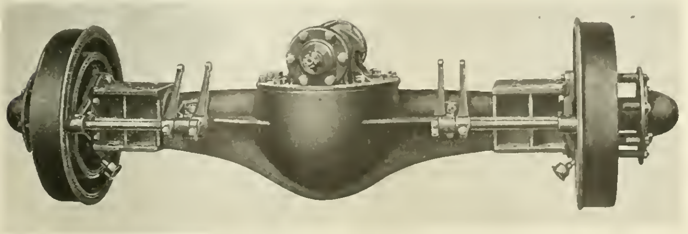
All of the parts, with the exception of the worm, bearings and differential, are machined in the Hayes plant. This course, together with the ultra-careful testing and inspection methods adopted, tends to assure the greatest possible measure of accuracy and interchangeability.

Each axle is designated by an identification number: Model 800 D represents the 1-ton; 800 E, the 1½-ton; 800 C, the 2-ton; 900 A, the 2½-ton; 900 B, the 3-3½-ton, and 1000 A, the 5-6-ton. All Wisconsin axles are sold under a full sense of the manufacturer's responsibility to his customer that perfect satisfaction in conjunction with the lowest possible price consistent with first-class material and workmanship is furnished.

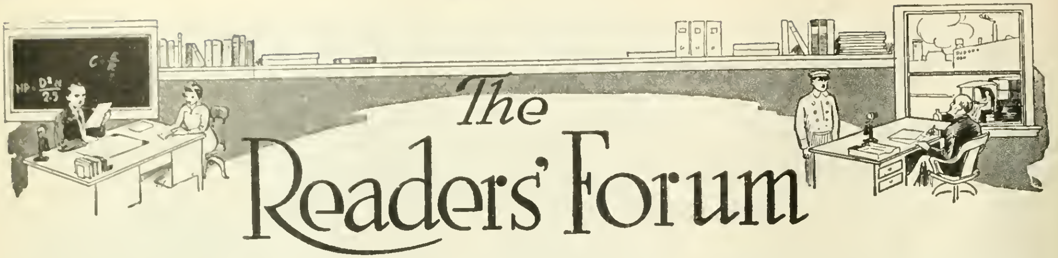
The plant of the Hayes Corp. is of modern construction and is fully equipped with up-to-date machine tools especially adapted for the rapid and economical production of Wisconsin axles, which are the sole specialty of the company. Many improvements have been incorporated, including the brake construction already referred to. The size of the differential has been increased in the smaller axles and the mounting of the worm has been redesigned in the larger units. In all cases the spring seat construction has been changed to facilitate the tightening of the spring clip nuts.

Front axles are not being produced at present, but it is expected that a line in accordance with the rear axle models will be marketed in the near future.

These will also be built for service under exacting conditions.



Wisconsin rear axles have housings consisting of a single piece casting extending from wheel to wheel. Means are taken to prevent escape of oil



The Readers' Forum

TRUCKS PRODUCED DURING 1918

Output of 250,000 Does Not Include Passenger Car Converters

To the Editor, COMMERCIAL VEHICLE:

With reference to the production figures you gave in THE COMMERCIAL VEHICLE for November 1, 1918, we would appreciate knowing if the 250,000 trucks listed include truck attachments or passenger cars that have been sent out minus the rear driving systems and have had attachments fitted and sold as new trucks.—J. R. PHILLIPS, Torbensen Axle Co., Cleveland, Ohio.

The production of 250,000 motor trucks during the year 1918 is based only on bona fide motor trucks. It does not include attachments for passenger cars or passenger cars which have been sent out minus the rear driving systems and later sold as new trucks after the attachments have been fitted.

FORMULA FOR DRAWBAR PULL

How to Figure Ability of Trucks to Pull Trailers

To the Editor, COMMERCIAL VEHICLE:

Can you give me a reliable formula by which I may determine the drawbar pull of a motor truck:

1—To pull a trailer; that is, how many pounds drawbar pull will, say, a Federal 3½-tonner develop for ordinary conditions?

2—How much load in the shape of a carried load and a loaded trailer can be hauled then with such a truck?—HORACE MILLER, Pasadena, Cal.

1—A convenient formula for the calculation of the drawbar pull of an average motor truck, not new, follows:

$$P = \frac{5.18364\, B^2SNR}{D}$$

When P is the tractive power in pounds
B is the engine bore in inches
S is the engine stroke in inches
N is the number of cylinders
R is the gear-reduction
and D is the diameter of the driving wheels in inches.

The gear reduction may be taken at any speed, depending upon which speed's drawbar pull is desired. For ordinary work, however, it should be taken in high. The gear-reduction referred to is the total gear-ratio between the engine crankshaft and the road wheels.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service

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To solve this formula for the Federal 3½-tonner we may substitute as follows:

$B = 4.5$
$S = 5.5$
$N = 4$
$R = 10.33$
and $D = 36$

Then $P = \dfrac{5.18364 \times 4.5 \times 4.5 \times 5.5 \times 4 \times 10.33}{36}$

And solving:

$$\frac{24{,}055.189}{36} = 668.2$$

2—To determine the excess power available for trailer hauling it is first necessary to determine how much of the tractive force represented by P is necessary to move the truck and its 3½-ton load. Definite figures on the weight of the Federal chassis with a body are not available, but for convenience this may be taken at 7000 lb. The load, weighing 7000 lb., brings the total weight to be moved up to 14,000 lb.

To determine what this represents in tractive resistance, use the formula:

$$W \times (\propto + G) = R$$

When W is the total weight of the truck and load
$\propto$ is the road friction coefficient
G is the grade in per cent
and R is the tractive resistance in lbs.

The coefficient of road friction is obtained from the table in the third column of this page. We may take that of an ordinary dirt country road, for example, which is 0.02. The grade we may take at 2 per cent, the maximum for high gear. Then substituting:

$W = 14{,}000$
$\propto = 0.02$
and $G = 0.02$

Then $R = 14{,}000 \times (0.02 + 0.02)$

And solving,

$560 =$ the road resistance.

Since we have found that the truck has a tractive force of 668 lb., subtracting 560 from this we have 108 lb. left over for use in hauling trailers. To determine what load may be carried with this excess drawbar pull, we have but to reverse our formula:

$$W = (\propto + G) \div R$$

Since the trailer will have to be drawn on the same road as the truck traverses, the road resistance coefficient and the grade factor will be the same. The resistance factor will have to equal the drawbar pull, or 108. Then substituting, we have:

$\propto = 0.02$
$G = 0.02$
and $R = 108$

Then $W = (0.02 + 0.02) \div 108$

And solving:

$2700 =$ total weight of trailer and load.

Coefficient of Road Friction

Hard, level asphalt	0.0100
Wood pavement	0.0115
Level macadam	0.0115-0.0300
Plank road	0.0090
Cobble stones	0.0175
Good dirt road	0.0110-0.0200
Ordinary dirt country road	0.0200
Sand	0.2000

MOTOR TRUCK USE ON THE FARM STEADILY GROWING

Farmer Finds Profits Increasing with Use of Trucks

To the Editor, COMMERCIAL VEHICLE:

We are interested in truck and trailer operation on the farm and would like to have you refer us to any articles which you have published ~~recently on this sub~~ject.—L. E. SEARS, Lord & Thomas, Wabash and Madison Streets, Chicago.

During the past year we have published the following articles regarding the use of motor trucks on the farm:

Motor Trucks Rural Express Routes in Maryland Increase Vital Food Production. April 1, 1918, pages 26 to 28. In this article it is shown how the farmer takes his produce to market by means of the rural motor express routes.

Varied Uses of Motor Trucks Bring Bigger Profits to Enterprising Farmers, April 1, 1918, pages 21 to 23. This article points out how the truck may be used efficiently about the farm.

Detroit Farmer Finds Motor Truck Quicker and Cheaper Than Horses for Delivering Goods to Market, July 1, 1918, page 25. As the title of this article suggests, this is a short story bringing out the advantages of hauling by motor truck over trucking with horses.

Motor Trucks Making Good Hauling Farm Products into Seattle, Portland and Tacoma, Sept. 15, 1918, pages 24 and 25. In this article the use of trucks on the farms in the Far West is brought out and the profits which their owners have reaped as a result of their use are indicated.

TRUCK TONNAGE MOVED YEARLY

Estimated That 202,500,000 Tons Are Handled Per Year by Motors

To the Editor, COMMERCIAL VEHICLE:

Have you any statistics on the truck tonnage of America? If you have will you kindly send it to us.—JOHN H. CROW, The Toledo Typothetae, Toledo, Ohio.

We estimate that there will be approximately 450,000 motor trucks in use in the United States by January 1, 1919. At an average capacity of 1½ tons and an average number of three trips per day, the maximum possible daily tonnage would be 2,025,000. Since the average truck is operated at less than one-third of its maximum carrying capacity, the actual tonnage carried is only one-third of the above amount or 675,000 tons. This would amount to 202,500,000 tons per year of 300 days.

It might be interesting to compare this tonnage with that hauled by the railroads, which during the year ended December 31, 1916, the last year for which the records are complete, transported 2,418,676,023 tons of freight. This includes the entire railroad system of the United States. The tonnage thus hauled by motor trucks is approximately 8 per cent of that hauled by the railroads.

TWO WAYS TO MEASURE GRADES

Difference Between Degree and Per Cent of Grade Explained

To the Editor, COMMERCIAL VEHICLE:

To settle an argument, will you please explain fully the degree and the per cent of grade on hills?—J. J. MEYERS, New York City.

To answer your inquiry, we will quote as follows from one of the engineering data sheets of the Troy Wagon Works Co., Troy, Ohio, which explains the difference very well:

"The tendency of the man who measures with the eye, particularly if he is not a trained engineer, is to greatly overestimate a grade. For instance, the average Pittsburgher is sure that his city abounds with 20 per cent grades and is indignant if you suggest that a 10 per cent grade is a tremendous rise even for Pittsburgh. Yet the city engineer's profiles show that the best known and most feared grades in Pittsburgh are only around 5 per cent.

"Correct information on grades is essential to a proper study of most transportation problems. This is particularly true as far as trailer usage is concerned. Many a truck owner, when told that his particular truck will not handle trailers satisfactorily on grades over 10 per cent, at once assumes the trailer has no place in his business. Generally the facts are that what he considers a 15 per cent grade is a 5 per cent grade, and he has an excellent trailer proposition without knowing it.

"Among many motor truck dealers and purchasers there is much doubt regarding the exact meaning of the word grade. Of course, a grade is a hill or an incline, but just how is its 'steepness' measured?

"The steepness is actually expressed in terms of per cent, or the ratio of rise to distance traveled. Thus, if a road rises 10 feet in every hundred, it possesses a 10 per cent grade. If it rises 10 feet in every 50 (which would be 20 feet in every 100), we would have a 20 per cent grade. The percentage of the grade is determined by dividing the vertical height which the truck has been lifted by the total distance required to rise to that height—assuming, of course, that curves have been eliminated and that the hill is a straight line. The famed Pike's Peak Highway, which is 12 miles long and rises some 6000 feet into the sky, has an average grade of only 10 per cent.

"There is great tendency on the part of many persons to confuse the per cent of a grade with its angle expressed in degrees. There is thus the popular impression that a 50 per cent grade, if one ever actually existed, is a 50-degree angle.

"A 45-degree grade is approximately one of 70 per cent, whereas a 45 per cent grade is inclined at an angle of about 27 degrees. In the accompanying table, the grade in per cent is given in the left-hand column, while the corresponding angle in degrees is shown on the right:

DIFFERENCE BETWEEN DEGREE AND PER CENT OF GRADE

Grade	Angle
5 per cent	2.8 degrees
10 " "	5.7 "
15 " "	8.5 "
20 " "	11.5 "
25 " "	14.5 "
30 " "	17.5 "
35 " "	20.5 "
40 " "	23.5 "
45 " "	26.75 "
50 " "	30. "
55 " "	33.3 "
60 " "	37. "
65 " "	40.5 "
70 " "	44.5 "
75 " "	48.5 "
100 " "	90. "

1918 TRUCK PRODUCTION 250,000

Over 5 Million Passenger Cars and 480,000 Motor Trucks in Use

To the Editor, COMMERCIAL VEHICLE:

Will you please give me the following information:

1—Approximate number of motor trucks in domestic use in the United States.

2—Approximate number of passenger cars in use in the United States.

3—Approximate number of motor trucks manufactured in the United States during 1918, and including Ford trucks.—ADIRONDACK GARAGE CO., Hudson Falls, N. Y.

The answers to your questions in the order asked are as follows:

1—As given on page 5 of THE COMMERCIAL VEHICLE for Jan. 1, 1919, the approximate number of trucks in service in this country as of that date is 480,000.

2—The total passenger cars in use as of Dec. 1, 1918, are 5,945,442.

3—The approximate production of motor trucks during 1918 was 250,000.

N. Y. MAXIMUM TRUCK LOADS

Tractor and Four-Wheeled Trailer Are Considered as Two Vehicles

To the Editor, COMMERCIAL VEHICLE:

We are subscribers for THE COMMERCIAL VEHICLE and contemplate using a 7½-ton truck with a 5-ton trailer capable of carrying a maximum total load of 15 tons. We propose to operate the outfit from our Carteret, N. J., factory to our plant in Brooklyn, N. Y. We should like to know whether these two vehicles can be operated in a unit in the following localities:

1—Across the bridges spanning the East River from New York City to Brooklyn.

2—Through the downtown traffic leading to and from the Hudson River ferries to New Jersey.

3—On the streets of New York City, including Brooklyn.

4—On the streets in the cities in New Jersey.

5—On the state highways in New York State.

6—On the state highways in the State of New Jersey.—BENJAMIN MOORE & CO., Brooklyn, N. Y.

The answers to the questions you have put are as follows:

1—The Department of Plant and Structures, New York City, advises that it will have to know the total actual weight of the outfit, including vehicles and loads, and the over-all length or wheelbase of the outfit, before it can give a ruling as to whether it would be possible to operate the train over the East River bridges.

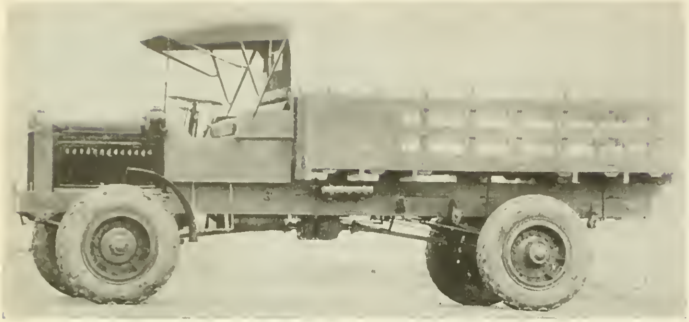
2—There are no restrictions regarding the use of such an outfit in the downtown streets leading to the Hudson River ferries. It is probable that such an outfit will be within the size limits of the ferryboats.

3—There are no restrictions against operating such a train in the New York City streets.

4—Same answer as that for No. 3.

5—The New York State law covering the operation of commercial vehicles outside of city limits reads that the combined weight of vehicle and load must not exceed 25,000 pounds. The same ruling holds good for a four-wheeled trailer, so that the total combined weight of your truck and trailer with their loads must not exceed 50,000 pounds.

6—The New Jersey State laws are the same as those in New York in regard to weight except that the limit for each vehicle is 30,000 pounds instead of 25,000.



Pneumatic tires are furnished on Winther four-wheel-drive trucks, models 448 and 468, at an extra charge

Winther Builds Four-Wheel-Drive Trucks in Seven Models

WINTHER FOUR-WHEEL-DRIVE SPECIFICATIONS

Model	438	448	468	488	4108	4128	4148
Capacity, tons	1½	2	3	4	5	6	7
Price	$1,995	$3,500	$4,500	$5,000	$5,850	$6,250	$6,500
Wheelbase, in.	132	158	158	164	170	170	170
Tires, front	34x4	36x4	36x6	36x6	36x6	36x6	36x6
Tires, rear	34x4	36x4d	36x5d	40x5d	40x6d	40x6d	40x7d
Bore, in.	3¾	4	4¼	4¼	4¾	5⅛	5⅛
Stroke, in.	5	6	6	6	5½	6	6
N. A. C. C. hp	22.50	25.60	29.00	29.00	36.15	42.20	42.20
Speed, r.p.m.	....	....	....	....	....	....	....
Speed, m.p.h.	17	15	13	11	10	10	10
Gear ratio in high gear	6.8 to 1	8.1 to 1	10.1 to 1	Rear reduction 12.5 to 1 Front reduction 11.2 to 1			
Final drive	(All models are of four wheel drive internal-gear type)						

IN addition to its line of seven internal-gear-driven trucks with rear-wheel drive, the Winther Motor Truck Co., Winthrop Harbor, Ill., builds a similar number of four-wheel-drive models having load capacities of 1½, 2, 3, 4, 5, 6 and 7 tons.

All these are of similar design, material and workmanship, varying only as to capacity and size, and for this reason a general review of the specifications of Model 468, the 3-tonner, will serve to indicate the principles of design and construction which are common to all.

The engine is mounted on three-point suspension and is of L-head type. Cooling water is circulated by a centrifugal pump and the radiator is of copper tube type with cast shell and spring suspension.

A Master non-adjustable carbureter is used and is fuel-fed by Stewart vacuum system from a cylindrical gasoline tank located under the driver's seat. Speed is controlled by a Simplex centrifugal governor and an Eisemann high-tension magneto furnishes the ignition.

The dry-plate clutch is 12 in. in diameter and is equipped with a brake. A Brown-Lipe selective gearset is used. This is of 4-speed type with Timken roller bearings and is carried on three-point suspension. An auxiliary transmission, which is connected to the rear end of the gearset by means of a Dexter coupling, is required to transmit power to both front and rear axles. Power is taken in through a driving shaft and transmitted by means of a wide, silent chain to a countershaft, whence it is transmitted to both axles.

An M. & S. self-locking differential is mounted on the countershaft in order to permit of different speeds for front and rear axles when turning. Shafts are mounted on ball bearings and the complete mechanism is enclosed in a cast-iron case and runs in oil. Leakage of lubricant is prevented by the use of adjustable felt packings.

The front axle is of special design, the load being carried on a drop-forged I-beam and the live axle being enclosed in a housing, on each end of which is a ball. A universal joint inside this ball connects the axle driving shaft with the internal gear driving pinion and permits of steering. Pins above and below the universal joints connect the live axle to the steering knuckle.

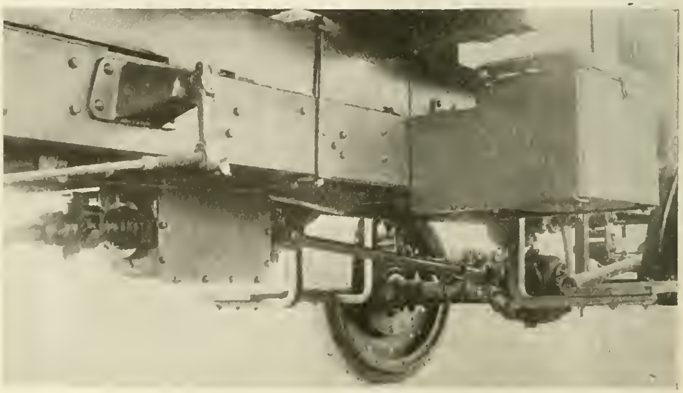
Thus the live axle is tied to the steering knuckle at each wheel and acts as a tie-rod, eliminating this member. Differential, housings, and all parts contained in the differential housings are interchangeable with the equivalent parts of the rear axle, as is also the internal ring gear. All parts of the differentials (except the casings) as used in the axles are interchangeable with the differential used in the auxiliary transmission.

In the rear axle the dead load-carrying member is drop-forged and of circular section, the differential driving gears are of bevel type and the drive at wheels is internal-gear, as in the case of the front axle.

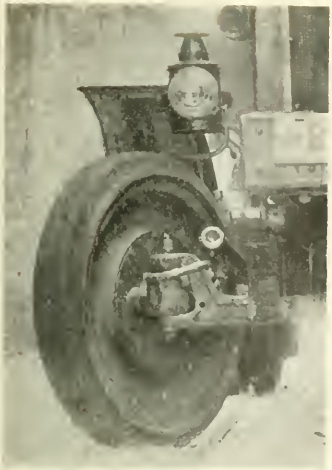
Gear ratios on this model are: transmission reverse, 5.81 to 1; transmission 1st speed, 4.84 to 1; transmission 2nd speed, 2.84 to 1; transmission 3rd speed, 1.5 to 1; transmission 4th speed, direct. Total axle ratio is 10.1 to 1 and total low speed, 46.75 to 1.

There are no gear reductions or speed changes in the auxiliary transmission. Road clearance is 21 in. at center of chassis and 11½ in. at axles with 36 in. tires. The actual horsepower developed by the engine under operating conditions is stated to be 55. These figures refer only to the individual model under consideration. Obviously, there are modifications corresponding with the rated load capacity of the various models, although the general design is similar.

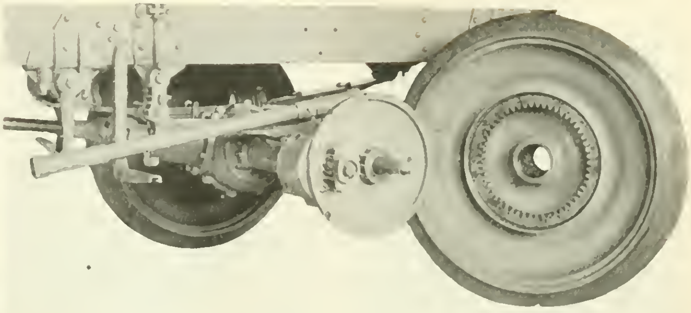
Both front and rear axles are completely enclosed to prevent dust entering and oil escaping, and are fitted with M. & S. self-locking differentials. Brakes consist of one set of external contracting



In the Winther four-wheel-drive power is transmitted from the gearset through an auxiliary transmission



Showing detail of Winther steering



Internal-gear drive used on Winther four-wheel-drive trucks. Both front and rear axles are completely enclosed to prevent dust entering and oil escaping

type and one set of internal expanding type. The former are 3 in. in width and the latter are 2½ in. The diameter is 20 in. Dustproof universal joints are fitted.

The 7 in. frame is of hot rolled channel steel, the cast wheels are regularly fitted with solid tires, although pneumatics are furnished at an extra charge, and the Ross steering gear is of the worm and nut non-adjustable type. The steering wheel is located on the right side and controls are in the center.

Semi-elliptic front and rear springs of ample dimensions are made of chrome-vanadium steel, tread is 70 in. front and 63 in. rear, and the 158-in. wheelbase affords a 13 ft. load space back of the driver's seat.

In this individual model speed is governed to 13 m.p.h., the body allowance is 1500 lb. and the maximum allowable weight on the chassis, including body and pay-load, is 7500 lb.

Equipment includes seat, side and tail lights, doors, jack, tools, etc. Electric starting and lighting can be furnished at an extra charge and styles and prices of bodies are furnished on application.

The Winther Motor Truck Co. has recently increased its capital from $3,300,000 to $3,800,000 in order to facilitate the extension of its production schedule.

Reference has already been made to the Winther line of seven rear wheel drive trucks in the issue of Nov. 1.

Two New Models Added to Day-Elder Worm-Driven Line

DAY-ELDER SPECIFICATIONS

	D	F
Capacity, tons	2	3½
Price	$2450	$3450
Wheelbase, in.	144	150
Tires, front	36 x 4	36 x 5
Tires, rear	36 x 6	36 x 5d
Bore, in.	4⅛	4½
Stroke, in.	5¼	5½
N.A.C.C. hp	27.20	32.40
Speed, r.p.m.	1250	1000
Speed, m p.h.	14	12
Gear ratio in high gear	9.6 to 1	10 to 1
Final drive	Worm	Worm

WITH the addition of models D and F, of 2-2½ and 3½-4 tons load capacity the line of worm-driven trucks built by the Day-Elder Motors Corp., Newark, N. J., has been rounded out to include a range of six models of from 1-1½ to 5-6 tons capacity.

Both the new models have Continental block-cast, L-head engines forming unit power plants with the clutch and transmission and carried on three-point suspension. Cooling water is circulated by a centrifugal pump, and Bush radiators of vertical fin-tube type and with cast cases are used.

Zenith carbureters are gravity-fed from 20-gal. gasoline tanks located under the driver's seat. The larger model is fitted with a Monarch governor operated by engine-suction. Ignition in each case is furnished by a Berling high-tension magneto with fixed spark control.

Model D has a Borg & Beck dry-plate clutch and model F is fitted with a Brown-Lipe clutch of dry multiple-disc type. A Covert 3-speed selective gearset is installed on model D and the other is fitted with a 4-speed Brown-Lipe gearset. Driveshafts are of the three-joint type, broken amidships and with a double-row, self-aligning ball bearing in the center. They are designed to afford straight-line drive. Hartford universal joints are fitted.

Hotchkiss drive is used, torque and propulsion being taken through the springs. Brakes are of internal expanding type, operating on rear-wheel drums. Both models have Savage Arms Corp. frames of semi-flexible type built of pressed steel and of ample dimensions to afford a substantial margin of safety under all operating conditions. Ross steering gears of screw and nut semi-irreversible type are used.

Chassis weights are 3650 and 5600 lb. respectively. Equipment includes two oil side lamps, tail lamp, mechanical warning signal, oil can, jack and complete set of tools.

Of the other five trucks which complete the Day-Elder line, model A is of 1½-ton capacity, model B is a 1½-2-tonner, model C is rated at 2½-3 tons and model E at 5-6 tons. All these are worm-driven and have practically similar specifications, due regard being given to the modifications or additions rendered necessary by the individual load capacity.

Models A & B have thermo-syphon cooling; all the others have pump water circulation. Berling magneto ignition is used on all and, with the exception of model E, all have combination force feed and splash engine lubrication. The lubrication on model E is full pressure feed to all bearings through a drilled crankshaft. On the larger models the two upper leaves of each spring are wrapped around the spring eye and have Government specification cups in center.

New Day-Elder chassis model F, 3½-4-ton load capacity

Clark New Series Internal-Gear-Drive Axle Made in Seven Models

Highway Tire Protectors, General Cord Tire, Detroit Weatherproof Cab, Lo-See Hot-Spot

THE Clark Equipment Company, Buchanan, Mich., has placed upon the market a new series of internal-gear-drive axles, of which there are seven models. These models range from ½ ton to 5- and 6-ton capacity. They are all of similar construction but differ in weight and size, according to the different capacity trucks upon which they are used.

On Clark axles ranging from ¾ to 3 tons the design is along slightly different lines than axles from 4 to 6 ton capacity. The torque on the lighter series is taken through the live axle by bolting to the load carrying axle, this bolting being made at the spring centers, the point of least deflection. On the larger axles, the strains being much greater, the torque is taken through a cross member which is bolted to the brake flange at the outer ends and to the gear case at the center of the driving axle, thereby securing flexibility. The torque on all models is taken directly from where it is set up to the springs and not transmitted to the load carrying axle.

No connection is found between the driving and load carrying axles at the center; thus any vibration found in the latter member is in no way transmitted to the live axles. This gives long life to all driving parts and bearings. All bearings are non-adjustable.

In all models the driving axle member is placed in front of the load carrying member, thus making possible a much shorter propeller shaft, and this in turn secures longer life in universal joints by elimination of the whip in the shaft. This constructional feature also means less load on bearings. The shafts that transmit power to the axle are made of the best quality chrome nickel steel, heat treated.

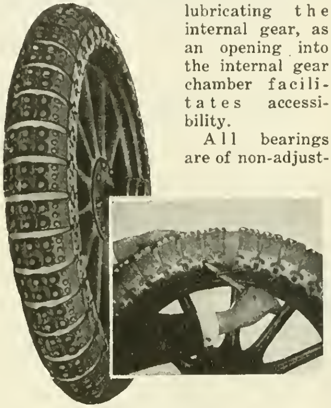
All models have a one-piece solid drop forged load carrying member made from 1½ per cent nickel chrome steel, heat treated with spindles integral. On the light axles the gear reduction is 6 to 1, on the medium duty 8 to 1 and 10 to 1, whereas on the heavy models the gear reduction is 11 to 1, 12½ to 1 or 15 to 1. The gears are 3½ per cent nickel steel, double heat treated with scleroscope hardness at 75 to 80 deg., which gives a surface hardness that cannot be touched with a file.

All points throughout the axle subject to excessive wear are fitted with phosphor bronze bushings which can be easily replaced when they become worn. Brake facing used throughout is of highest quality. On axles for 1 and 2-ton capacity trucks the M. & S. locking type differential of Clark manufacture can be furnished, or the plain type differential produced by the Brown-Lipe-Chapin Co.

The bearings used throughout are Hyatt, New Departure and Bower, with S. K. F. spherical seated thrust bearings both sides of the differential. This latter bearing is self-aligning and will adjust itself to any slight variation in the differential set up.

Pinion shaft bearings are thoroughly lubricated by oil from the gear-case, and hard felt washers are used throughout the axles to exclude dirt and retain lubrication. It is unnecessary to remove wheels when lubricating the internal gear, as an opening into the internal gear chamber facilitates accessibility.

All bearings are of non-adjustable type and are oversize according to manufacturers' ratings. All parts of the axle are readily accessible for repairs or replacement and all parts are interchangeable, there being no right or left-hand units. Axles are designed for use with any type of wheel and wheels are readily removable or replaceable without injury to bearings or gears, as they can only be put on in one way.


Highway tire protectors, showing method of attachment

Finished surfaces are rough turned and ground to limits in order to obtain absolute accuracy in the mounting of bearings and other parts.

These axles have been known in the past as Celfor, and have been sold and advertised under that trade name. Due to the merging of the Celfor Tool Co. and the Buchanan Electric Steel Co. under the new name Clark Equipment Co., these axles are now known as the Clark internal-gear-drive axle.

The carrying capacities on the spring pad of the different axles are as follows:

Model	Capacity (tons)	Carrying Capacity on Spring Pads (lbs.)
A	½ to ¾	2500
AS	¾ to 1	3000
1	1 to 1½	4200
2	2 to 2½	6500
3	3 to 3½	11000
4	4	15000
5	5 to 6	18000

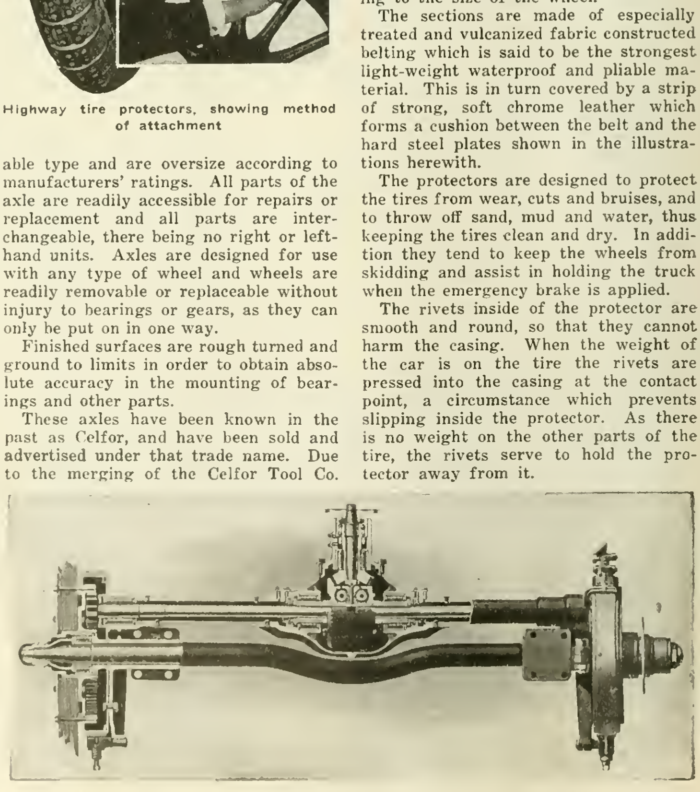
Highway Tire Protectors

HIGHWAY tire protectors are made by the Buckholt Mfg. Co., Stevens Point, Wis. They are composed of sections joined together by means of steel hooks and tightening links, the entire protector for a wheel being made up of the necessary number of sections according to the size of the wheel.

The sections are made of especially treated and vulcanized fabric constructed belting which is said to be the strongest light-weight waterproof and pliable material. This is in turn covered by a strip of strong, soft chrome leather which forms a cushion between the belt and the hard steel plates shown in the illustrations herewith.

The protectors are designed to protect the tires from wear, cuts and bruises, and to throw off sand, mud and water, thus keeping the tires clean and dry. In addition they tend to keep the wheels from skidding and assist in holding the truck when the emergency brake is applied.

The rivets inside of the protector are smooth and round, so that they cannot harm the casing. When the weight of the car is on the tire the rivets are pressed into the casing at the contact point, a circumstance which prevents slipping inside the protector. As there is no weight on the other parts of the tire, the rivets serve to hold the protector away from it.


New series Clark internal-gear axle. There are seven models. The illustration shows the lighter type

General cord tire, made up to 40 x 8 in. for trucks

Jefferson Replacement Coils

THE Jefferson Electric Co., Chicago, has placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped trucks. This flexibility is obtained by the design and construction of the fittings, adjustable caps, terminals and mounting arrangements.

It is stated that a small stock of these coils and fittings is sufficient to place a service station, garage or repairshop in a position to deal with any emergency, placing the truck in commission in a few minutes by the substitution of a new coil for the old one.

General Cord Tire

THE General cord tire, made by the General Tire & Rubber Co., Akron, O., is of two-cure construction, expanded on a specially constructed air bag instead of on a steel core. Care is taken that every cord is expanded equally to the fraction of an inch and the tire is cured while the cords are thus stretched to the degree that normal inflation on the wheel would stretch them.

For this reason the tire, when inflated on the wheel, is in the same condition as when being cured. In other words, the method of construction tends to eliminate the stretching of the rubber and fabric and accordingly it is in good shape to give naturally to road obstructions and to minimize the risk of cuts, splits, separation from fabric, etc.

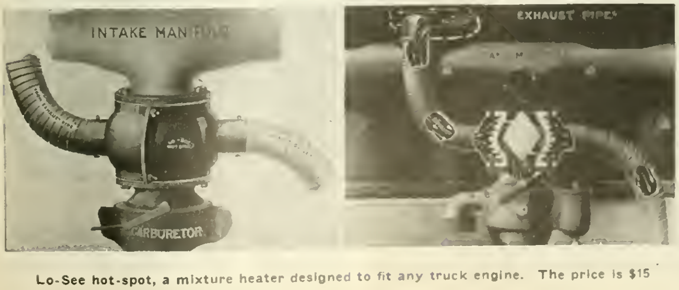
It is stated that a 36 x 4½-in. General cord tire is as large as a 37 x 5-in. fabric tire; moreover, it has eight plies of cords. For passenger cars this tire is made with both ribbed and non-skid tread in sizes from 32 x 3½ in., and it is also made for trucks in sizes up to 40 x 8 in.

Lo-See Hot-Spot

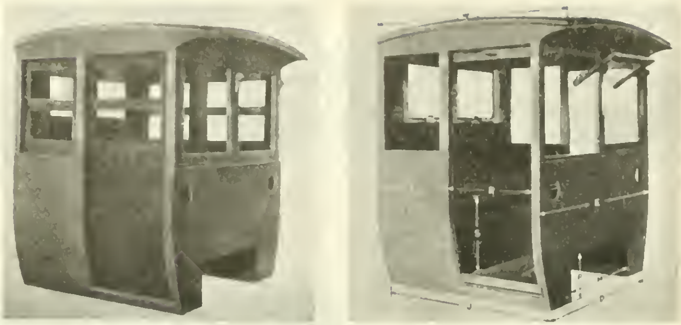
THIS device is manufactured by the Wee Specialty Co., Chicago. It is a mixture heater which is placed between the carbureter and the intake manifold. The inside is spiral in shape and the inside surface over which the mixture is whirled has a number of small flutes to increase the radiation surface.

The heat is furnished by running a portion of the exhaust gas through a flexible tube from the manifold to the heater. This hot gas passes around a number of fins which take up the heat and pass it through to the flutes on the inside.

It is claimed that the use of this device facilitates the complete combustion of low grade gasoline and that by reason of the perfect combustion obtained the tendency is for the lubricating oil to last longer, as there is no free gasoline to enter the crankcase.



Lo-See hot-spot, a mixture heater designed to fit any truck engine. The price is $15



Detroit weatherproof body, showing how door slides into top when not in use

Detroit Weatherproof Cab

THE Detroit weatherproof cab, made by the Detroit Weatherproof Body Co., Detroit, is so designed that it may be completely enclosed during stormy weather or converted into a cab of open type in a minute or so. Even when closed it is possible for the driver to signal traffic with his hand.

These bodies are constructed of wood and heavy gage metal and are equipped with light, strong and weatherproof doors which may be slid into the tops when not in use. In this position they are quite out of the way and are protected from injury. The doors are so fitted that they do not rattle. The windows are so constructed that they slide upward, permitting the driver to peer out or to signal traffic.

Windshields are divided into two sections; that directly in front of the driver may be opened, allowing the other section to remain closed. There is ample seat and leg room and the seat is upholstered in substantial material.

Se-Ment-Ol Liquid

THIS product, which is made by the Northwestern Chemical Co., Marietta, O., is a liquid radiator cement. It is intended to be poured into the radiator, the truck being operated as usual. The water, in circulating through the cooling system, carries the Se-Ment-Ol in due course to the actual leak, where, on exposure to the air, it congeals and is hardened by the heat from the engine. It is said to form an elastic repair which cannot be destroyed by the action of the water or the vibration of the truck.

It is not necessary to drain the radiator, as the preparation is described as being harmless. If allowed to remain in the cooling system it will automatically stop new leaks which may occur from time to time. A 75 cent can will repair a radiator holding 6 gal. of water.

The company also makes Shalex radiator cleaner, a liquid intended to be poured into the cooling system for the purpose of removing scale or obstruction. This preparation is left in the system for a few hours while the truck is being driven. A 14-oz. can costs 75 cents.

Men and Makers

BOSTON & ALBANY RAILROAD.

The new order of things in railway operation is strikingly illustrated by the purchase of the 2-ton Federal truck shown above by the Boston & Albany Railroad. Whereas in the old days it was the policy of the railroads to grab all the freight in sight whether it was revenue producing or not, they are now leaving the short-haul shipments, which were generally made at a loss, to the motor truck. The work which the Federal shown above is engaged in shows how much short-haul work can be performed more profitably by a truck than by a steam locomotive. The truck runs between Springfield and West Springfield and its use has enabled the railroad company to take off one locomotive previously used for the haulage of goods between the two points and place it in service for longer-haul shipments. The truck covers between 25 and 40 miles a day and has saved more than $75 a month in handling and truck charges under the old scheme of horse wagons and the steam locomotive

DENBY MOTOR TRUCK CO. has established a permanent export office in New York with G. W. Worden in charge. Mr. Worden has handled the foreign business from the factory for some time.

White Co.'s advertising department has moved from the factory administration building to the Union Building, 1836 Euclid Avenue, Cleveland, Ohio.

Denby Motor Truck Co. and the City Council of Chatham, Ont., have an agreement that the former will erect a plant in that city to be ready for occupancy by March 1. The Denby company has been incorporated in Canada with a capital stock of $200,000. The plant of the Chatham Brass Works has been purchased by the Denby company and will be used for the manufacture of axles and gearsets.

Acme Motor Truck Co., Cadillac, Mich., is now represented in Detroit by the Acme Truck Sales & Service Co., which has been formed by George M. Brooks, A. L. Kauffman and John Kunke.

Chevrolet Motor Co., Detroit, plans to expand its factory at Toledo to a $4,000,000 or $5,000,000 plant within 2 years. Additional property of approximately 5 acres has been purchased for new buildings. The plant has been employing 1200 men, and it is expected that from 3000 to 4000 will be employed when the new additions are complete.

R. E. Taylor Corp., New York City, has been appointed distributer for the Signal Motor Truck Co., Detroit, in territory comprising New York State, western Connecticut, New Jersey, Pennsylvania, Delaware, Maryland and District of Columbia.

Bishop Truck & Tractor Co., St. Louis, Mo., has taken the agency in the St. Louis territory for the Sandow motor truck. J. E. Tate, formerly connected with the Stewart and Sterling lines of trucks, has been appointed manager of truck and tractor sales.

Scheffner & Otto, Freeport, Ill., have taken on the International motor truck agency for the Stephenson County territory.

Elbert S. Hatcher Co., Springfield, Ill., has been organized and opened a truck agency at 207-209 Washington Street. The company will distribute the Republic truck

Twin City Automobile Co., Chehalis and Martin, Wash., has opened salesrooms for Signal trucks.

A. J. March Motor Truck Co., Milwaukee, Wis., state distributer of the Clydesdale and Vim trucks, has also made a similar connection with the Four Wheel Drive Automobile Co., Clintonville, Wis. Royal H. Case, former vice-president and sales manager of the Osmond Motor Car Co., Milwaukee, has become associated with the March company.

Rosenstein's Garage, Chehalis, Wash., will handle Standard and Winther trucks.

Ohio Auto Sales Co., Cleveland, Ohio, has taken the agency for the Maxwell truck in northeastern Ohio.

Lewis E. Ohye Motors Co., Portland, Ore., has secured the distribution of Acason trucks for Multnomah County.

Northwest Oakland Co., Portland, Ore., will distribute the Clydesdale truck in Oregon and Washington.

H. H. Heiser Mfg. & Selling Co., Denver, Col., has moved into a new building at Fifteenth and Wynkoop Streets, and has taken on the distribution of the Oneida and Rainier trucks.

Capital Transit & Repair Co., Olympia, Wash., has entered the truck field with the Republic and Velie trucks.

Peterson Truck Co., Omaha, Neb., has taken the Gary and Hawkeye truck agencies and opened salesrooms at 2427 Farnum Street.

Olympia Garage Co., Inc., of Olympia, Wash., has secured agencies for the G. M. C. truck.

Harry B. Quick Auto Co., Chehalis, Wash., will handle G. M. C. trucks.

Southern Border Motor Co. has been organized in El Paso, Tex., which will handle the agency for the Republic truck.

Hayward-Cameron Automobile Co., Omaha, Neb., has taken the agency for the Nash truck.

Robinson Auto Co., Tyndall, S. D., will distribute I. H. C. trucks.

F. & F. Garage, Aberdeen, Wash., has secured the agency for Republic trucks.

De Castellane-Brown Motor Co., Tacoma, Wash., will handle the Wilson truck.

Kumpf Motor Car Co., Denver, Col., has taken the agency for Pierce-Arrow trucks for the State of Colorado, and will make its headquarters at 439 South Broadway.

Joseph L. English, Decatur, Ill., has opened a new garage and repairshop at the corner of Church and Main Streets, and will cater to truck repair work.

Dearborn Truck Co., St. Louis, Mo., has purchased all the Smith Form-A-Truck attachments of the Motor Truck Sales Co. of St. Louis and becomes the largest truck attachment company in that city.

Goodyear Tire & Rubber Co., Akron, Ohio, has purchased of Theodore Krumrich for $90,000 a plot of property fronting 150 ft. on East Market Street. This is the highest price paid in Akron for a similar frontage outside of the business district.

General Tire & Rubber Co. has increased its capital stock from $1,000,000 to $2,500,000. The following officers have been re-elected: M. O'Neil, president; W. O'Neil, vice-president; W. E. Fouse, secretary; Chas. Herberich, treasurer.

Firestone Steel Products Co., Akron, Ohio, has added three men to its sales force. A. D. Droeger, as manufacturers' representative, will travel throughout the entire country. C. W. Flick will cover the eastern territory. He was formerly assistant sales manager of the Mason Tire & Rubber Co. J. C. Bailey has been made Western representative. He comes from the Mason Tire & Rubber Co.

Goodyear Tire & Rubber Co., Akron, Ohio, has established a foreman's school through which it aims to make better executives of the men attending the course. Some of the subjects taken up are the improvement of department organization, the development of better methods of handling routine business, how to read charts, a larger acquaintance with the sources of supply of raw materials. Real study is varied by lectures on popular subjects; labor policies and personal health are brought up for discussion.

Pearce Tire & Rubber Co., Ashtabula, Ohio, is now in full operation in its new plant. Officials say that within 60 days its production will exceed 100 tires daily. This will be increased gradually until the full capacity of the factory, which is 500 a day, is reached.

Ayers Co., Grand Rapids, Mich., distributer of Kelly-Springfield tires in that territory, has leased a store at 209 Ottawa Avenue. This was one of the firms burned out at the Monument Square Building fire a few weeks ago.

Torbensen Axle Co., Cleveland, Ohio, contemplates a $75,000 plant extension and has contracted for the immediate construction of a two-story brick, steel and mill constructed building 100 by 140 ft. as an addition to the present factory.

Zenith Carburetor Co., New York City, has moved its offices and service station from 245 West Fifty-fifth Street to 692 Eleventh Avenue.

General Motors Corp., Detroit, is planning the construction of a new differential gear plant in Detroit, it is rumored. The company is also said to have its eye on the Canadian market and that a big assembly plant may be built soon in some Dominion city.

Continental Motors Corp., Detroit, has set a 1919 production schedule which calls for an increased engine production of between 15 and 25 per cent over the 1918 output. The two plants of the Continental Corp. produced approximately 189,000 engines last year, a large number of which were built for the Government.

Templars Motors Corp., Cleveland, Ohio, has erected a three-story, 500 x 72-ft. addition to its plant. It is a concrete structure with the outside walls practically all glass. This increased floor space of almost 2½ acres is now being equipped with machinery.

Sparks-Withington Co., Cleveland, Ohio, will establish a plant here for the production of Sparton radiators. It will be operated by a local company.

Starkweather-Snook Corp., Fort Madison, Iowa, manufacturer of the S. & S. shock absorbers, has opened a branch office and warehouse at 1402 South Michigan Avenue, Chicago, with Chas. Snook in charge. The main office and factory will continue at Fort Madison, but the Chicago branch will carry a complete stock.

Holmes Foundry Co., Port Huron, Mich., maker of steel castings and other foundry products for the General Motors Corp. and its subsidiaries, has been incorporated with a capital stock of $1,225,000. It follows the reorganization of the Romeo Foundry Co. The officers are: L. A. Holmes, president; L. G. Blunt, vice-president and general manager; C. C. Peck, secretary and treasurer; William F. Hooper, general superintendent. The reorganized company is closely associated with the Holmes Foundry Co. of Sarnia, Ont., of which Mr. Holmes is the head.

Lowry Top & Body Co., Philadelphia, Pa., has moved from its factory at Thirty-third and Walnut Streets to its new factory at Adams and Gaul Streets.

John L. Wierengo & Staff is the new name of the advertising agency of John W. Hatfield & Staff, Grand Rapids, Mich.

Campbell-Ewald Co. has moved from 117 Fort Street West, Detroit, to the Marquette Building, corner of Wayne and Congress Streets, of the same city.

J. H. Ashdown Hardware Co., Winnipeg, Man., Can., will market a frost-proof radiator. This is made by the Rolfe Campbell Radiator Co. of Winnipeg, and has been tested in both Manitoba and Saskatchewan for over a year.

Capt. Harold J. Vogler has been appointed district sales manager for the Service Motor Truck Co., and has been assigned to District No. 2, which includes Maryland, Virginia, District of Columbia and the Carolinas. Previous to entering the United States Army, Captain Vogler was wholesale manager for the Willys-Overland Co., and also had charge of its dealer organization in the East.

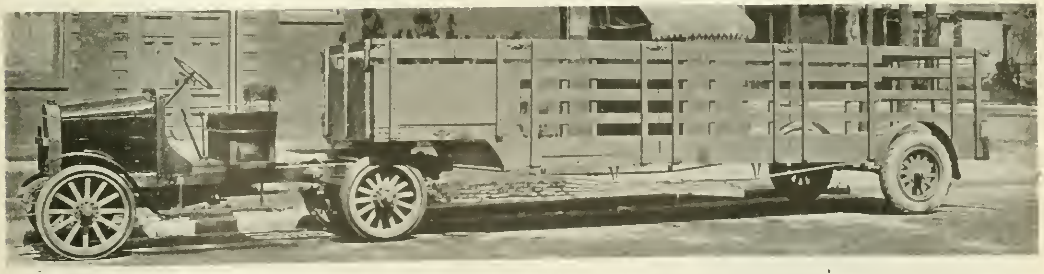
Lieutenant Willets, who was chief instructor in the Motor Training School which the Government formerly maintained at the F. W. D. plant, is now a member of the Four Wheel Drive Auto Co. force. He will be in charge of the instruction work connected with the plant.

W. N. Durphy, sales representative of the Four Wheel Drive Auto Co. in the Des Moines territory, died very suddenly at the home of the F. W. D. dealer in Des Moines on Tuesday, Jan. 15. Ptomaine poisoning is supposed to have been the cause of his death.

C. B. Harvey has just been appointed district sales manager of the O. Armleder Co., Cincinnati, Ohio, with headquarters and office in Chicago, from which he will look after the interests of the company in the middle western states.

E. R. Greer, at one time engineer of the Emerson-Brantingham Co., Minneapolis, Minn., and more recently the personal representative of Major Glover of the Motor Transport Corps, has been placed at the head of the service department of the Four Wheel Drive Auto Co.

H. T. Melhuish, for some years advertising manager of the Fulton Motor Truck Co., Farmingdale, L. I., goes to Philadelphia to take charge of the Fulton office in that city, succeeding M. R. Sanborne, who goes to the Kansas City office.



One of the most unusual trailers yet designed is that intended to carry a complete airplane from point to point at high speed. The tractor and trailer outfit shown above was developed for that purpose and consists of a light Acason truck with a shortened wheelbase and a Freuhauf two-wheeled semi-trailer with a body 25 ft. long and 7 ft. wide with side racks 48 in. high. The trailer wheels are mounted on 38 by 7 Goodyear pneumatic tires for greater speed and less vibration. The outfit shown was developed as a result of the war experience of the French army, although the unit shown above has been employed in this country for hauling planes from the factories in which they were assembled to the various training fields and from one part of the training field to another when the damaged plane had to be taken to the shops for repair by other than its own power

Augusta, Kansas, in the heart of the Kansas oil territory, has realized the benefits of motor-propelled street cleaning equipment and has purchased the power flusher shown mounted on the 3-ton Denby truck illustrated above. The outfit is controlled by one man, who both drives and operates the spray nozzle at the same time. A special engine mounted in its own sub-frame at the rear of the chassis frame is employed to put the water under pressure and to provide a uniform flow of water irrespective of the volume in the tank

Putnam Drew will handle the advertising and publicity work at the Fulton factory at Farmingdale, L. I.

E. A. Haskins has returned as manager of the service department of the Federal Motor Truck Co., Detroit. He has been absent about a year, during which time he helped to design a standardized post office truck, adapted for rural motor express and parcel post work.

G. C. Stevens, for the past 7 years district sales manager for the Chicago Pneumatic Tool Co., resigned to accept a position with the Corbitt Motor Truck Co., Henderson, N. C., as its eastern sales manager, with headquarters in New York.

H. L. Browne has joined the sales force of the Acme Motor Truck Co., Cadillac, Mich., and will act as factory representative in Colorado, Wyoming, New Mexico and Utah. He was formerly connected with the Service Motor Car Co.

J. E. Bowles, who for the past year has been special representative of the Acme Motor Truck Co. in the middle western states, will be transferred to the Pacific Coast, with headquarters at San Francisco, Cal., commencing at once.

George P. Gould will act as factory representative of the Acme Motor Truck Co. in Maine, Massachusetts, New Hampshire and Vermont.

L. J. Stevenson has been appointed sales manager of the Commerce Motor Truck Co., with headquarters at Buffalo, N. Y.

Lieut. Frank William Cady has joined the advertising staff of the Dodge Bros. Motor Car Co., Detroit.

A. F. Mitchell was elected president of the Turnbull Motor Truck & Wagon Co. at the company's annual meeting. He succeeds W. O. Allen, Fostoria, Ohio, who continues as a member of the board of directors. Other officers named are: Vice-president, R. C. Holgate; treasurer and general manager, Charles C. Gorman; secretary, L. J. Spafford; general salesmanager, W. L. Krapp; advertising manager, George A. Wieland; chief engineer, H. K. Rienoehl.

W. A. Almy has been promoted from salesmanager of the passenger carriage department to general transportation manager of the Packard Motor Car Co. of Philadelphia, Pa. John Rosen succeeds Mr. Almy in the position he vacates.

F. A. De Pron and Walter Hewitt have joined the foreign sales department of the Four Wheel Drive Auto Co., Clintonville, Wis.

A. B. Parks has joined the sales force of the Four Wheel Drive Auto Co., Clintonville, Wis.

C. B. Caruthers has been appointed district manager for Indiana and Kentucky by the Denby Motor Truck Co., Detroit.

Osmond Mather, late of the air service, has joined the sales department of Russell P. Taber, Inc., Hartford, distributer of the Reo, Republic and Duplex trucks.

John Denhof, owner of the Chehalis Garage, Chehalis, Wash., has secured the agency for Bethlehem trucks.

Clarence J. Hout, who was at one time connected with the Nash Motors agency, Ithaca, has been made salesmanager of the truck department of the United Auto Sales Co., Baltimore.

Harvey J. Woodard and **Mark W. Roe** have been advanced to the position of vice-presidents of the Republic Rubber Corp., Youngstown, Ohio. Mr. Woodard becomes vice-president in charge of sales and Mr. Roe vice-president in charge of the plant.

A. M. Whaley, formerly southern district manager for the Kelly-Springfield Tire Co., has been appointed southern sales manager for the General Tire & Rubber Co., Akron, Ohio, and will maintain headquarters at Atlanta, Ga.

Thomas L. Moore, appointed southwestern district manager for the General Tire & Rubber Co., will have headquarters at Dallas, Tex.

D. Y. Cooke has been made secretary and general sales manager of the Racine Rubber Co., Racine, Wis., and director of the Ajax Rubber Co., New York. Mr. Cooke succeeds Mr. Severance, who died recently.

O. L. Travis has been appointed sales manager of the Owen Tire & Rubber Co., Bedford, Ohio, manufacturers of Owen truck tires.

J. H. Ficken has resigned from the Carlisle Cord Tire Co. and will in future be connected with the Kelly-Springfield Tire & Rubber Co.

Henry L. Hornberger, formerly a Philadelphia newspaper man, has been appointed general sales manager of the Globe Rubber Tire Mfg. Co., Trenton, N. J. The executive offices are in New York.

John H. Erben, Hartford, Conn., has resigned as local branch manager for the B. F. Goodrich Rubber Co. and his post is being filled temporarily by Benjamin H. Thompson of the New York branch.

W. S. Bloomer of the Republic Rubber Co., Youngstown, Ohio, has been promoted to district manager and will manage the states of New Mexico, Arizona, Wyoming, Colorado, Montana and part of Nebraska and Texas.

Fred M. Elvidge, Jr., has received his discharge from the army and has resumed his desk at the New York office of the Ajax Rubber Co., where he is the branch store supervisor.

William E. Duck, Jr., who before he entered the Canadian flying service was with the Baltimore branch of the Firestone Tire & Rubber Co., is back in Baltimore and has been appointed manager of the Firestone truck tire sales department here.

George Wurtz, for several years general Wisconsin traveling representative of the mechanical goods department of the Diamond division of the B. F. Goodrich Co., Akron, Ohio, has been promoted eastern manager of the same department, with headquarters in Pittsburgh.

Honor Blocker has been appointed advertising manager of the Republic Rubber Corp., Youngstown, Ohio.

W. H. Hanson has resigned as sales supervisor at the Stewart-Warner Speedometer Corp., Chicago. He will devote his time to the management of the Standex Mfg. Co., which he has organized, with offices and plant at 341-349 East Ohio Street, to manufacture and market motor specialties. Prior to his connection with Stewart-Warner Mr. Hanson was engaged in the manufacture of the V-Ray spark plug at Marshalltown, Iowa.

L. M. Baker, New York City, who was sales manager of the United Motors Service, Inc., has joined the sales force of the Hyatt Roller Bearing Co., Detroit, as a special sales engineer.

The
COMMERCIAL VEHICLE
Read by Business Men

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BALL BEARINGS
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Dependable ignition and dependable lighting are prime essentials to dependable, low-cost service. Which explains why builders of high-grade ignition apparatus and lighting generators, in standardizing on "NORMA" Ball Bearings, have so generally availed themselves of the proved "NORMA" dependability in speed service.

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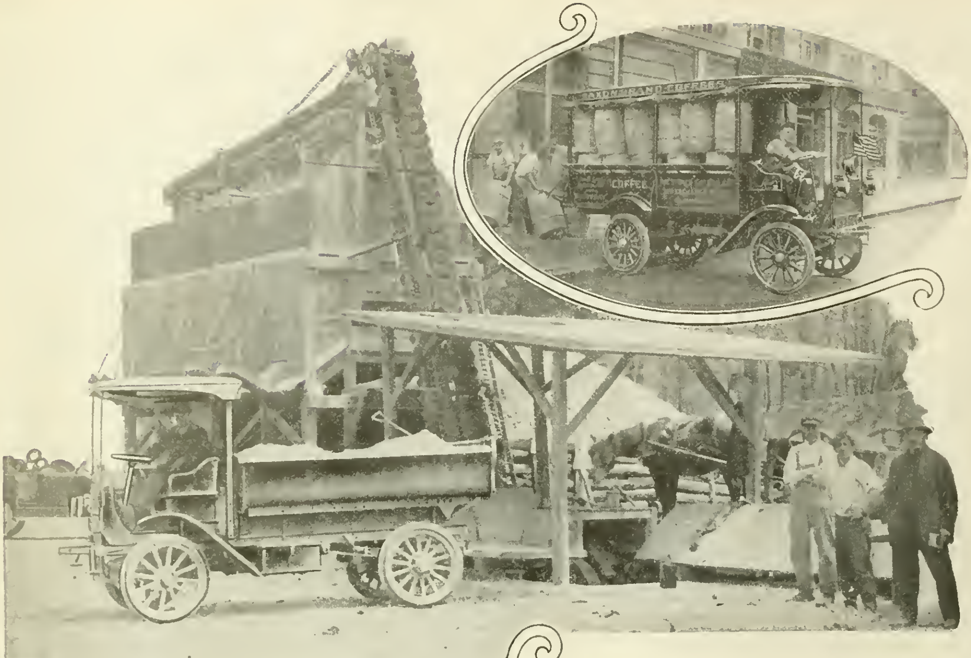

After the War Readjustment Facts

DURING the first nine weeks after the Armistice was signed, The Autocar Company of Ardmore, Pa., received repeat orders for Autocar Motor Trucks from three hundred and fifty-six different concerns.

These business houses realize that increasing their transportation facilities is one of the main essentials in getting back to a peace basis.

The confidence in the Autocar that leads to these repeat orders is based on the efficiency that Autocars have proved in actual use—and on the after sale service rendered by local Autocar branches and dealers.

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The
COMMERCIAL VEHICLE
Read by Business Men

Vol. XX February 15, 1919 No. 2

General view of the Coliseum exhibits at the 1919 exclusive truck show in Chicago, the first since 1913

149 Trucks of 52 Makes, 10 of Them New, Were Seen at Windy City's 1919 Exhibition

FIFTY-TWO makes of complete trucks comprising 149 vehicles were exhibited at the exclusive motor truck show held in Chicago from Feb. 3 to 6 under the auspices of the Chicago Automobile Trade Assn. It was the first exclusive truck show held in Chicago since Feb. 10 to 16, 1913.

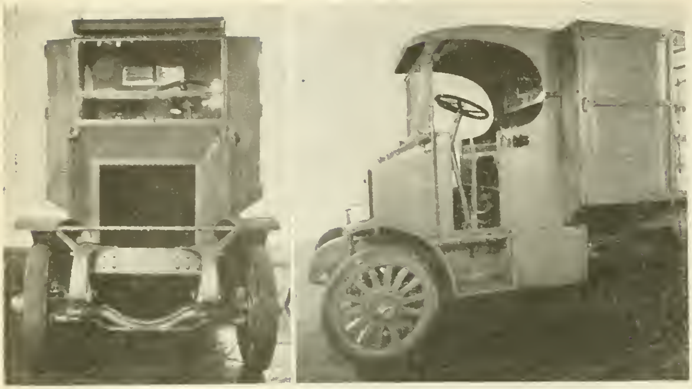
The great majority of these were shown in chassis form so that the prospective purchaser might study the details of construction. However, there were several interesting types of bodies designed to increase truck efficiency. In addition to the complete truck exhibits there were shown three makes of trailers, one make of standard bodies and three makes of passenger car converters. Truck parts, including engines, axles and wheels, were on view in the balcony of the Coliseum in addition to a vast array of truck accessories.

Nineteen New Models Shown

Nine companies which were doing business during a part of 1918 exhibited nine brand new models, while ten new companies exhibited their vehicles for the first time. The concerns which added new models to their lines included the Acme Motor Truck Co., Cadillac, Mich.; the Master Trucks, Inc., Chicago; the Commerce Motor Car Co., Detroit; Signal Motor Truck Co., Detroit; Dorris Motor Car Co., St. Louis; Stewart Motor Truck Co., Buffalo, N. Y.; Available Truck Co., Chicago, and the Fulton Motor Truck Co., Farmingdale, L. I.

New companies showing their wares for the first time included the Winslow Motor & Engineering Co., Chicago, which had on exhibit the only steam motor truck in the show; the Mutual Truck Co., Sullivan, Ind.; Paige-Detroit Motor Car Co., Detroit; All-American Truck Co., Chicago; Dearborn Truck Co., Chicago; Hebb Motors Co., Lincoln, Neb.; Tower Motor Truck Co., Greenville, Mich.; Transport Truck Co., Mt. Pleasant, Mich.; Nelson Motor Truck Co., Saginaw, Mich., and the Panhard Motors, Grand Haven, Mich.

The Brockway modified Class B war truck could not be shipped to the show in time, although two other makes, the Signal and the Clydesdale, are fitted with modified Class B engines as offered by the Continental Motors Co., Detroit. Both of these installations, however, have single instead of double ignition, making



Front and side cab views of the new Winslow steam truck. As shown at the right, the V engine is mounted under the floorboards. The water tube boiler, which is illustrated in detail below, is carried in the compartment back of the driver's seat

use of magnetos. This requires the use of a new detachable cylinder head with only one set of spark plugs. The electric starter and lighting as originally furnished on the Class B engines are absent from those so far employed for commercial service.

Navy Seaplane Featured

The large number of exhibits made it necessary to use the Coliseum, the Annex and the First Regiment Armory. The feature exhibit in the Armory was a giant Navy seaplane loaned by the Great Lakes Naval Station. This occupied the center of the floor and was surrounded by a large number of Liberty and foreign airplane engines with color drawings and cross-section views of the Navy planes, engines, guns and other parts. The truck exhibits were ranged around the edges of the room, which looked rather empty, and it seems that some of the Coliseum exhibits might have been transferred to the Armory to give it an appearance of being filled to its capacity. As the exhibits there were arranged, there was room for several more, although the Harvey and Master companies had street exhibits directly in front of the Coliseum.

The seaplane will undoubtedly draw a large attendance because of the great interest in aviation at the present time, and the Great Lakes Naval Station will be repaid for its co-operation by gaining recruits, a booth for which is installed near its exhibit.

Excellent Federal Exhibit

As a general thing, the various lines of trucks were shown with a view to obtaining the greatest merchandising benefit from the display. In this respect the Federal Truck Co. was a good example, with but three models of trucks in a space in which four or five could easily have been crowded. There was one truck set at a slight angle to the aisle at each corner of the booth, with the third in the center near the aisle, with a passageway between it and the other two models through which visitors could pass and get either a close-up or a perspective view of any of the three vehicles.

The G. M. C. display made use of a good merchandising practice borrowed from passenger car exhibits in having a mirror with two small storage battery lamps placed under one of the chassis which had the lower half of the crankcase removed to show the working of the cranks and camshaft. This exhibit attracted considerable attention.

Many New Engineering Details

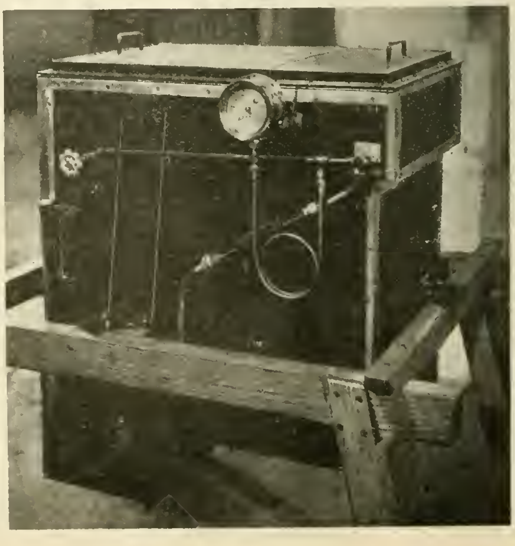
Contrary to expectations, there were many engineering advancements which are of interest to the owner in that they point the way in which the trucks are developing in becoming more efficient and more convenient, both of which help to reduce operating costs. One of the noticeable trends was the large increase in the use of oil instead of grease in the lubrication of front and rear spring and shackle bolts and even steering rod connections. No less than fourteen makes of trucks, including Patriot, Couple-Gear, Brockway, Paige, Master, Rainier, Clydesdale, Bethlehem, Indiana, Nash, Lapeer, Oneida, Available and Dorris, now use oil lubrication for those parts. Although the working out of the idea varies in almost every case, wool felt plungers inside of hollow bolts being used on the Sanford trucks, the tendency is to make the oiling of these parts more convenient for the driver.

Two of the trucks use the Alemite method of greasing, in which a small cylinder with a plunger check at the center is employed, the grease being forced into the cylinder by means of a grease gun instead of with the fingers. The Stewart and All-American trucks use Bound Brook Oil-less bearings for the spring bolts and shackle bolts.

Inclosed Cabs Increase

One of the most apparent trends in truck design as seen at the show was the increased use of closed cabs to protect the driver in cold, rainy or snowy weather. Most of us remember the days when the motormen and conductors of the trolley cars in all of our great cities were unprotected by the glass fronts which are now common. The transition from the non-protection of 10 years ago to the almost perfect protection of today was a slow one, and the same will also probably hold true in the case of protecting the motor truck driver. It is gratifying, however, that this transition has gone forward at an increased rate during the past 2 years.

The inclosed cab for the motor truck driver is not an expensive part of the



The water-tube boiler used on the Winslow steam truck. The boiler is fired by kerosene and is fed by a special worm-driven pump. The steam is reclaimed after leaving the engine by passing it through a condenser mounted in the front of the vehicle in place of the ordinary radiator truck as compared with the benefits accruing from its use. The wages of the motor truck driver are almost double what they were 2 years ago, so that it is necessary for the truck owner to realize the greatest work ability out of each truck if his transportation costs are not to increase at an alarming ratio. The inclosed cab is a wise investment for the owner in that it keeps the driver in good physical and mental condition in cold or stormy weather and thereby enables him to do more work with less effort than would be the case if he spent a large proportion of his time in trying to keep warm or dry. Many of the inclosed cabs exhibited were included as standard equipment on the trucks as sold from the factories. There were many designs of cabs, some being of the convertible type and others requiring some take-apart operations to change them from winter to summer use.

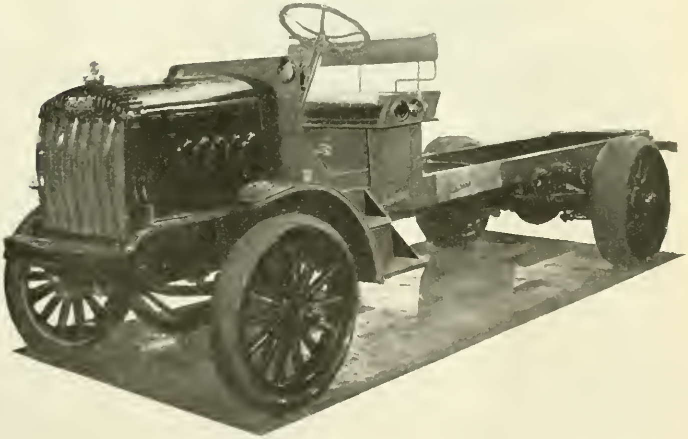
Some of the cabs afforded protection to the drivers by means of substantial curtains, while others were of the built-up type with glass panels in wood sashes. In some instances these sashes are removed from the cab entirely for summer driving and on others dropped into convenient pockets and carried on the truck at all times. Still another new type makes use of roll-up door curtains which are carried on rollers suspended from the roof of the cab when not in use. In almost every instance built-in windshields were employed. Many of these were of the rain-vision or two-part type for good ventilation and were provided with means whereby the glass in front of the driver could be kept clean for safety's sake under all conditions.

Makes of Trucks Shown

The makes of trucks exhibited and the number of vehicles of each shown are as follows: Acason, 2; Acme, 3; All-American, 3; Autocar, 4; Available, 2; Bethlehem, 4; Brockway, 2; Chevrolet, 2; Clydesdale, 3; Commerce, 2; Couple-Gear electric, 1; Day-Elder, 4; Dearborn, 4; Diamond-T, 4; Dodge Bros., 3; Dorris, 2; Federal, 3; Ford, 2; F. W. D., 2; Fulton, 2; Garford, 6; Gary, 1; G. M. C., 5; Hendrickson, 1; Jumbo, 1; Indiana, 5; Kisselkar, 2; Lapeer, 1; Master, 7; Maxwell, 4; Mutual, 1; Nash, 4; Oneida, 4; Paige, 3; Panhard, 3; Patriot, 2; Pierce-Arrow, 3; Rainier, 2; Reo, 7; Republic, 4; Riker, 1; Sandow, 3; Sanford, 2; Service, 3; Schacht, 2; Signal, 2; Tower, 2; Transport, 1; Velie, 3; Walker electric, 2, and the Winslow steam truck, 1. The Packard and White exhibits were conspicuous by their absence.

Two new models of Available trucks had several departures in design, including a new method of brake equalizing, a new method of front axle mounting and a two-step runningboard. The brake equalizing is accomplished by two flat equalizer rods, one above the other, which run in slotted members fastened to the under side of the truck frame near the midpoint of the chassis. These rods extend crosswise of the frame and move forward in a longitudinal direction toward the front end of the truck as the brakes are set and backward as they are

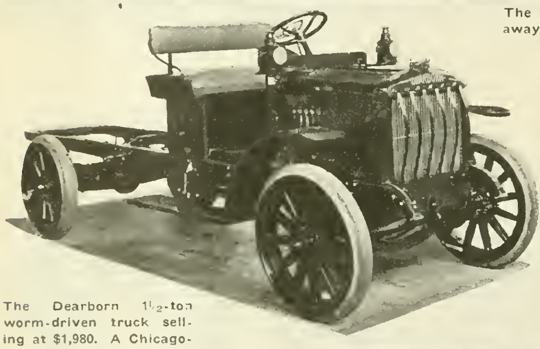
The new Stewart 3½-tonner selling at $3,500 and equipped with Continental engine, four-speed gearset and internal-gear-driven rear axle



New 3½-ton Available which has a new method of brake equalization and has its front axle mounted on a slant, with the rear end of the front spring lower than the front

The new Paige 3½-tonner, which has a Continental engine, Brown-Lipe clutch and four-speed gearset and a Timken worm-driven axle

The new Master 1½- and 5-ton models, the former shown in a drive-away mounting. The smaller unit can be had with worm or internal-gear drive. The 5-tonner is worm driven



The Dearborn 1½-ton worm-driven truck selling at $1,980. A Chicago-standard rear axle and Continental engine are employed

The 5-ton Oneida, shown for the first time. Note the cab, metal wheels and special form of radius rod bracket

released, or vice versa. The Timken rear axle used has two brake-shoe segments in each drum, and under the ordinary method the two forward shoes are moved into contact with the drum when the emergency brake lever is pulled and the two rear shoes when the foot pedal is used. This sets up a strain in the axle which the Available company has overcome by connecting one of the rear shoe rods to the transverse equalizer rod on one side and one of the front shoes on the other side, thus tending to equalize the entire action. The front axle of each of the new models is set on a slant from the front to the rear by making the rear end of the spring lower than the front. When an obstruction is encountered the wheels tend to mount it without the strains set up when the axle is set level. The steering arm knuckle is also set over the centerline of the axle so that its arc of movement is very small when the spring is deflected. This gives an easier steering truck.

Quadruple-Heated Fuel

The All-American truck heats its fuel four times before it enters the cylinders, in this way giving a greater degree of vaporization and making it possible to get more miles per gallon and to use poorer grades of fuel. These four heatings are made possible by mounting the gasoline tank directly above the engine under the hood; by a hot air jacket around the air intake pipe leading to the carbureter; by passing the gas through the cylinder block after it has left the carbureter and by then making it impinge on the hot sides of the intake manifold, which is cast integrally with the exhaust manifold.

Due to the use of steam instead of gasoline, the Winslow steam truck was perhaps the newest vehicle at the show. The Winslow company has built only one model to date, the 5-tonner at the show, although it is intended to bring out smaller units at a later date. The truck is fitted with a four-cylinder engine with the cylinders cast in pairs and set in a V of 90 deg. The engine is placed under the floor of the cab and drives direct without any clutch through a tubular propeller shaft with universals to the Sheldon worm-driven rear axle. An emergency gear reduction 3.5 to 1 is provided, making the total gear reduction to the rear wheels 41 to 1. The final drive is taken through radius rods and the torque through the springs.

Water-Tube Boiler Used

The water is carried in a transverse tank under the driver's seat and is fed to a horizontal water-tube boiler carried in a special crosswise compartment behind the driver's seat above the floor of the truck body by a special worm-driven boiler feed pump. The boiler is fired by kerosene, which is also carried in a bolster tank under the driver's seat. A large condenser is mounted at the extreme front of the truck in place of the usual radiator. Its makers claim that one of its main advantages is its low cost of fuel. It is claimed that the truck will run at a cost of 6 cents a gross ton-mile. The gross ton-mile is figured at the gross weight of the truck and load. With the average 5-ton truck weighing 10 tons and running 4 miles to the gallon of gasoline at 25 cents a gallon, the corresponding cost per gross ton-mile would be 10 cents.

Another claim is for a great tractive effort in starting, it being said that the truck has an available torque of 13,200 lb. in., making a maximum available torque for the rear axle driveshafts of 45,100 lb. ft., or a tractive effort of more than 12,500 lb., which will far exceed the friction between the wheels and the road, even when the truck is fully loaded.

New Lee Trailers

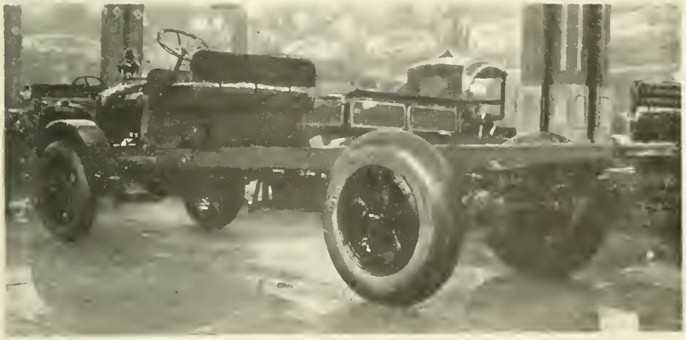
The Lee Loader & Body Co., Chicago, exhibited a brand new series of three special trailers which have been tried out, notably by the city of Indianapolis, where one type has given eminent satisfaction by helping to reduce the cost of performing work previously done by horses at the rate of $117 a day. The three new units consisted of a 5-ton side and end dump four-wheel trailer, a drop-frame trailer and a new type of contractor's trailer which may be used as a semi-trailer, with the forward end carried on the rear deck of a tractor or as a four-wheel trailer by the utilization of a pair of front wheels.

Two models of Troy trailers, one a 2-ton reversible chassis and the other a 3½-tonner with a steel body, were shown. The Highway Trailer Co., Edgerton, Wis., exhibited three models of trailers, two of the four-wheeled type of 3- and 5-ton capacity respectively and a 7-ton semi-trailer. Another trailer make, The Hesse, made by the William G. Hesse & Son Mfg. Co., Leavenworth, Kan., was shown in two models, one of 3-ton capacity of the four-wheeled type and a 4-ton semi-trailer.

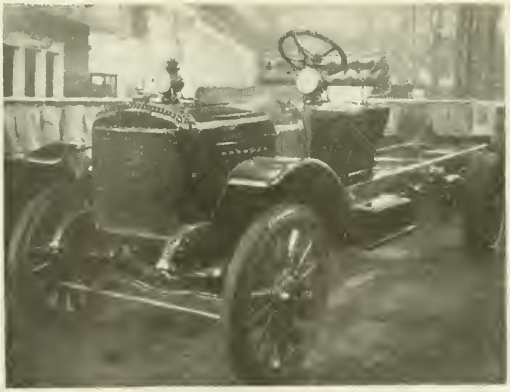
The Lapeer Tractor-Truck Co., Lapeer, Mich., showed one of its complete tractor and easily-disconnected trailer outfits. That company claims that the new Fulton semi-trailer shown at the same show infringes on its patent rights.

The various truck parts exhibited at the truck show were very important to the truck owner because of the fact that the large percentage of the 1919 production of motor trucks will be what is commonly known as the assembled rather than the manufactured vehicle. In the way of engines the Waukesha Motor Co., Waukesha, Wis., exhibited four makes of engines, including one of the actual Class B engines. The Waukesha company will shortly bring out an entirely new line of high-torque engines particularly designed for motor truck service. One of the unusual features of the new line will be a patented manifold with a mechanism which will permit the engine to utilize gasoline, kerosene or other lower grades of fuel without any changes in the engine itself. The headliner of the new models will be a 5 by 6¼ four-cylinder engine with 490 cu. in. piston displacement. That engine has been designed as an improvement on the Class B truck engine in that it will incorporate the new manifold mentioned and will have a lower compression to prevent knocks at low speed. It will have 50 cu. in. more piston displacement to offset the lower efficiency which would otherwise result on account of the lower compression and also the loss in volumetric efficiency which would otherwise occur due to the greater heating of the fuel in the new manifold. The

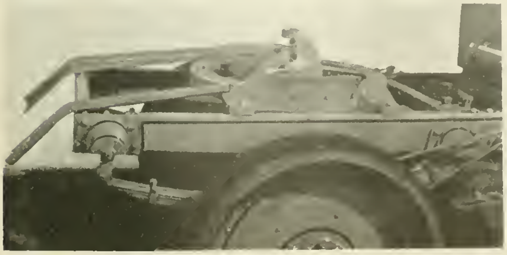
(*Continued on page 36*)

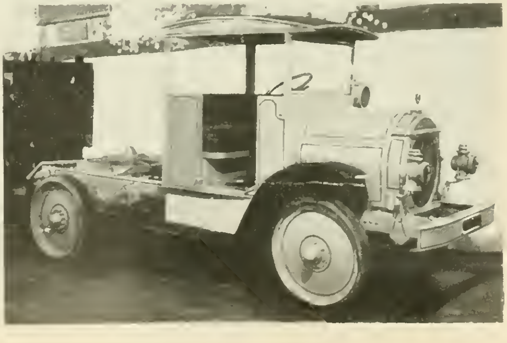


Above, the new Republic 3½-tonner with metal wheels and 44 by 10 in. pneumatics in the rear



To the right, the new Republic 2½-ton model which has a Continental engine





Details of the fifth-wheel arrangement and cab on the new Fulton 3½-to-4-ton tractor semi-trailer outfit

New York Exclusive Motor Truck Show a Success

161 Complete Vehicles of 58 Makes Exhibited—Pneumatic Tires, Chassis Oil Lubrication and New Types of Bodies Were Features

NEW YORK'S exclusive motor truck show, the first held in the city proper since January, 1913, opened on February 10 with fifty-eight different makes of complete vehicles on display. In all 161 vehicles were on exhibition. Of these, four were brand new trucks made by concerns which have entered the motor truck industry within the past six months. They included the Olds Motor Works, Lansing, Mich., with a new Oldsmobile ¾- to 1-ton light delivery truck selling at $1,495; the Schwartz Motor Truck Co., Reading, Pa., with a new 1½-ton internal-gear-driven truck; the W. W. Shaw Corp., Chicago, with a new 2-tonner selling at $2,950, and the West Motor Truck Co., New York City, with a new 2-ton electric truck.

Eleven Companies Showed New Units

Besides the brand new models displayed, eleven other new models of lines previously on the market were on exhibition. These were shown by the following companies: Acme Motor Truck Co., Cadillac, Mich., Columbia Motor Truck & Trailer Co., Pontiac, Mich.; Corbitt Motor Truck Co., Henderson, N. C.; Dearborn Truck Co., Chicago; Fulton Motor Truck Co., Farmingdale, L. I.; Master Trucks, Inc., Chicago; Rainier Motor Corp., New York City; Republic Motor Truck Co., Alma, Mich., Rowe Motor Mfg. Co., Lancaster, Pa.; Stewart Motor Corp., Buffalo, N. Y., and the H. E. Wilcox Motor Co., Minneapolis, Minn. The La France 2-tonner, made by the Ward La France Co., Elmira, N. Y., was shown for the first time in the Metropolitan territory.

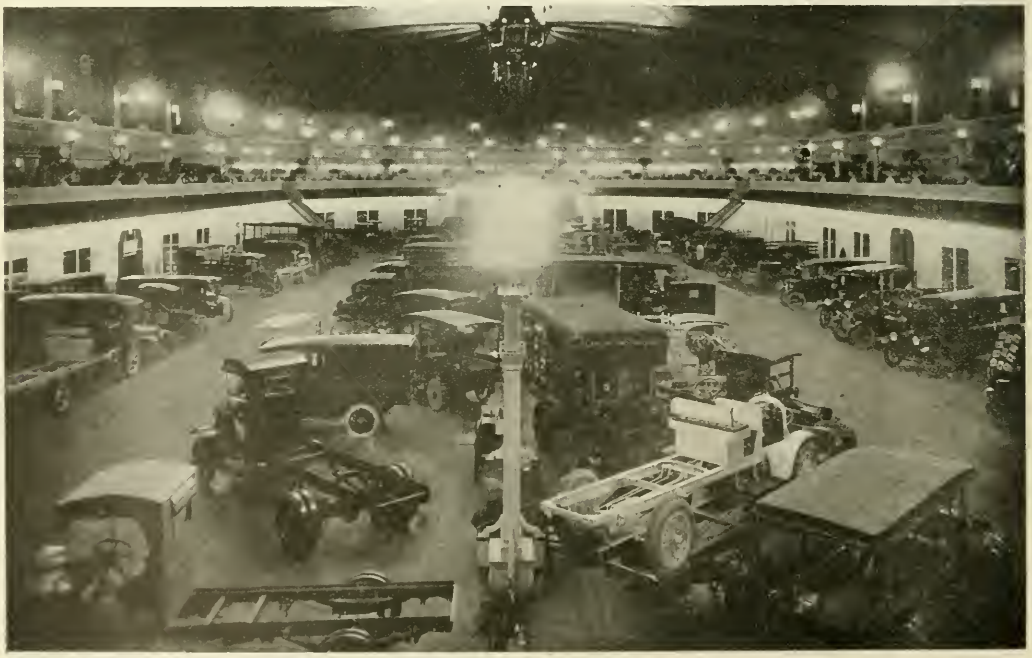
Twenty-six of the fifty-eight different makes of trucks at the New York show were not exhibited at the Chicago show, so that a visitor to both shows had a much wider range to choose from than he had if he saw only one of the two exhibitions. This is especially the case since twenty-two of the fifty-two makes seen at Chicago were not shown in New York. Those makes on display in New York and not at Chicago included the following: Atlas; Columbia; Corbitt; Denby; Giant; Hall; Kelly-Springfield; La France; Larrabee-Deyo; Maccar; Menominee; Oldsmobile; Overland; Packard; Parker; Rowe; Schwartz; Shaw; Sterling; Sullivan; Traffic; U. S.; Ward electric; West electric; Wichita, and Wilcox.

Similarly, those makes seen at Chicago and not at New York are as follows: Available; Brockway; Chevrolet; Commerce; Couple-Gear; Dorris; Ford; F. W. D.; Gary; G. M. C.; Hendrickson; Indiana; Kissel; Mutual; Panhard; Patriot; Pierce-Arrow; Sandow; Signal; Walker electric and Winslow steam truck.

Sixty-ninth Regiment Armory Also Used

The large number of truck exhibits made it necessary to use the Sixty-ninth Regiment Armory in addition to Madison Square Garden. The decorations for the passenger cars show, which was held the week previous, were left in place for the truck show week of February 10 to 15. As was the case at Chicago, the sixteen new models of truck makes seen at New York were a surprise in that it was expected that very few new models would be exhibited on account of the years 1917 and 1918 being ones of production rather than of new models.

The makes of trucks exhibited and the number of vehicles of each shown are as



General view of Madison Square Garden, where part of the 1919 exclusive motor truck show in New York was held from February 10 to 15. The trucks are arranged in four long rows with two wide aisles between

Part of the truck exhibit at the Sixty-ninth Regiment Armory, where the overflow displays from Madison Square Garden were shown. The decorations in both buildings were the same as used during the passenger car show the week previous

follows: Acason, 2; Acme, 4; All-American, 2; Atlas, 4; Autocar, 4; Bethlehem, 4; Clydesdale, 5; Columbia, 2; Corbitt, 1; D-E, 3; Dearborn, 1; Denby, 3; Diamond-T, 3; Dodge Bros., 3; Federal, 3; Fulton, 3; Garford, 3; Giant, 4; Hall, 2; Hulburt, 2; Jumbo, 1; Kelly-Springfield, 3; La France, 1; Larrabee, 1; Maccar, 3; Master, 5; Maxwell, 4; Menominee, 2; Nash, 5; Oldsmobile, 3; Oneida, 3; Overland, 4; Packard, 4; Paige, 3; Parker, 1; Rainier, 6; Reo, 6; Republic, 5; Riker, 3; Rowe, 1; Sanford, 1; Schacht, 4; Schwartz, 1; Service, 3; Shaw, 1; Signal, 2; Sterling, 5; Stewart, 5; Sullivan, 1; Titan, 1; Tower, 1; Traffic, 3; United States, 2; Velie, 2; Ward, 2; West, 1; Wichita, 1, and Wilcox, 4.

Pneumatics Much in Evidence

Viewing the show as a whole, there was a noticeable tendency toward the increased use of pneumatic tires on trucks up to 2-tons capacity. Perhaps the most conspicuous example of this kind was the Rowe 3-tonner, which is equipped with 38 by 7 in front and 42 by 9 pneumatics in the rear and is designed to run at a speed of 30 miles an hour with a full 3-ton load. The Rowe truck is further characterized by the use of an eight-cylinder Herschell-Spillman 3¼ by 5 engine with an S. A. E. horsepower of 33.84. The new 3½-ton Republic may also be had with Firestone giant pneumatics at an extra cost, and the model exhibited at the show was mounted on 38 by 7 pneumatics in front and 44 by 10 in. pneumatics in the rear.

A large proportion of the chassis shown were equipped with some form of closed cab for the driver's better protection. Several of these were of the built-up type with wood doors and drop sash windows. Others, notably that on the Hall 3½-tonner, were provided with fabric side doors with transparent windows in an integeral unit which may be rolled up out of the driver's way under the roof of the cab when it is desired to have the cab open. Great advancement was shown in fastening the cab doors and sashes, so that when the cabs are shut they are just as weatherproof as a passenger car sedan. Cushions in the cabs appeared to be covered with good grades of imitation leather and in many cases were mounted on springs to give easier riding.

Along with the many cabs shown, there were several very excellent examples of the body builder's art. In this respect, the bodies built by the Fred Roeder Mfg. Co., Brooklyn, N. Y., were very conspicuous. One of that concern's bodies mounted on a 5-ton Sterling chassis attracted considerable attention. Almost every kind of body type was seen, including convertible platform, side stake and low side types; pay-as-you-enter buses; van bodies; large and small dump designs and special panel jobs with interior shelving.

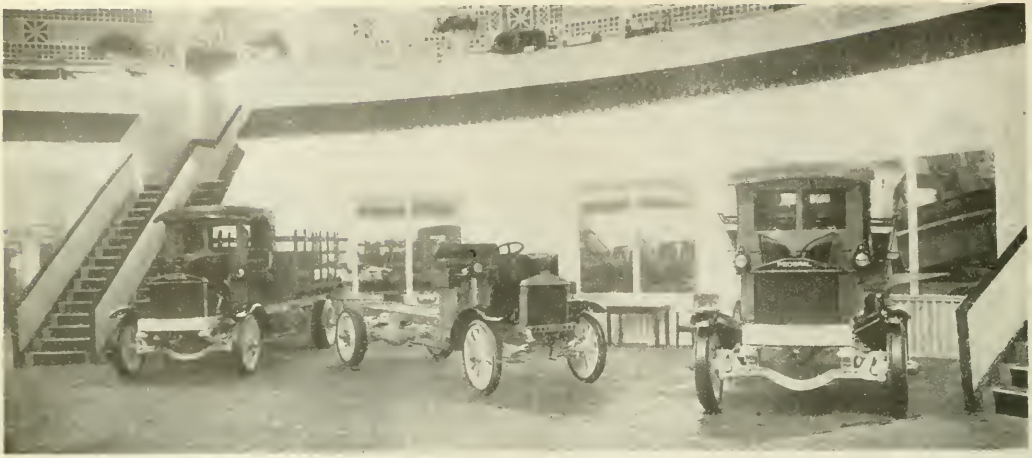
Packard Has Steel Body

Perhaps the most interesting of the convertible types was a steel body mounted on a 6-ton Packard. It was made by the Young Hoist Co., and raised by means of a Young horizontal hoist. It had a steel platform with low removable steel sides. With the low steel sides in place the body serves to haul heavy bulk material such as excavated ground, sand, cement and the like. Additional side members may be placed on top of the low sides mentioned to give a larger volumetric capacity for handling bulky but lighter goods than would be carried when the low sides alone are employed. The upper sides are held in place by special front and rear frames, the rear one of which is also provided with a tailgate for rear dumping. The Economy dump body designed to fit any 1-ton chassis and selling at the moderate price of $250 complete with a hand hoist was also shown. The body is made of 12-gauge steel throughout and has a cubical capacity of 35 ft.

Ward Electric Excites Attention

The 750-pound Ward special electric truck on display excited considerable comment on account of a new front step and hinged dashboard. The Ward vehicle was designed particularly for the house-to-house delivery of bread and milk where stops are very frequent. The new step, which is in front of the forward wheels and about 12 in. off the ground, also serves as a bumper and when the right half of the vertical dashboard is swung around over the left half, as shown on page 13, and makes it possible for the driver to get in and out of the truck from the sidewalk in the quickest possible time.

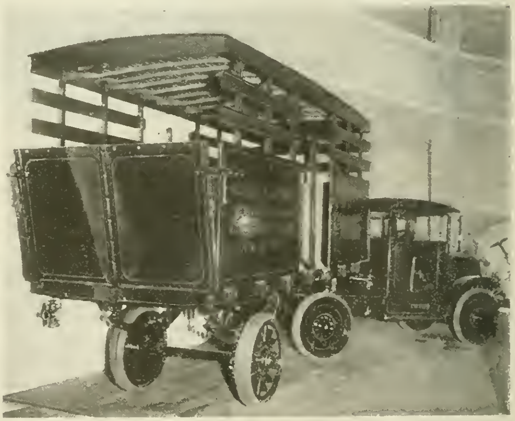
In the engineering field there appeared to be a tendency towards chassis simplification. In this respect the use of oil



The Federal display, one of the best laid-out exhibits at the show. The booth is not overcrowded and permits the visitor to get either a close-up or perspective view of all three models which have not been changed for this year

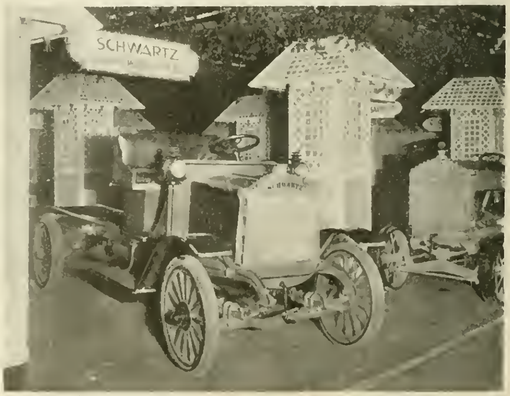
NASH TRAVELING TRUCK SHOW
NASH TRUCK
TRAVELING SHOW
NASH
NASH
MOTOR CORP.
NEW YORK CITY
WARREN NASH MOTOR CORPORATION
123 W 64th ST NEW YORK CITY
NASH TRUCK

A new idea in truck merchandising. The interior of the body is fitted up with some of the parts used in the Nash line



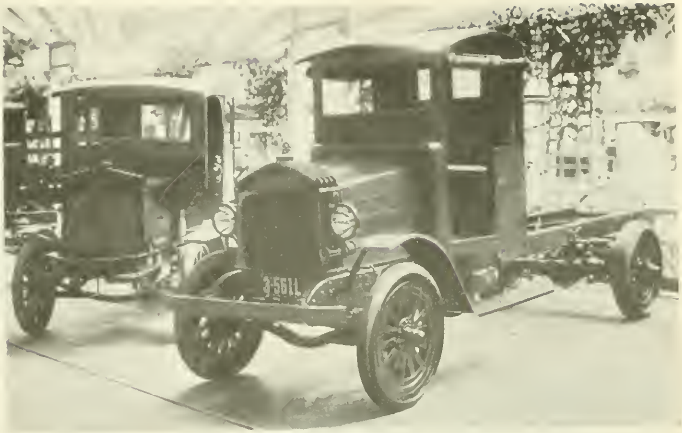
The new Fulton 3½-to-4-ton tractor and semi-trailer outfit. The trailer has a wheeled support to enable it to stand alone

The new Shaw 2-tonner, made in Chicago and exhibited in New York City for the first time at any motor truck show



The new Schwartz 1½-tonner made in Reading, Pa. It is assembled from standard parts and has an internal-gear axle cups for the lubrication of spring and shackle bolts, steering gears and propeller shafts was the most noticeable. Brake rod layout also has undergone some slight modifications with a view to better equalization and simplification.

In addition to the various makes of complete vehicles, five makes of passenger car converters were shown, including the Converter car, Dearborn, Graham Bros., Guaranty and Truxton. Three makes of trailers were also on display. These included the Lapeer, Troy and Warner makes. Another innovation at the show was the display at a motor truck exhibition of farm tractors, no less than four such vehicles being shown.


At the left, the Traffic, made in St. Louis, Mo., and, to the right, the La France 2-tonner, both shown for the first time at any exhibition in the Metropolitan territory

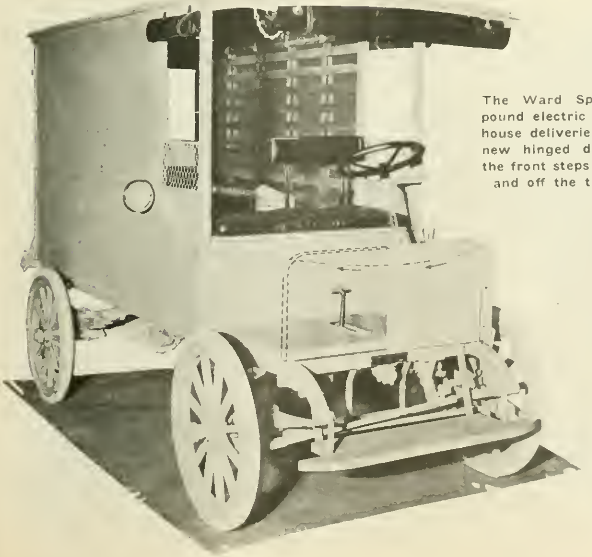
The New Models

In the way of new models the Acme 5-tonner, whose price has not yet been determined, is fitted with metal wheels as standard equipment and drives from a Continental 4¾ by 6 in. modified Class B engine through a Borg & Beck dry-plate clutch and a three-speed Cotta selective gearset to a Timken worm-driven rear axle. The new Columbia model is a 1-ton internal-gear-driven truck with a Continental unit powerplant engine and a Russel internal-gear rear axle. It sells at $1,750 in the chassis. The new Corbitt model is a 5-tonner which is fitted with a 5¼ by 5¾ in. engine instead of a 4½ by 6 in. Continental unit as formerly. The model has been further redesigned in its details and the price increased $500 from $4,500 to $5,000.

The Dearborn Truck Co., Chicago, which bought out the Smith Motor Truck Corp., and the Smith Form-a-Truck Co., Chicago, and marketed the Smith converter separately or as complete units with Ford front ends, showed an entirely new model called the Dearborn. The vehicle is a 1½-ton worm-driven truck assembled from standard parts and selling at $1,980. It has a unit powerplant made up of a Continental 3½ by 5 engine, a Fuller dry multiple-disk clutch and a Fuller three-speed selective gearset. The rear axle is made by the Chicago-Standard Axle Co., Chicago. The Fulton company's new model consisted of a 3½- to 4-ton tractor and semi-trailer outfit which is characterized by an unusual type of fifth-wheel and by the use of small wheels for supporting the front end of the semi-trailer. The semi-trailer is also fitted with a wheeled supporting gear to keep the trailer erect while it is disconnected from the tractor. When not in use the support may be folded up out of the way under the semi-trailer body.

The new Master trucks are 1½- and 5-tonners. The former may be had with either a Torbensen internal-gear-driven rear axle at $1,890 or with a Timken worm-driven rear axle at $1,990. The option on the rear axle does not change the other details of the truck, which has a wheelbase of 144 in., a Buda 4⅛ by 5½ in. engine with Eisemann high-tension magneto and an impulse starter, and a Fuller dry-disk clutch and Fuller gearset. The 5-tonner sells at $4,890 in a standard wheelbase of 170 in. It is assembled from standard parts, including a Buda 4½ by 6 engine, Brown-Lipe dry-disk clutch, Brown-Lipe four-speed gearset, and Timken worm rear axle.

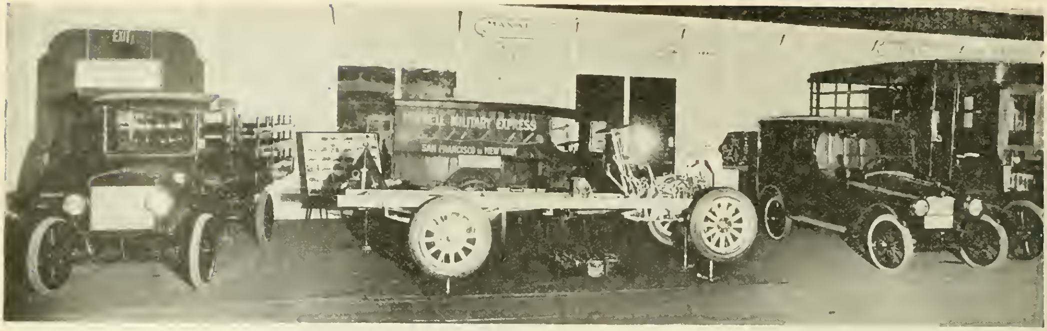
The Rainier Motor Corp. exhibited a complete line of five models, of which two, a ¾-ton special and a 2-tonner, both worm-driven, were new. The ¾-ton special is fitted with a 3½ by 5⅛ in. Continental engine, Brown-Lipe dry-disk clutch and Brown-Lipe gearset and a Timken rear axle. It lists at $1,550. The 2-tonner sells at $2,250 and uses a Continental motor, Brown-Lipe clutch and gearset and a Wisconsin worm-driven rear axle.


The Ward Special, a 750-pound electric for house-to-house deliveries. Notice the new hinged dashboard and the front steps for getting on and off the truck quickly

Republic Shows Two New Units

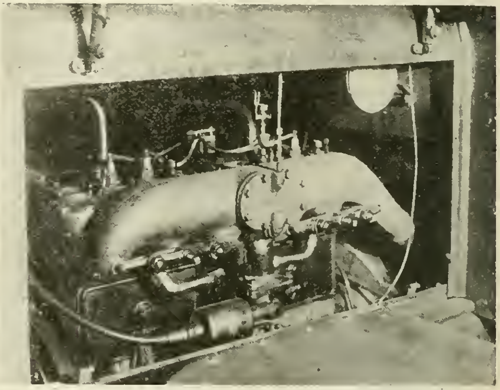
The two new Republic models are of 2½ and 3½-ton capacity. Both are now fitted with Continental engines instead of Budas and with three- instead of four-speed gearsets. The cubical capacity of the radiators of both models has been increased and a new type of Pharo suction governor fitted. As previously mentioned, the 3½-ton model may be had with pneumatic tires all around at an extra cost. Metal wheels are standard on the 3½-ton vehicle. The new Rowe 3-tonner on pneumatic tires has an eight-cylinder engine and is designed to run 30 miles an hour under full load. It was described in greater detail in THE COMMERCIAL VEHICLE for January 1, 1919.

Another new model of an established line was the Stewart 3½-ton internal-gear-driven truck, which is listed at $3,500. It is fitted with a Continental



A well-arranged exhibit, that of the Maxwell Company. The stripped chassis can be seen from the main aisle, while wide spaces to the front and rear enable visitors to move in and out of the booth freely. Note the transcontinental Maxwell in the background

The new Giant 3½-tonner whose engine has a special manifold and fittings to enable it to burn kerosene or other low grade fuels, a possible future fitting on all makes of trucks



The special kerosene-burning equipment and manifold as fitted on the new line of Giant trucks, formerly known as Little Giants. Note the special fuel tank under the hood

4½ by 5½ in. engine with an Eisemann high-tension magneto and drives through a dry-disk clutch and four-speed selective gearset in a unit powerplant. The Wilcox line of trucks, which was shown in New York for the first time, has been slightly redesigned. Each model has a four-speed gearset and in the case of the long wheelbase models, the propeller shaft has three universals, the center one being carried in a self-aligning bearing.

Trailers and Converting Attachments

Among the trailers exhibited were the Lapeer, made by the Lapeer Tractor-Truck Co., Lapeer, Mich. This is a semi-trailer with automatic coupling attachment and brake operated from the tractor driver's seat. The coupling is a fifth wheel arrangement consisting of inclined tracks and coil springs to absorb starting and stopping strains. When the trailer is disconnected from the tractor it is supported on a leg which is inter-connected with the coupling. This trailer is made in capacities of from 2 to 7½ tons.

The Troy Wagon Works Co. showed a 5-ton reversible trailer, embodying the usual features of the company's product. Bronze and steel are used for every part except the wheels, steering knuckles are on all wheels, telescoping spring drawbars are used and the drawbar head is of broad-faced bumper type. Troy trailers are made in capacities of from 1 to 5 tons. Trailers built by the Warner Mfg. Co., Beloit, Wis., were also exhibited.

Several makes of commercial attachments for passenger cars were exhibited. These included displays by Graham Bros., Evansville, Ind., and Truxtun units made by the Commercial Car Unit Co., Philadelphia, and exhibited by the Hayes-Diefenderfer Co., New York, who also showed models of Hay-Dee extensions.

Exhibits of engines, axles and the heavier parts were not so numerous as was the case at Chicago. The Chadick, DeLameter Corp., New York, parts and service representative of Continental motors and Sheldon axles, displayed examples of the products of the factories represented. The Clark Equipment Co., Buchanan, Mich., showed its internal gear drive axles, which are made in capacities of from ½ to 5-6 tons, and also the Clark disc steel wheels for medium and heavy-duty trucks.

Steel Wheels on View

There were a number of steel wheels on view, including the West cast steel wheel, made by the West Steel Casting Co., Cleveland; the Budd pressed steel wheel, made by the Budd Wheel Corp., Philadelphia; the Dayton steel wheel made by the Dayton Steel Foundry Co.; the Smith steel wheel with hollow spokes, made by Smith Wheel, Inc., Syracuse, N. Y., and two or three resilient or puncture resisting wheels, including the Jaxon and the Eagle. Sewell cushion wheels, made by the Sewell Cushion Wheel Co., Detroit, were also on view.

(*Continued on page* 29)

Truck Bodies

So many new and interesting motor truck bodies were exhibited at the New York and Chicago truck shows that there was not sufficient space in this issue to do them justice. Accordingly, they will be treated in a separate article to appear in the next issue of this magazine.

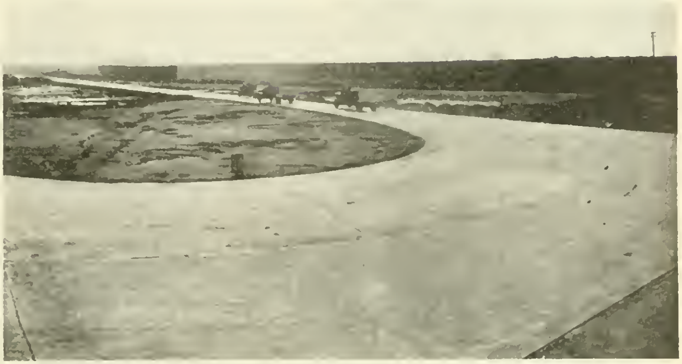
New Truck Testing Track Made of Concrete

ONE of the most recent uses of concrete and one of the most recent developments in motor truck factory efficiency is the new concrete testing track built within the grounds of the Diamond-T Motor Car Co., Chicago. The track was conceived early last fall and was first used during November for testing out the Class B Liberty trucks assembled by the Diamond-T company.

Before the construction of the new track it had been the practice of the Diamond-T company to test all of its own vehicles as well as the Class B trucks over the streets of Chicago in close proximity to its factory. This method was not entirely satisfactory because there was no way of controlling and supervising the work of testing. Later a cinder track was built to overcome the difficulty but failed because the trucks soon dug large holes in it and these increased the gasoline consumption.

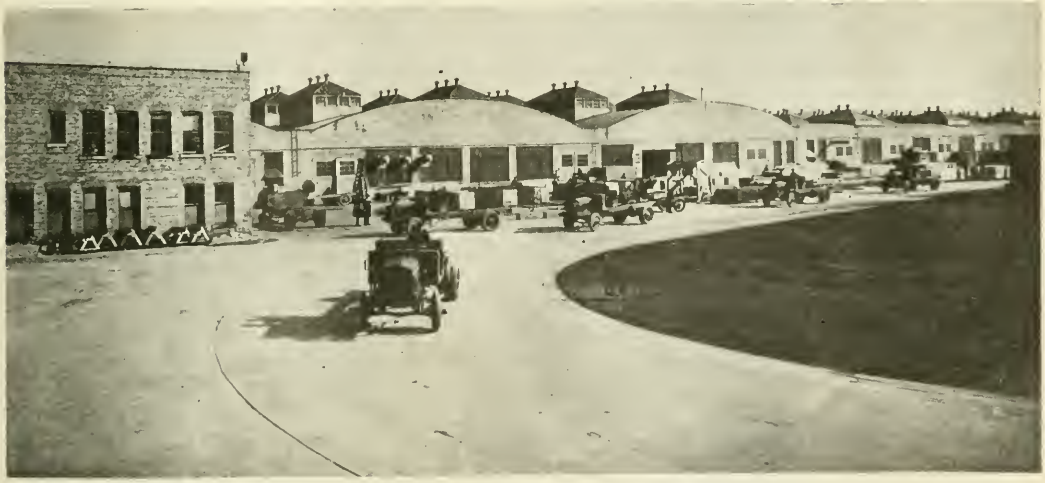
All of the unsolved problems of both the above-mentioned methods have been satisfactorily solved by the concrete track. It enables the trucks to be tested out on the company's own property and under its constant supervision. The testers are now always close to the factory and have the advantage of immediate assistance and advice which was not possible under the methods employed heretofore.

Other advantages of the track, which is 1/3 mile long, are that the trucks will be cleaner after the test runs and need less washing; that it will be cheaper to maintain the trucks and that more trucks may be tested per day. Insurance rates are lower due to the elimination of the possibilities of hitting pedestrians and having accidents, and a uniform standard for testing is provided under all conditions of weather.

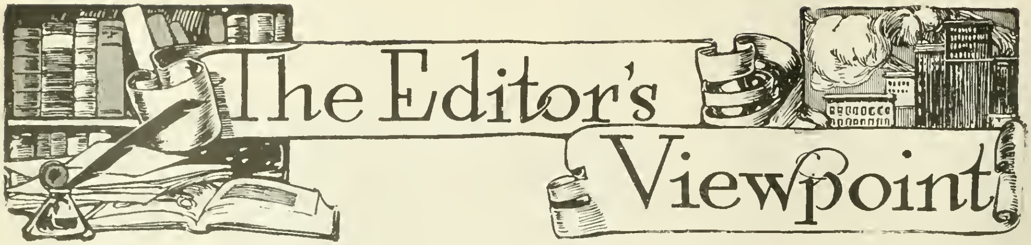


The Diamond-T truck testing track, showing how it is laid in sections with expansion joints between

Another view of the track, with several trucks being tested out under close factory supervision



Class B and Diamond-T trucks starting out on their 50-mile test runs on the concrete track. The track is on the factory grounds, so that much time is saved in making repairs or adjustments



The Editor's Viewpoint

The 3 Per Cent Transport Tax

TRUCK owners who hire out their vehicles at so much a day are up in arms against the payment of the 3 per cent tax on the total shipping charges on goods carried by public trucks which move goods for hire. This tax was placed early in 1917 and was intended to apply to public trucks running overland in competition with the railroads. Until recently no attempt has been made to collect it except in widely-separated points. Internal revenue collectors are now at work attempting to get in the tax and in New York City have given their own personal opinion that trucks hired out by the day should pay the tax, even though the truck and driver are at all times under the orders of the company hiring the vehicle while still remaining the property of the truckman.

The truck owner points out that he simply sells the services of his truck and the driver to operate it and has no means of knowing accurately the amount of work done by the truck or the shipping charges on the goods carried. He also points out that the company hiring the truck and driver at so much a day really owns the truck and is paying for it at the rate of so much a day because it controls it, and even though it never takes actual title to it.

As a privately-owned truck doing exactly the same work does not have to pay the tax, the truck owner states his belief that his truck should not have to pay the tax. There can be no argument against paying the tax in cases where the truck is always under the control of the owner and picks up goods from several different concerns, provided the vehicle runs in competition with the railroads or other means of transportation.

But under the conditions cited, at least one large New York truck owner who hires out his vehicles has refused to pay the tax until some official ruling from the Treasury Department in Washington may be had.

Boston Should Have Truck Show

NOTWITHSTANDING the meager attendance at the recent exclusive truck show in Chicago and so far at the New York truck show in progress as this is written, it seems that Boston should stage some form of motor truck exhibition during the next two months. The Boston truck show has been the only commercial vehicle exhibition of anywhere near national importance held in the years from 1913 to 1918 inclusive. It has served all New England and because of this service has undoubtedly contributed in a large measure to the growth of motor trucks in New England from 20,335 in 1915 to the 59,758 in use up to December 1, 1918.

Of all years, the present one calls for a truck show in Boston for the reason that 1919 is going to be a year of fierce competition in the sale of trucks. The last two years have been years of production. Now the war and its tremendous war truck orders are over. The trucks which would have gone into military service during 1919 if the war had continued will now have to be sold in the commercial field. Approximately 126,000 trucks were sold to the Government during 1917 and 1918, or an average of 63,000 for each of the two years. With this figure in mind, it is seen that at least 63,000 more trucks will have to be disposed of this year in addition to another 60,000 of increased production now planned by the makers, or over 123,000 trucks in all.

The disposition of this number of trucks, more than was produced in the two years of 1914 and 1915 combined, is no mean task. Truck shows will help sell this vast number of trucks by bringing the truck forcibly to the attention of the public, even though no large number of sales be actually completed at the exhibitions and even though the show attendance be meager. Makers who distribute trucks in New England and dealers who sell them there should for their own benefit see to it that Boston has its annual motor truck display.

The Field of the Motor Truck and Trailer in Cotton Haulage in the South

Inter-City Movement Now Bulk of Work—Big Chance for Development in Hauling from Producing Points to Markets

By Joseph Husson

SAVANNAH, GA., the heart of the cotton export business of the United States, offers a large future field for motor truck use in hauling cotton in its various forms. To-day the surface of that field has only been scratched. The field may be divided into three parts: 1—Hauling bowl cotton from the local farms to the Savannah ginneries for removing the seeds and for baling; 2—Hauling baled cotton from the Savannah ginneries and railroad terminals to warehouses and to cotton compresses, and 3—Hauling baled cotton from points within a 50-mile radius of Savannah to the warehouses or compresses for export or domestic shipments.

Light Trucks for Gin Cotton

The work of hauling bowl cotton to the Savannah ginneries is at the present time done by mules and small, light, medium-priced trucks owned by the farmers themselves. Mules were used exclusively for this kind of work for many years, and it was only during 1918 that any considerable number of small, light trucks were put into the service.

The great prosperity of the South due to the 35-cent cotton price which existed during the greater part of 1918 resulted in many of the small farmers, a large majority of them negroes, buying small trucks for cotton haulage and for carrying the other products of their farms to market. The number of trucks at the present time in such service is very small as compared to the number of mules. This condition exists partially on account of the layout and construction of the ginneries and the seasonable character of the work.

The cotton ginning season begins about Aug. 15 and runs to Jan. 1. During this season everybody wants to have his cotton ginned, so that there are always long lines of vehicles waiting their turn at the gins during the season, while in the off season the plants are shut down. The cotton is brought to the gin in large bulky loads and sucked up through pneumatic tubes to the gins themselves, where the seeds are extracted. Practically every gin in the South has only two or three of these pneumatic tubes, so that some vehicles must always wait in line. This wait is not so expensive when a mule is standing idle, but when it is a light truck the conditions are at once changed because the work ability of the vehicle is cut down to a non-paying extent.

As told on page 23 of THE COMMERCIAL VEHICLE for Feb. 1, 1919, the long waits at the ginneries are general in Georgia and throughout the South and must be improved before there can be any radical increase in the motor trucks handling seed cotton. If a truck has to wait in line 2 or 3 hours, it obviously loses all of its advantages of speed as compared with the mule. When there is plenty of other goods to be hauled, it is evident that it does not pay to allow the truck to stand idle for such long periods. With the seeming impossibility of at once increasing the gin facilities in any radical manner, the use of trailers in connection with the trucks employed in the service offers at least a partial solution of the problem. Their use would enable the trucks to be taken out of the line, leaving the trailers to be moved up under the pneumatic tubes in their turn by hand power or by one or two mules kept at the gins for that particular purpose. The trucks which hauled the trailers could be profitably employed in other work while the trailers were being unloaded and could call for the empty trailers later in the day, when they could be again loaded with other materials required by the farmer on his plantation.

1 to 1½-Ton Trucks Used

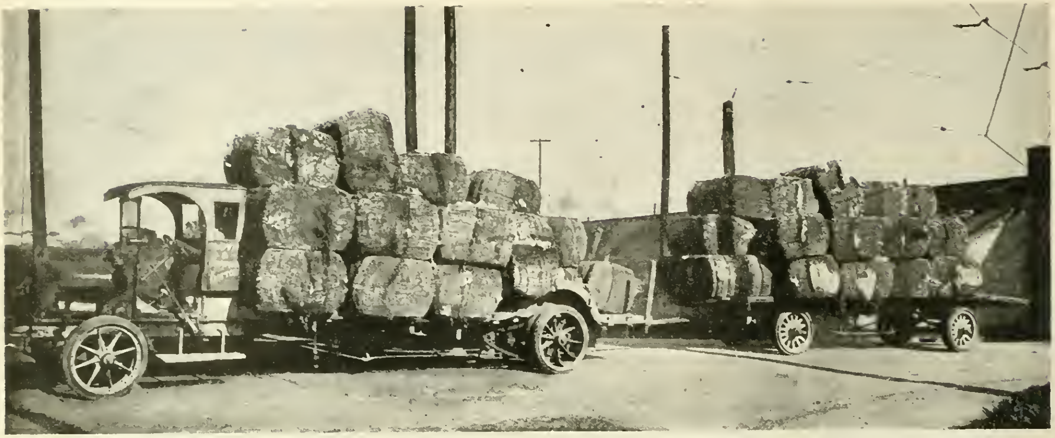
What trucks are at present employed in hauling bowl cotton are of 1- to 1½-ton capacity. In almost every case they are of the popular-priced variety and equipped with bodies of large volumetric capacity in order to carry their full loads of cotton in its light, fluffy form.

After the most prosperous year which the South has known since the Civil War, the average Georgia farmer in the vicinity of Savannah and throughout the entire South has more money than ever before, and with what motor haulage has been done during 1918 as a concrete lesson of the advantages of motor transportation will undoubtedly purchase a large number of light vehicles for the coming season. The plans for greater road building in the vicinity of Savannah during 1919 will also tend to increase the use of motor trucks and permit the truck's present superiority over the mule to be further enlarged.

To date the greater use of trucks in cotton haulage in Savannah is in the transfer of baled cotton from the railroads to the various warehouses and to the several compresses. The pioneer user of trucks in this field was Floyd & Co., which purchased a 3½-ton Packard truck in 1914. Since that time the haulage end of the cotton business of Floyd & Co. has been taken over by M. H. Floyd, whose present motor truck fleet consists of five vehicles ranging from 1½ tons to 5 tons in capacity and five trailers.

During the 1918 season M. H. Floyd handled close to 30,000 bales of cotton, 10,000 of which

The special low-platform White truck owned by M. H. Floyd, Savannah, Ga. It is shown being loaded at a railway platform with tweny-five bales of cotton to be hauled to a compress 5 miles away



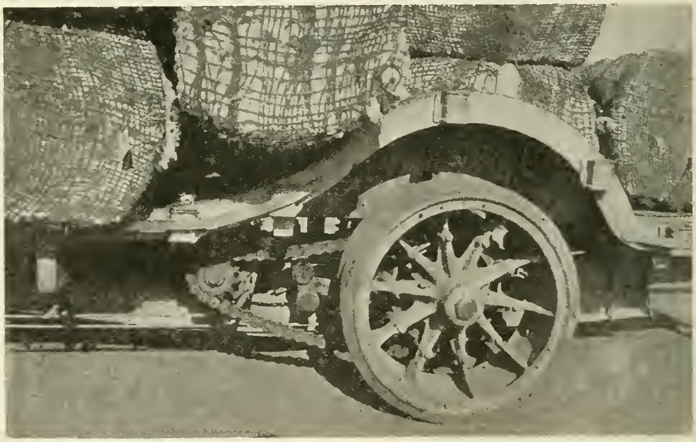
One of the White truck and Troy trailer outfits which carry forty-nine bales of cotton weighing 500 pounds to the load. Two of these outfits hauled 20,000 bales in 1918 between the Savannah railway terminals and a large compress 5 miles distant

were moved locally between the various railroad terminals and warehouses and 20,000 bales from one railroad to the compresses of the Savannah Warehouse & Compress Co., up the Savannah River, 5 miles from the city proper. Floyd & Co., which is still in business as a cotton buying and selling organization, also maintains a ginnery in Savannah, to which approximately 1000 bales of seed cotton were hauled during 1918. Approximately 150 of these bales were brought into the gin by means of motor trucks. This is only 15 per cent of the total amount handled by that particular gin, leaving 85 per cent still hauled by mules. While this percentage seems very small it is in reality large, since before 1917 practically all of the seed cotton was hauled exclusively by mules.

Uses Five Trucks with Five Trailers

M. H. Floyd's fleet at this writing consists of two White 1½-tonners, one Gramm-Bernstein 2½-ton truck and two special White 6½-tonners. These five vehicles are used at times in connection with five trailers of the four-wheeled type, three of which are regular Troy models of 5-ton capacity and two 1½-ton trailers made from old passenger car chassis.

As might be imagined by the difference in the sizes of the trucks, each has its own particular cotton work to perform. The two White 1½-ton models can carry eight bales apiece, or a total load of 4000 lb., with the average bale weighing 500 lb. It is only used for hauling baled cotton on special occasions However, greater economy can be had by the use of the special White 6½-ton models, which carry twenty-five bales on their own bodies in each case in addition to hauling twenty-four more bales on each 5-ton Troy trailer. The total number of bales moved per truck and trailer unit is therefore forty-nine bales, or a total load of 12¼ tons. The 2½-ton Gramm-Bernstein carries on an average of twelve bales on its own body in addition to an equal number on one of the lighter trailer units.



Detail of the underslung frame, rear wheel and chain-drive on the special White truck, which carries twenty-five bales of cotton to the load

Until February, 1917, most of the cotton received in Savannah reached the city at the terminals of the six railroads at that time serving the city. The baled cotton was then hauled either to a warehouse to await sale in the Savannah market or moved direct to one of several compresses, where it was further compressed and the bale reduced in size for saving shipping space in the vessels which transport it to northern ports or overseas. In February, 1917, the Savannah Warehouse & Compress Co. opened one of the largest compresses in the entire South at Port Wentworth, 5 miles up the Savannah River, where land was cheap and where the plant could be laid out along the most advanced lines with modern facilities for unloading, compressing, storing and loading the cotton onto lighters which were moved to the side of the ships to carry it. All except one of the six railroads entering Savannah laid special spur tracks to the compress so that cotton could be shipped direct to the compress without a warehouse handling it in the city.

The Midland railroad, perhaps the smallest of the six, did not enter into an agreement with the warehouse and compress company for trackage privileges on the ground that it had to make a continual fight against the other larger railroads to get its empty cars back so that they could be moved to the cotton-growing area where new shipments could be loaded.

Of course, the Midland railroad company had to provide some method of getting the cotton from its Savannah terminals to the compress at Port Wentworth if the owner of the cotton desired it to be shipped to that point. Vehicles with two teams, or a total of four horses, were first employed to move the cotton over the 5-mile haul to the compress, but proved so expensive and slow that motor trucks were installed. At first, individual trucks were used, but, as there were no grades on the route, trailers were experimented with and proved so successful that practically all of the cotton now received in Savannah via the Midland railroad is hauled to the compress by Floyd's forty-nine-bale White truck and Troy trailer outfits. During 1918 the trucks rendered a quicker service for the Midland railroad, which had no trackage facilities to the compress, than was given by the other railroads which did have such trackage facilities. All of the cotton received at any of the Midland depots in Savannah was hauled to the compress within 24 hours after the time of receipt and the freight cars released at once.

20,000 Bales Hauled to Compress

In the case of the cars shipped direct to the compress, delays of 2 or 3 days were usual, due to the rail congestion and insufficient switching facilities. The inability to get empty cars for cotton haulage was evidenced by the fact that some cotton shippers employed open gondola cars where the danger of fire was ever present on account of the flying sparks from the locomotive hauling the train. The trucks were able to give the quicker service because of the use of the highways, which were not congested to the same extent as the railways. The Floyd company moved approximately 20,000 bales from the Midland terminals to the compress during the 1918 season.

It also moved approximately 10,000 bales to other compresses and warehouses in the city of Savannah proper. In this latter work the Gramm-Bernstein truck with or without a trailer was employed. The two White 1½-tonners were employed for special work, which included hauling cotton seed from the company's gin to the oil mills where the seed was converted into cottonseed oil. Due to the truck's greater speed as compared with horses in the seed haulage work, it makes on occasion five trips of 2 miles each a day as compared with only two or three trips by horse wagons.

Reasons for Trailer Success

The use of the tractor-trailer outfit for hauling to the compress proved successful because of the fact that a large tonnage was moved at one time and because sufficient loading and unloading facilities were available to enable the outfit to deliver a larger number of bales in a day than two individual trucks working separately. The trailers were loaded at the terminals of the Midland railway while the truck was either busy on other city work with shipments of twenty-five bales or less or hauling one of the other trailers to the compress. This helped to reduce the idle truck loading time. The unloading time at the compress was the same for the truck and trailer as it was for the truck alone, since a double crew of men was employed. By the time the truck was unloaded the trailer was also unloaded, so that the entire outfit could depart for its next load.

The White trucks which carry twenty-five bales at one time accomplished this end by means of a special underslung body which is 22½ ft. long back of the driver's cab. As shown in the accompanying illustrations, the body is of the platform type and slants downward from the front to the rear, with a special apron over each rear wheel. The low height of the body from the ground makes for easy loading and for the elimination of lifting on the part of the loaders. As shown in the illustration at the bottom of page 17, the truck platform is lower than the height of the average depot platform, so that the first tier of bales is lowered onto the truck body rather than raised up to it. The bales are laid on their sides in two rows from the front of the truck to the rear. The body is sufficiently long to place five bales in each longitudinal row, or ten bales for each level. A second level of ten bales is loaded directly above the first with five bales on top of the second stratum to give a total load of twenty-five bales. Similarly, the Troy trailer is provided with as low a platform as is possible to clear the wheels and with body extensions both front and rear, giving longer overhangs at each end than is common in the average trailer body.

Cotton Haulage Is Seasonable

Due to the fact that cotton haulage is a seasonable business of about 5 months' duration, M. H. Floyd had to provide other work for his vehicles to do during the closed cotton season. While all of the bodies are of the platform type, stakes can be fitted for hauling other goods, and during 1918 much material was moved to the Port Wentworth development more quickly by trucks than it could have been moved by railroads. At Port Wentworth there are a large saw mill, sugar refinery, pulp mill, two shipbuilding companies, the Diamond Match Co. and a grain elevator. The Floyd trucks hauled between 8000 and 10,000 barrels of rosin over a 2- to 2½-mile distance and great quantities of other naval supplies. The trucks are also supplied with side stakes for handling cattle from the nearby farms to the city for slaughter and from the city to the farms for fattening. At the time this is written, the Floyd trucks have already moved between fifteen and twenty carloads of animals, mostly beef cattle. From fifteen to twenty head are carried on the 5-ton truck. The haul is about 15 miles one way and the rate received is $30 per trip. There is still further opportunity for the increased operating efficiency of the Floyd trucks because of the fact that only 2 per cent of return loads are carried. However, the return loads problem is a comparatively new one in the South

The two truck and trailer outfits on their way from the Midland railway terminal to the compress 5 miles away with loads of forty-nine bales each. In turning out to let a passenger car pass, the rear right wheel of the truck in the second outfit has been mired and the driver and helper are getting it out with the assistance of the second truck's crew

One of the White 1½-tonners with a load of waste cotton which will be baled later and sold. The truck is also used to carry cotton seeds to the mills for making oil

and this percentage may be expected to be increased as soon as the company's business can be arranged to take advantage of the idea if it can be done without disrupting the ordinary schedule of work.

All of the Floyd trucks are operated by colored drivers who are paid at the rate of $18 a week, or $3 a day. White drivers in Savannah are very scarce, and it was the opinion of M. H. Floyd that there were not over a dozen good white truck drivers in the city. The colored driver learns like a parrot and must be initially taught properly if good results are to be expected.

Most of the cotton received in Savannah comes from the territory north of the city in the vicinity of Statesboro, Sylvania, Claxton, Millen and Metter. Practically all of these large cotton producing centers are within a 50- to 60-mile radius of the city and the great development in the use of trucks in cotton haulage in Savannah lies in the increased use of such vehicles to haul the cotton from these producing centers to the city.

Big Return Loads Company Needed

Practically none of this work has been done as yet due to the poor condition of the roads and the non-existence of a concern which could enter the business on a large scale and obtain return loads to make the operation profitable. Since about 300,000 bales of local cotton are received in Savannah yearly, the business is one which already has considerable volume, which no doubt can be increased as better and cheaper transportation is supplied.

That this cotton can be hauled to Savannah more quickly and as cheaply if not cheaper than by railroad is borne out by what already has been accomplished in the mill town of La Grange, Ga., where R. W. Underwood with three motor trucks hauled 4000 bales of cotton to the La Grange mills from points up to 20 miles from that town. For instance, Chipley, Ga., is 20 miles from La Grange, and the cost of moving the cotton by trucks is $1.25 a bale as compared with $1.79 by the rail route, including the cost of moving the cotton from the rail siding to the mill proper. If this rate can be made with profit using a 2-ton truck capable of only hauling twelve bales at a time, it seems evident that a truck and trailer outfit such as that of M. H. Floyd which carries forty-nine bales to the load could even reduce the price for the same distance and favorably compete with the railroads in the longer distances by giving a quicker and direct service. There are also many producing centers not served by railroads, and in these the truck's chances would be even better.

Underwood's truck fleet is made up of two 2-ton Packards, each capable of hauling twelve bales to the load, and one Studebaker 1-tonner, which can carry five bales. In the closed-cotton season he employs them in the transfer business, and has made several trips from La Grange to Milltown, Berian County, 250 miles distant, and many more trips to Atlanta, 75 miles away.

He hauled a small amount of cotton to the La Grange mills in 1917 and carried it at the freight rate, which before Aug. 1, 1918, was 20.8 cents per 100 lb. After that date the rate was raised to 35.8 cents per 100 lb., which makes the rate per 500-lb. bale $1.79 as given above. The truck rate for the same length of haul is $1.25, thus saving the mills at the rate of 54 cents for every bale moved by truck.

He also hauled about 1000 bales of cotton from Oddessadale, Ga., twelve miles from La Grange, at $1 a bale. The rail rate between the same points is $1.25.

Here is one of the outfits being unloaded at the warehouses of the compress. The idle truck time is reduced by employing two unloading crews, one for the truck and the other for the trailer. This view shows clearly the underslung frame of the White truck

No Probability of Truck Prices Being Reduced Before July 1, If at All During 1919

All Except Few Makers Guarantee Present Prices for 6 Months

FULLY 95 per cent of the American motor truck manufacturers have given guarantees of one kind or another against price reductions on their various models of trucks for the next six months. In many instances, the prices are guaranteed to remain the same as at present to July 1, 1919.

This is very important to the prospective truck purchaser who has held off buying a new vehicle in the hope that the price would come down due to either a reduction in the cost of material and labor used in making the truck or by reason of the Government auctioning off large numbers of the so-called surplus military trucks on hand in this country.

No War Trucks at Auction

As told elsewhere in this issue, Col. Edwin F. George, Chief of the Motors Branch of the Purchase, Storage and Traffic Department of the Quartermaster Corps, is authority for the statement that the Government has completed plans for the utilization of every army motor truck now in service or on hand in this country. The first selection of the vehicles on hand will be made for our standing army, the size of which has been placed at about 500,000 men by a bill now pending before the National Legislature. What trucks are left after the needs of our army have been met will be turned over to the Post Office Department, the Department of the Interior and other governmental bureaus or even to the various states for road construction work. If this plan is pursued by the Government it is evident that there will be no forced reduction in truck prices caused by an over-glutting of the commercial market as would be the case were any large number of trucks auctioned off at cut-rate figures.

In regard to the cost of labor and material entering into commercial vehicle construction, various of the makers have pointed out that there may be some decrease in the cost of those materials which the government has used in large quantities during the war. Most of the makers do not expect that any considerable reduction in these prices will be made before July 1 of this year.

The makers have pointed out, however, that the cost of labor is the greatest single factor in the manufacturing price of a truck and that there is no apparent cause for making labor prices go down. All indications rather point to an upward trend in the cost of labor. It is for this reason that most of the makers have signified their intention of maintaining their present truck prices, not by their own choice, but due to conditions over which they have no control. In many instances they point out that unless the cost of labor is reduced the present prices will stand until January 1 of next year in order that they may make a fair profit on their invested capital.

Motor Truck Price Situation at a Glance

Name	Remarks
Acme	No price changes to March 1 or to July 1 unless labor costs are reduced.
Atterbury	Guarantees against change in price until July 1.
Autocar	Guarantees against price reduction to December 31, 1918.
Beck	Sees no possibility of reduction in prices before July 1.
Briscoe	Guarantees against price reduction until June 30, 1919.
Brockway	Prices same as during 1918 and made possible only by increased production.
Clydesdale	Guarantees no price reduction before July 1.
Commerce	Guarantees dealers against reduction in price of any trucks on order.
Corbitt	Does not contemplate changing prices during next 6 months.
Dart	Willing to guarantee no price changes before July 1.
D-E.	Guarantees against price reduction for 3 months.
Duplex	States prices will not be reduced.
Federal	Guarantees all prices to July 1.
F. W. D.	Guarantees no price reduction before July 15
Gabriel	Does not contemplate any reduction in price.
Garford	Guarantees against price reduction until July 1.
Gary	Confident there will be no price reduction before July 1.
G. M. C.	Prices of all models as before the war. Increased production makes this possible. No further reduction contemplated.
Gramm-Bernstein	Does not contemplate price changes before July 1.
Indiana	Guarantees against price reduction until June 1.
I. H. C.	Present prices guaranteed until July 1
Kimball	Does not contemplate price reductions during year 1919.
Kissel	Contemplates no price reduction for at least 6 months.
Koehler	Contemplates no price reduction during the year.
Knox	Does not contemplate any price changes at present.
Larrabee-Deyo	Contemplates no price reduction for 6 months.
Maccar	Sees no opportunity for price reductions for at least 3 months and probably 6.
Mack	Guarantees against price reduction during the year 1919.
Maxwell	Guarantees prices until July 1.
Menominee	Guarantees prices until July 1.
Myers	Guarantees prices until July 1.
Nash	Anticipates no price changes for 6 months.
Nelson & Le Moon	Guarantees prices until July 1.
Netco	Contemplates no price changes before July 1.
Old Hickory	Sees no price reductions during 1919.
O. K.	Anticipates no price changes before July 1.
Overland	Price question not taken up.
Panhard	Guarantees prices until July 1.
Parker	Contemplates no price changes before July 1.
Riker	Prices will not vary over 5 per cent.
Selden	Anticipates no reductions in price.
Seneca	Contemplates no price reductions before July 1.
Service	Guarantees prices until April 1.
Shaw	Guarantees prices until July 1.
Standard	Contemplates no price changes until July 1.
Steele	Will not change prices during 1919.
Sullivan	No changes in price before July 1.
Tower	Contemplates no price reduction.
Triangle	Contemplates no price reduction. Price of one model to be increased.
Velie	Guarantees against price reduction to July 1.
Vim	Guarantees prices until July 1.
Watson	Contemplates no price reduction.
Wichita	Does not anticipate any price reduction.
Wilson	Will guarantee prices until July 1.
Winther	Present truck prices guaranteed until July 1
Wolverine	Guarantees prices until July 1.

No Army Motor Trucks for Civilian Use

Departments of Government Will Use Surplus Vehicles

DETROIT, Feb. 8—Col. Edwin F. George, Washington, D. C., chief of the motors branch of the Purchase, Storage and Traffic Department of the Army, today said that the Government had completed plans for the utilization of every motor truck, passenger car and tractor now in the service, and that in no event would machines be placed on public sale.

Colonel George also said the War Department would first decide upon the number of vehicles required for the permanent army organization. The remaining trucks will be turned over to the Post Office Department, the Department of the Interior and other Government departments. What trucks then remain will be placed at the disposal of each State for agricultural or National Guard purposes.

SALE OF TRUCKS OVERSEAS AUTHORIZED

WASHINGTON, D. C., Feb. 4—An order issued to-day by General Peyton C. March authorizes the commanding generals of the American Expeditionary Forces to sell any war supplies, including motor trucks, passenger cars and motorcycles, to concerns, individuals or nations that were allied with the United States. These are to be sold by auction or by sealed bids when no longer needed for the army. Reports of sales are to be made monthly. No materials or supplies are to be sold for less than their invoice price, including cost of inspection and transportation. Some restrictions in sales are made on guns and railways and immovable property.

PORTLAND WAR TRUCK AUCTION

PORTLAND, ORE., Feb. 10—The 200 motor trucks of the United States Spruce Production Corp., which will be sold under sealed bids in this city on Feb. 15, are not under the control of the War Department and their sale in this manner does not indicate in any way the policy of the Government regarding the disposition of other motor trucks bought for military purposes and that now remain in this country. This statement was made by Col. Fred M. Glover at the meeting of the N. A. C. C. held in New York City on Feb. 11.

The trucks to be sold and the number of each make are as follows: Standard, 127; Dart, 10; Packard, 23; Velie, 5; Selden, 9; United, 10; Federal, 5; Gramm-Bernstein, 10, and Garford, 1.

NEBRASKA REGISTRATION BILL

OMAHA, NEB., Feb. 4.—A new registration bill presented to the Nebraska legislature by the Public Safety Committee of the Omaha Automobile Club provides that when ownership of a motor truck is transferred, both seller and buyer shall sign a joint statement on the reverse side of the original registration certificate. It further provides that the seller may keep the license plate and seals for 10 days after application for transfer, and that until the transferee shall have signed the reassignment certificate the transfer shall be deemed incomplete and of no force or effect for any purpose. This means that the original owner of a motor truck will not sign away his ownership until he is sure that a reassignment certificate will be granted.

DORRIS ADDS 3½-TON TRUCK

ST. LOUIS, Feb. 7—The Dorris Motor Car Co. has added to its line a 3½-ton truck, styled model K-7, to sell for $3,800. The company's 2-ton vehicle sells for $2,985.

HURLBURT STILL OPERATING

NEW YORK CITY, Feb. 7—The Hurlburt Motor Truck Co., New York City, is continuing business pending arrangements for the liquidation or reorganization of the company. A preliminary examination of the books shows liabilities for merchandise and borrowed money about $1,000,000, with assets consisting of machinery, materials, accounts and notes receivable, so that if arrangements can be made for the continuance of business by a reorganization and the addition of new capital the creditors might be paid in full. A committee of creditors has been formed of A. E. Brion, H. W. Chapin, M. L. Bayard, E. H. Brodwell and E. V. Harman.

TRUCK SALES MANAGERS TO MEET IN APRIL

PHILADELPHIA, PA., Feb. 4—The National Assn. of Motor Truck Sales Managers will hold their next convention in Philadelphia, from April 10 to 12. Headquarters for the spring convention will be established in the Bellevue-Stratford Hotel.

MOTOR TRANSPORT INVENTORY

WASHINGTON, D. C., Feb. 4—The Motor Transport Corps is engaged in taking an inventory of every motor vehicle owned by the Army and all equipment, including spare parts, machine shop parts, machine parts and accessories. Many motor vehicles had not been taken over formally by the Motor Transport Corps, having been bought and operated by the Ordnance, Quartermaster, Medical, Signal, and other branches of the Army, and inventories never were made. All these machines and their equipment now will be accounted for in the Motor Transport Corps inventory, which is being made by eighty-eight officers and five enlisted men.

The country has been divided into districts, with a district officer in charge at each point. A school has been established for instruction of officers in inventory work.

Truck Makers Discuss Vital Problems

More Than 75 Manufacturers Are Represented

NEW YORK, Feb. 11—Representatives of over seventy-five motor truck makers attended the truck convention held to-day by the National Automobile Chamber of Commerce, the convention being one of the best held in some time by the Chamber. Subjects relating to increased use of motor trucks and improved systems of handling them were discussed. The convention covered a wide range of subjects and turned the meeting into a kind of house-cleaning day on many matters relating to trucks.

A new system of registering motor trucks on a basis of speed and weight was recommended by George H. Graham. A similar system was recommended for all horse vehicles.

Col. Fred Glover intimated that there will be very few surplus war trucks and that most of our war trucks in Europe will be disposed of on the other side of the Atlantic.

The complete elimination of the truck warranty by manufacturers and the sale of trucks on their merits and reputation was recommended by E. J. Herbig.

David Beecroft, in reviewing possibilities of foreign trade in trucks, showed that prospects are not bright for such trade at present due to the large surplus of war trucks owned by our Allies.

David C. Fenner asked for standardization of more truck parts and emphasized the necessity of such in throttle and spark levers as well as with gearshift and brake levers.

E. J. Mehren favored a federal system of highways to supplement State systems and emphasized the necessity of a great educational campaign on highway improvement and the better use of highways.

James I. Blakslee advocated a better national system of transportation by closer correlation of the post office, the highways and the motor truck.

A committee of truck men was appointed to discuss with a committee of the tire makers what truck tire sizes should be eliminated.

BIG DECREASE IN RUBBER IMPORTS

NEW YORK CITY, Feb. 11—Importations of crude rubber into the United States during January, 1919, amounted to 7235 tons, as against 16,084 tons for January, 1918, and 11,292 tons for December last. This is also less than the imports for any one month during the past year except September and November, during which months there were heavy restrictions on raw rubber importation.

The following statistics for the month of January for 4 years have been compiled by the Rubber Assn. of America:

	1916 Tons	1917 Tons	1918 Tons	1919 Tons
January	9,162	12,788	16,084	7,235

896 Trucks Exported in December, 1918

Decrease of 78 Shipped in December Over November

NEW YORK CITY, Feb. 13—During last December 896 trucks valued at $2,636,689 were exported. This shows a decrease of seventy-eight trucks in number and $72,673 in valuation over November, 1918, during which month 974 trucks valued at $2,709,362 were exported.

The figures for December, 1918, show an increase of eighty-nine trucks over December, 1917, at which time 807 trucks valued at $1,592,881 were exported. The increased valuation is $1,043,808.

NEW YORK TRUCK REGISTRATION

ALBANY, N. Y., Feb. 13—Secretary of State Francis M. Hugo has given out the following figures showing the registration of motor trucks in Greater New York for 1917 and 1918, together with the increase and the percentage of increase shown by the figures, as follows:

	1917	1918	Inc	P C Inc
Bronx	1,440	1,988	548	38
Kings	6,809	8,831	2,022	30
New York	14,250	17,046	2,796	20
Queens	2,025	2,746	721	36
Richmond	554	801	247	40
	25,078	31,412	6,334	32

The increase in truck use in the State of New York for the year 1917-1918 is 19,866 vehicles, or a gain of 34 per cent for the State. In 1917, 55,402 trucks were registered and the figures for 1918 are 75,268.

CANADIAN TRUCK REGISTRATION

MONTREAL, CAN., Feb. 10—The following table gives the number of motor trucks in the various provinces of the Dominion of Canada:

	Trucks
Ontario	7,400
New Brunswick	230
Quebec	1,946
British Columbia	1,499
Alberta	668

Owing to the fact that in the license offices of a number of the various provincial governments no distinction is made between passenger and commercial cars it is not possible to give the number of motor trucks in Canada. Where it has been possible to distinguish between trucks and passenger cars such information has been secured, and the table published herewith gives such data.

SWITZERLAND REGISTERED 1206 TRUCKS IN 1917

BERNE, Jan. 5—According to statistics of the Automobile Club of Switzerland at the end of 1917 there were 6140 motor vehicles in Switzerland, of which 1,206 were motor trucks and 4,934 passenger cars. There were fifteen firms in the Helvetic confederation. These had produced 2565 of the total number of vehicles, the remaining 3,575 representing forty-three foreign makes. Of the foreign nations supplying vehicles France comes first, Germany second, America third, Italy fourth, and Belgium fifth.

MOTOR EXPRESS LINE IN IOWA

BLOOMINGTON, ILL., Feb. 9—The Dubuque Motor Transportation Co., Dubuque, Iowa, has been organized with a capital stock of $100,000. Six 5-ton trucks will be operated at the outset and a test made of the performance of each. Two of these will be Indianas, two Nash and the others will be selected later. It is planned to operate a truck line covering the territory within a radius of 25 miles of Dubuque, both in Iowa and Wisconsin. An effort will be made to develop a business in both directions, taking freight and express from the city to the rural sections and returning with farm products. It is hoped to have the system in operation by March 1.

Coming Events

Feb. 15-22	Newark, N. J., Motor Truck Show, First Regiment Armory
Feb. 15-22	Albany, N. Y., Albany Motor Truck Show, State Armory.
Feb. 17-20.	Chicago, Delivery Conference.
Feb 17-20.	Philadelphia, Pa., Motor Truck Show, Auspices of Motor Truck Assn., Commercial Museum.
Feb 17-22	Grand Rapids, Mich., Motor Truck Show, Klingman Bldg.
Feb 18-22.	Oklahoma City, Okla., Motor Truck Show.
Feb 20	Cleveland, Ohio, Meeting Automotive Metal Wheel Assn., Hotel Statler.
Feb. 24	Springfield, Mass., Motor Truck Show, Municipal Auditorium.
Feb 24-27	South Bethlehem, Pa., Motor Truck Show
Feb. 24-March 1	Portland, Ore., Motor Truck Show, Portland Auditorium.
Feb 25-28	New York City, Sixteenth Annual Convention American Road Builders' Assn., Hotel McAlpin.
March 1-8	Detroit, Motor Truck Show, Crosstown Garage
March 3-8.	Muskegon Mich., Motor Truck Show.
March 4.	Newark, N. J., Monthly Meeting, Motor Truck Club of N. J.
March 10-15.	Omaha, Neb., Motor Truck Show, Auditorium.
March 12-15.	St. Joseph, Mo., Motor Truck Show, Auditorium.
March 15-22.	Harrisburg, Pa., Motor Truck Show, Overland Bldg.
✓April 1-5	Brooklyn, N. Y., Motor Truck Show, Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory.
April 5-12	Montreal, Can., Motor Truck Show, Victoria Rink.
	Wilmington, Del., Motor Truck Show, Hotel du Pont.
April 10-12	Philadelphia, Pa., Meeting Motor Truck Sales Managers, Bellevue Stratford Hotel.
April 14	Bristol, Va.-Tenn., Great Southern Automotive Show.
April 24-26	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.

Tax May Be Placed on Truck Transport

1919 Revenue Bill Putting Tax on Trucks Before Congress

WASHINGTON, Feb. 7—The 1919 revenue bill, taxing passenger cars, motor trucks, tires, accessories, parts, truck express and taxicabs, among its numerous provisions, was agreed upon yesterday by the conferees and now comes before Congress for approval. It is anticipated that the bill will be passed promptly as it stands. The provisions include a tax of 3 per cent on motor trucks, trailers and the equipment, including tires, tubes and other parts; 5 per cent on passenger cars and all other automobiles, including equipment, excepting on tractors, which are not taxed; and 5 per cent on tires, inner tubes, parts and accessories made for automobiles and sold to any person other than an automobile manufacturer. The floor tax on parts originally included is eliminated.

The tax of 3 per cent on motor truck haulage when it competes with rail or water transportation of freight remains in the bill, and in addition there is included a tax of 1 cent for each 20 cents paid for motor truck express where it competes with rail or water express, and 8 per cent of the transportation fee for carrying of passengers by motor truck, passenger car or motorcycle when it is in competition with rail or water carriers.

Following are excerpts from the bill, including those provisions most important to truck owners:

Section 500.—That from and after April 1, 1919, there shall be levied, assessed, collected and paid in lieu of the taxes imposed by Section 500 of the Revenue Act of 1917:

a—A tax equivalent to 3 per cent of the amount paid for the transportation on or after such date, by rail or water or by any form of mechanical motor power when in competition with carriers by rail or water, of property transported from one point in the United States to another; and a like tax on the amount paid for such transportation within the United States or property transported from a point without the United States to a point within the United States.

b—A tax of 1 cent for each 20 cents or fraction thereof of the amount paid to any person for the transportation on or after such date by rail or water or by any form of mechanical motor power when in competition with express by rail or water of any package parcel or shipment by express, transported from one point in the United States to another; and a like tax on the amounts paid for such transportation within the United States of property transported from a point without the United States to a point within the United States

c—A tax equivalent to 8 per cent of the amount paid for the transportation on or after such date of persons by rail or water or by any form of mechanical motor power on a regular established line when in competition with carriers by rail or water from one point in the United States to another or to any point in Canada or Mexico where the ticket or order therefor is sold or issued in the United States not including the amount paid for commutation or season tickets for trips less than 30 miles or for transportation the fare for which does not exceed 42 cents; provided that where such water transportation lines are in competition between American ports with foreign water transportation lines from adjacent foreign ports, the tax imposed under this subdivision of amounts paid for water transportation between American ports shall not exceed the amount of the transportation tax to which such foreign water transportation lines are subjected by their government corresponding to this tax.

U. S. Pays Annual Mud Tax of $700,000,000

Transportation Costs More Than Doubled by Poor Roads

WASHINGTON, D. C., Feb. 12—"The United States pays annually a mud tax of $700,000,000" because it lacks a nationwide system of well built public roads and highways. We are paying an average of 23 cents per ton-mile for hauling produce over our "wretched public roads," while over the "splendid roads of France" the cost is 7 cents per ton and in England about 11 cents per ton per mile. Farmers were obliged to move more than 4,000,000,000 lb. of food over the highways in this country last year and were handicapped by isolation from markets to shipping points due to bad roads, making this work doubly hard. These statements were included in a speech by Senator C. A. Swanson before the Senate, in which he earnestly advocated the adoption of the Bankhead bill appropriating $600,000,000 for highway construction in the United States. Following are excerpts from the speech:

"There is no question pending in America to-day more important to the wellbeing and development of her people than the improvement of public roads and highways. I have always considered this as the most paramount of our unsolved practical problems.

"The amendments contained in the pending bill increase the appropriations made by the act of 1916 to the extent of $50,000,000 for the fiscal year ending June 30, 1919; $75,000,000 for the fiscal year ending June 30, 1920; and $75,000,000 for the fiscal year ending June 30, 1921, making an aggregate increase over the amount heretofore appropriated of $200,000,000. The amount unexpended out of the appropriations heretofore made is about $75,000,000. This, added to the $200,000,000 increase provided by the pending bill, will make a total of $275,000,000 to be expended by the Federal Government up to June 30, 1921, toward aiding communities and States in the construction and improvement of their public roads and highways.

"Under the method of distribution adopted, Virginia would receive out of these appropriations up to June 30, 1921, the sum of $5,458,162.37, to be added to a like amount from the State and local communities, to improve and develop her public roads. Thus, the practical effect of this amendment, if adopted, would be to secure for road improvement in the State of Virginia to June 30, 1921, the sum of approximately $10,900,000.

"In addition, the bill authorizes the Secretary of War to transfer to the control of the Secretary of Agriculture all available war material not needed for the present purposes of the War Department and suitable for use in the improvement of highways, to be used on the roads constructed in whole or in part through Federal aid. This provision, if enacted, will cause to be furnished immediately to the State authorities a large amount of road material and machinery which will be of inestimable benefit. This will make available a large quantity of valuable material and machinery that otherwise would be of little benefit to the Government and might ultimately be wasted."

TO KEEP ROADS OPEN

WASHINGTON, D. C., Feb. 3—Help given last winter by the Weather Bureau in keeping the Lincoln Highway open between Harrisburg and Pittsburgh, Pa., during the season of heavy snows is being arranged this year for portions of New York and New Jersey. The bureau has called the attention of its officials in charge of stations to the service they may give the public by co-operation with state highway commissions, automobile associations and others in keeping open main highways, especially those used for rural express, motor truck and parcel-post routes. The work in the winter of 1917-18 was in co-operation with the Pennsylvania State Highway Commission. Reports of the amount and condition of snows were made by the assistant superintendents of highways at points along the Lincoln Highway to the Weather Bureau office at Pittsburgh, which bulletined the reports to the press, automobile clubs and motor truck associations. The official in charge at Pittsburgh also issued warnings of heavy snows for the mountain regions of western Pennsylvania, based on the state forecasts. These were furnished to the press and telegraphed to the State Superintendent of Highways, who gave instructions to his assistants for keeping the routes open.

OHIO DELIVERY COMPANY

CINCINNATI, OHIO, Feb. 6—The C. & D. Motor Delivery Co., Cincinnati, operates between Dayton and Cincinnati on a daily schedule. The company has agents in the cities of Hamilton, Middletown, Franklin, Miamisburg and West Carrollton along the route.

ROADS MAY COST $15,000 PER MILE

WASHINGTON, D. C., Feb. 2—The House Committee on Roads yesterday favorably reported a bill increasing the limit of cost of roads to be built with Federal aid from $10,000 to $15,000 per mile.

This action was taken to permit the various states to proceed with projects stopped by the Government fixing a limit which could be paid for construction at a figure at which no contracts could be placed.

"The construction of public works," said the report, "is recognized throughout the country as one of the means for solving the questions of unemployment due to cessation of the production of materials required for carrying on the war."

WISCONSIN REGISTRATION

MILWAUKEE, WIS., Feb. 12—Registration of trucks in Wisconsin during 1918 numbered 6,817, a substantial increase over 1917. Trucks registered in Milwaukee numbered 1,994.

Good Roads Congress in New York City

Meetings Are Slated for Feb. 25 to 28 at Hotel McAlpin

NEW YORK, Feb. 14—The Ninth American Good Roads Congress and the Sixteenth Annual Convention of the American Road Builders' Association will be held at the Hotel McAlpin, Feb. 25-28. It is planned to devote Feb. 25 and 26 to the presentation and discussion of papers and the 27th and 28th to the consideration of reports of committees. The business session will be held on the afternoon of Feb. 28, and the annual banquet on the evening of the 26th or 27th.

Among the subjects to be discussed are:

National Highways and Federal Aid for State Highway Improvements.

Relation of Highways to Railways and Waterways.

Efficient Methods of Contracting for Highway Work During the Reconstruction Period

Efficient Methods of Promoting Highway Bond Issues.

Efficient Methods of Drainage for Different Geological Conditions.

Foundations for Heavy Horse-Drawn and Motor Truck Traffic.

Methods of Maintaining Highway Systems Prior to Construction by the State or County

Economic Utilization of Labor Saving Machinery.

Cost Keeping for Highway Contractors.

Street Systems, Their Relation to Highways Outside of Urban Districts.

The Efficiency of the French Broken Stone Roads During the War.

Efficiency of Bituminous Surfaces Under Motor Truck Traffic.

Recent Developments in the Construction, Maintenance and Reconstruction of Cement Concrete Pavements.

Present Status of Brick Pavements Constructed with Sand Cushions, Cement Mortar Beds and Green Concrete Foundations.

Recent Practice in the Construction of Stone Block Pavements.

Committees will submit reports on the following subjects:

Regulations Covering Speed, Weight and Dimensions of Motor Trucks.

Methods of Financing Highway Improvements for States, Counties and Towns.

Civil Service Requirements for Highway Engineering Positions.

Sources of Supply of Unskilled Labor for Highway Work.

Convict Labor on Highway Work: Organization, Administration, Camps and Cost Data.

Reconstruction of Narrow Roadways, of Truck Highways with Adequate Foundations and Widths for Motor Truck Traffic.

Methods of Strengthening and Reconstructing Highway Bridges for Heavy Motor Truck Traffic.

Efficient Methods of Snow Removal from Highways Outside of Urban Districts.

Guarantees for Pavements on Roads and Street.

Uniform Highway Signs.

Because of the war, it was decided to postpone the exhibit of road machinery, equipment and materials until next year.

GREAT SOUTHERN TRUCK SHOW

BRISTOL, VA., Feb. 8—The Great Southern Automotive Show is slated for the week beginning April 14. The show will be held under the direction of the Bristol Chamber of Commerce.

$200,000,000 PROPOSED FOR ROADS

WASHINGTON, D. C., Feb. 4—The Senate Post Office Committee to-day reported out the annual Post Office appropriation bill proposing funds of $200,000,000 during the next 3 years for construction and maintenance of roads and highways.

Motor Transport Corps to Be Discontinued

Overman Act Creating the M. T. C. and T. C. Repealed

WASHINGTON, D. C., Feb. 12—The Army appropriation bill providing for 28,579 officers and 509,909 enlisted men, appropriating $1,117,289,488.56, orders the repeal of the Overman act under which the Motor Transport Corps, Tank Corps and Aviation Corps were created for the emergency, and by its provisions abolishes the Motor Transport Corps and Tank Corps completely. The aviation departments, both military and production, are recommended for continuation. The bill provides for the purchase, operation and maintenance of motor trucks and other motor vehicles by each individual army corps, such as the Engineers, Quartermaster, Ordnance and Signal Corps, and thereby reverts back to that condition which existed prior to the war, when the motor transport was not pooled and when each division purchased different types and sizes of vehicles, creating waste, confusion, extravagance and inefficiency, which finally resulted in the creation of a Motor Transport Corps for the purpose of pooling motor vehicles under one body. Hearings of the House Military Affairs Committee, which prompted this act, have not been made public, and consequently causes are not available for publication at present. It is thought in official circles here that either a vital omission was made accidentally on the part of the House Military Affairs Committee in thus scattering the purchase, operation and maintenance of motor vehicles throughout the army, or that possibly some influence has brought about this arrangement, probably by suggestion to the Committee. It is known that none of the army officers connected with the Motor Transport Corps testified with regard to the functions or importance of that corps to the committee. Amazement at the provisions of the bill is displayed, and particularly so because of the proof that motor transport must be pooled in this country from the experiences of France and Great Britain. The bill as it now stands, allowing each corps to operate and maintain its own trucks and other vehicles, means a complete cessation of the standardization plan and a renewal of the original system whereby hundreds of types of trucks were operated and necessitated the maintenance of great stores of parts for maintenance and repair.

One of the first lessons that came out of the war was that idle trucks were a frequent result of the operation of trucks under different corps. There was no correlation of work. One corps cannot use the trucks of another corps.

An effort will be made, it is understood here, to present this matter properly before Congress and urge an amendment which will make an appropriation for the Motor Transport Corps and take the purchase, operation and maintenance of trucks from the other divisions or pooling under the motor division. That either this step or the pooling of all the motor vehicles under the Quartermaster Department in one division is vitally important to the army is the statement made by many army officers.

The army bill provides $4,000,000 for the Signal Corps, $10,000,000 for military air service, $449,000,000 for the Quartermaster Department and $3,000,000 for the Ordnance Department, and specifically states that these funds, in addition to the purchase of other supplies for each of these departments, are also for the "purchase, hire, operation, maintenance and repair of motor propelled vehicles" by each of these respective departments. Five hundred thousand dollars is also provided for the Ordnance Department for armored motor cars.

IMPROVE JERSEY ROADS

TRENTON, N. J., Feb. 3—The State of New Jersey is spending $1,000,000 on the reconstruction of 17½ miles of new roads in two sections. The one section is between Metuchen and Rahway, near Menlo Park, and has required the relocation of the route, eliminating thirteen very sharp turns and the grade crossing on the line of the Pennsylvania Railroad. When this new road is finished it will leave a perfectly straight road, paralleling the Pennsylvania Railroad from the town of Metuchen to Rahway. Many thousand dollars were spent in addition to the actual cost of the construction for draining, grading and the purchase of the new right-of-way for this section. The other project under way is between New Brunswick and Kingston. Here on 2 miles of the route $50,000 was spent for drainage.

The width of the new concrete road is 18 ft. and the slab is 8 in. thick at the sides and 10½ in. at the center. In addition to the 18 ft. width there is a 3-ft. tar penetration macadam shoulder on each side of the road, making it in effect a 24-ft. pavement with a 3-ft. shoulder outside of that, or in all a 30-ft. graded width.

MICHIGAN ENDORSES ROAD LAW

LANSING, MICH., Feb. 6—A campaign to insure passage of the $50,000,000 good roads amendment, which has passed both houses of the legislature and will come before the voters at the April election, was launched here Friday by the Michigan Ass'n. of Road Commissioners and Engineers. In connection with automotive clubs and good road associations throughout the state, they will conduct an intensive campaign to reach every man and woman elector with circulars and by speaking tours.

WARD LA FRANCE DROPS PRICES

ELMIRA, N. Y., Feb. 3—The Ward La France Motor Truck Co. has reduced the price of its 2-ton truck $150, and its 3½-ton truck $175. The present prices are as follows:

	New Price	Old Price
2-ton truck.......	$3350	$3500
3½-ton truck	$3750	$3925

$300,000,000 Allowed for Road Building

Dept. of Agriculture Says Labor Will Consume Half

WASHINGTON, D. C., Jan. 27—About $300,000,000 will be put into road building this year, according to estimates by experts of the Department of Agriculture, submitted to the Division of Public Works and Construction Development of the Department of Labor. It is understood that about half this amount will go to labor.

The $300,000,000 of construction estimated will not be sufficient to make up deferred war construction, it is believed, for normally the amount spent on roads in the United States is not far below $300,000,000. During the war road building almost came to a stop in many States.

Estimates prepared for the following States are considered accurate within one or two per cent, according to officials of the Department of Agriculture: Maine, $1,500,000 Rhode Island, $90,000; Connecticut, $4,000,000; New York, $12,000,000; New Hampshire, $175,000; Kentucky, $1,500,000; Alabama, $1,000,000; West Virginia, $16,000,000 Illinois, $9,000,000; Iowa, $15,574,000; Louisiana, $4,674,000; Texas, $20,000,000; Nebraska, $1,657,089.07; North Dakota, $3,000,000; Wyoming, $653,000; Colorado, $3,900,000 California, $20,000,000; Arizona, $900,000 Nevada, $1,148,849.80; Idaho, $1,000,000 New Jersey, Maryland and Montana are expected to make considerable expenditures on roads this year.

WORK TO DECREASE ACCIDENTS

WASHINGTON, D. C., Feb. 3—The Highways Transport Committee, Council nationwide assistance to reduce acci-nation wide assistance to reduce accidents resulting from carelessness on the part of pedestrians and drivers of vehicles. The regional, state, district and local sections of the committee will be called upon for co-operation. General adoption of modern highway traffic regulations by cities and communities will be sought, and it is believed that this will materially reduce the number of accidents.

CANADA WANTS BETTER ROADS

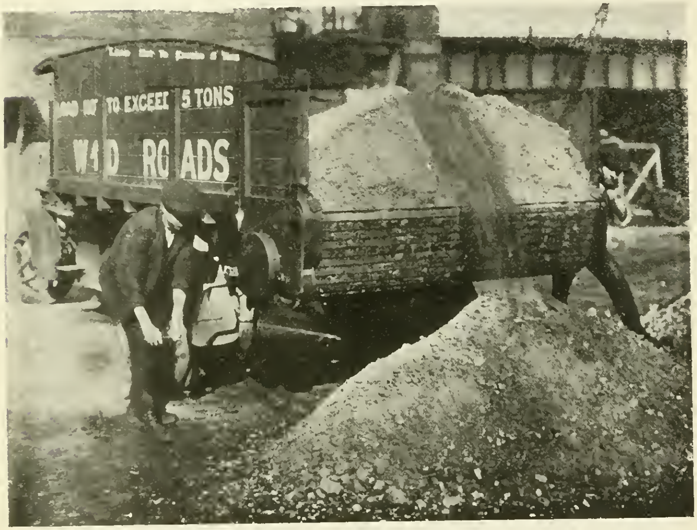
CHATHAM, ONT., CAN., Feb. 4—Kent County Council Saturday passed a resolution calling on the Ontario legislature to inaugurate more aggressive road improvement policies. It also urges that the government build and maintain provincial highways because of the big revenue the government gets from motor licenses.

BEAM STARTS NEW LINE

PHILADELPHIA, PA., Feb. 8—Perry Beam, until recently president of the Beam-Fletcher Corp., has organized a motor freight service between Philadelphia, Newark and New York, under the title "Beam's Own." The Philadelphia office and receiving station is at 425 Market Street, directly opposite the receiving station of the Beam-Fletcher Corp. Each concern is using conspicuously large canvas signs.

Wilkins' Patent Unloading Gear for Commercial Vehicles

A Device Which May Be Applied to Existing Trucks Without Necessitating Body Changes—Also Facilitates Loading, as the Flexible Platform May Be Wound Forward—Many Used by British Army in France



With the Wilkins gear two men can unload a 3-ton truck in about 40 seconds. A 5-ton load of blocks of masonry, bricks, etc., has been dumped in 1½ minutes

WHEN the British army commenced operations on an extensive scale in Northern France it was speedily realized that good roads and an efficient system of maintaining them under abnormal conditions were primary essentials to the rapid movement of men, munitions and supplies. Herculean efforts were necessary to keep the roads in even passable condition under the heavy and interminable traffic and the fact that there was practically unlimited man-power available did not solve the problem so far as the speed element was concerned.

A War Emergency Product

Under such circumstances it became imperative to evolve or devise appliances which would assist in the speeding up of roadmaking to a point where continuous heavy traffic of trucks, guns and supplies could be assured irrespective of climatic conditions. One of the devices adopted to help in affecting the result desired was the gear arrangement illustrated herewith. Hundreds of these were fitted to existing trucks of both American and British makes. They did much to relieve congestion by keeping the road-menders supplied with material just where it was needed and at the time it was required. The elimination of the element of delay proved the turning point in road maintenance and henceforth the various army units and their supplies were pushed on at a hitherto impossible speed. It is understood that a number of the unloaders have been ordered by the American Expeditionary Force.

This gear is the invention of Lieut. W. Owen Wilkins, of the British Expeditionary Force. The appliance consists of a flexible platform or screen, composed of slats of steel or other material. These slats are connected by a series of strong hinges and are so arranged as to travel longitudinally.

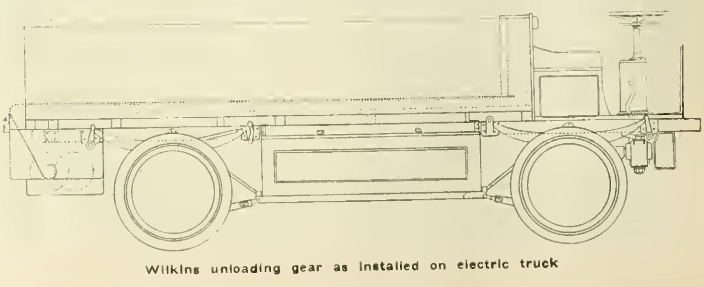
The platform is supported throughout its length on a series of metal skids or their equivalent, so distributed as to insure easy motion. At its rear end the platform is bolted to a drum mounted just below and slightly forward of the tailboard. The drum is connected through reduction gearing to a through-shaft, to each end of which detachable handles are applied, thus permitting the platform to be wound toward the rear end of the truck.

Can Be Easily Operated

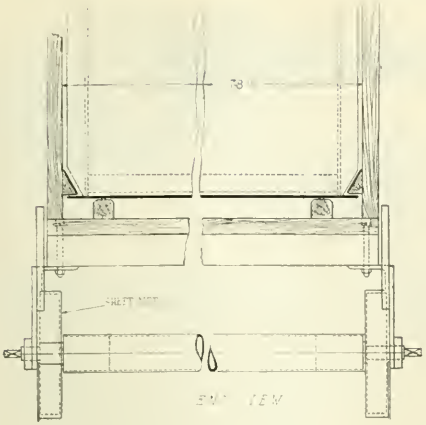
At the other end of the platform a vertical plate is fitted. This forms the front wall of the load-carrying compartment. When unloading, this plate moves with the flexible platform and brings with it the material contained in the truck. Accordingly, assuming the tailboard has been previously removed, the lead is thus deposited on the ground, or wherever required.

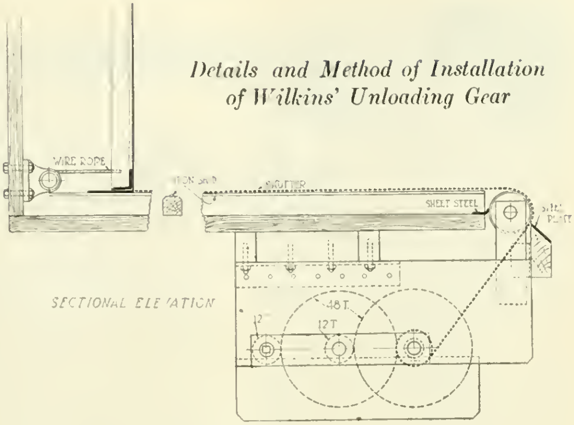
It is stated that a pressure of about 30 lb. on each handle is sufficient to move the load, so that the operation of unloading is readily effected by hand power, one man sufficing on each side. An additional advantage claimed for the equipment is the fact that apart from the resultant ease in unloading, loading up is also facilitated, as the flexible platform can be wound forward as the load is deposited on the rear of the truck body.

The Wilkins gear is described as being suitable for trucks of any load capacity and a test made some time ago demonstrated that a three-ton load of material could be easily unloaded by two men in 40 seconds. A later test with a five-ton load consisting of heavy blocks of masonry, old bricks, lengths of chain, etc., was unloaded by two men in 1½ minutes.

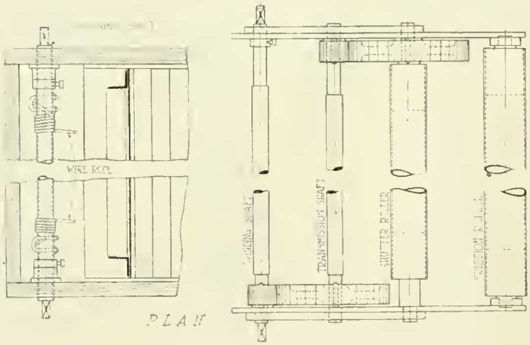


Wilkins unloading gear as installed on electric truck





Details and Method of Installation of Wilkins' Unloading Gear



A feature of interest to road-builders, contractors, etc., is that a portion of the load can be deposited at any desired spot. No overhang of the body is required when the gear is used, thus insuring a more even distribution of weight and strain when the truck is traveling with a full load. The Wilkins gear may be easily applied to existing vehicles without necessitating structural changes in the regular body and the work can be completed in a few hours.

Drake & Gorham, Ltd., electrical engineers, 47 Spring Gardens, Manchester, England, are handling the Wilkins unloading gear and deal with the matter of granting licenses, etc. Prices are approximately $275 to $325 in England, according to size and capacity. These figures are subject to alteration at any time.

When Overland Haul Trucks Can Compete with Railroads

At present, such distances as those which have a freight rate that can be increased at least one-third, by adding teaming charges on both ends, seem best adapted to the successful operation of overland truck freighting.

By making a factory door to store door delivery the motor truckman is able to add the freight rate to the teaming charges thus saved and thereby make a profitable business possible without asking the customer to pay more than if he used the railroads. Therein lies the possibility for an enormous future trucking business, for the truckman can offer at equal prices, quicker delivery, less handling, insurance against necessity for tracing. Less than 1-carload lots can be handled to advantage, and, most important of all, the capital invested in the goods shipped can be released quicker.

At the present time there seems to be no doubt that many of the overland motor lines will become a permanent transportation institution of the future and that these lines will also thrive in competition with railroads and trolley freight, even after embargoes are lifted.

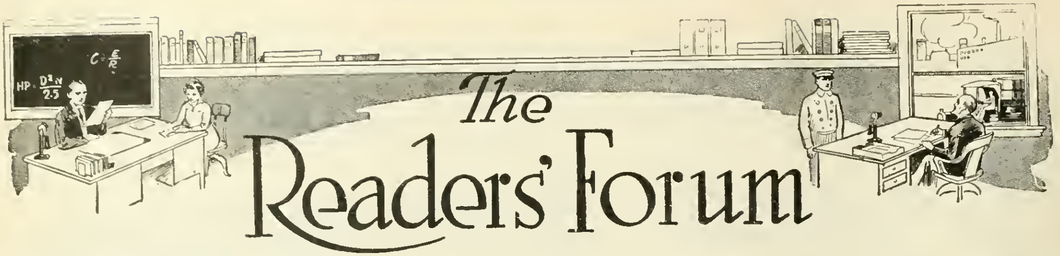
A great many manufacturers have hesitated before using motor truck lines because there was and still is a prevalent idea that it is a very expensive way to express goods. None but the most enthusiastic truck owners expect to ever be able to transport goods at freight rates and make sufficient money to warrant staying in business, at least not at the present prices of tires and repairs.

There are many obstacles in the path of the freight solicitor of the successful motor truck line. It very often happens, for example, that the shipper pays only the charges for hauling to the freight car and the consignee pays the freight and hauling charges at the other end. Perhaps one or both have their own teams employed in loading and unloading.

Often one of the two parties will not agree to pay for door delivery on account of his own equipment. It is essential that both do pay. This obstacle will slowly be removed, for as the advantages of the motor truck lines become more evident there will be less of factory and store owned teams to interfere with the rate arrangements. The wholesale houses and manufacturers need only to be given half a chance to get rid of being in the teaming business. Indeed, many of them hire their work done at extra cost rather than be bothered with the management of personally-owned equipment.

The railroads in most cases necessitate that the goods be brought to them and in turn be carried away again. Few concerns can afford side tracks and again few are favorably located. The unavoidable congestion at the freight sheds causes expensive loss of time. Five hundred different trucks can load at five hundred different factories in the same city without interfering with each other and each one can start for a different point.

To ship by railroad all five hundred would have to come to one point, thus causing the unavoidable waiting. For the average freight sheds to attempt to house the goods or to attempt to unload the five hundred teams at once would be impracticable. The unloading must necessarily be distributed throughout the day in order to keep the help busy for the regulation number of hours.



The Readers' Forum

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

THE WEIGHTS OF COMMON WOODS

Table Gives the Wet and Dry Weights Per 1000 Board Feet

To the Editor, COMMERCIAL VEHICLE:

Please furnish us with a table of the weights of the various kinds of wood in pounds per 1000 board feet.—H. J., New York City.

The following tabulation gives the weight in pounds per 1000 feet for the more common kinds of wood:

Lumber—Per Thousand Feet

	Wgt. Dry Pounds	Wgt. Green Pounds
Black Ash	3,200	4,600
White Ash	3,800	4,600
Basswood	2,500	4,200
Beech	4,000	5,750
Birch	4,000	5,500
Butternut	2,500	4,000
Cherry	3,800	5,000
Chestnut	2,800	5,000
Cypress	3,000	5,000
Cottonwood	2,800	4,600
Rock Elm	4,000	5,400
Gum	3,300	5,400
Gum Sap	3,000	5,000
Hickory	4,500	6,000
Mahogany	3,500	4,500
Maple, Hard	3,900	5,400
Maple, Soft	3,300	5,000
Oak	4,000	5,500
Poplar	2,800	3,900
Poplar Bay	2,800	3,900
Sycamore	3,000	4,750
Walnut	3,800	4,900

2-TON TRUCK PRICES FOR 8 YEARS

Cost of Six Prominent Makes Compared from 1912 to 1918 Inclusive

To the Editor, COMMERCIAL VEHICLE:

We are compiling a record of advances in prices of 2-ton trucks by leading manufacturers from 1912 to date. It has been called to our attention that you would be able to furnish these prices by years, and we would ask that you kindly give us the price of the 2-ton models of the following companies from the year 1912 to the present time by years. The trucks we are desirous of having the information on are: Packard, Pierce-Arrow, Peerless, Mack, Kelly-Springfield and White.—J. L. HULSMAN, Packard Motor Car Co. of Boston, Boston, Mass.

The prices of the 2-ton trucks of the companies mentioned as they were published in our specification tables for each year from 1912 to the present year follow:

	Jan. 1912	Jan. 1913	Jan. 1914	Jan. 1915	Jan. 1916	Nov. 1916	Nov. 1917	Nov. 1918
Packard	3000	2800	2800	2800	2800	2800	3400	3400
Pierce-Arrow	none*	none	3000	3000	3000	3000	3300	3750
Peerless	none	none	none	none	....	....	3000	none
Mack	3000	....†	none	....	2700	2700	3000	3000
Kelly-Springfield	not mfg	none	....	2750	2750	none	none	none
White	none	none	none	none	none	none	none	none

*The word none indicates that in our specification tables no 2-tonner was listed with the other models of the line.

†A dotted line indicates that no price was given in our specification tables on the 2-ton model of the line.

DATA ON OPERATION OF BUS LINE

Many Companies Build Trucks Suitable for Bus-Body Mounting

To the Editor, COMMERCIAL VEHICLE:

I am contemplating starting a bus line to operate in the State of Maine and would ask that you kindly refer me to some article published in your paper regarding the operation of a bus line in the New England States. I am also desirous of having you tell me whatever you can of the Stanley truck, as that is the type I have in mind. Will you kindly also suggest some truck companies whose trucks would be suitable for mounting bus bodies.—F. E. KLINE, New York City.

The Stanley Motor Carriage Co., Newton, Mass., maker of the Stanley truck, has not built this vehicle since 1917, although it is very possible that it will resume the manufacture of the truck now that the armistice has been signed. In 1917 the truck was listed as a 2500-lb. vehicle and was priced at $2,000.

Although we have published a great many articles on the operation of bus installations, we believe the synopsis of the one given herewith will tell you what you desire to know. The United Transportation Co., Inc., Troy, N. Y., operates a bus line between Albany, N. Y., and Pittsfield, Mass. The company operates a 1½-ton White truck equipped with pneumatic tires in the front and cushion tires in the rear. The 1½-ton White truck is priced at $3,300 to-day. The bus body was made by the Kingsbury-Leahy Co., 135 Hudson Avenue, Albany, N. Y., and seats twenty-two passengers. This outfit was described on page 33 of the November 15, 1915, issue of THE COMMERCIAL VEHICLE. The truck chassis was manufactured by the White Co., Cleveland, Ohio.

Below are a few of the names of the makes of 2-ton trucks using bus bodies which have been described in THE COMMERCIAL VEHICLE during the last 2 or 3 years:

Autocar Co., Ardmore, Pa.
Acason Motor Truck Co., Detroit, Mich
Atterbury Motor Car Co., Buffalo, N. Y
Bessemer Motor Truck Co., Grove City, Pa
Dart Truck & Tractor Corp., Waterloo, Ia
Federal Motor Truck Co., Detroit, Mich.
Garford Motor Truck Co., Lima, Ohio.
General Motors Truck Co., Pontiac, Mich.
International Motor Co., New York City.
Packard Motor Car Co., Detroit, Mich.
Pierce-Arrow Motor Car Co., Buffalo, N. Y

The full list of the makes of 2-ton trucks was published in the Nov. 1, 1918, issue of THE COMMERCIAL VEHICLE.

INDUSTRIAL TRUCKS FOR LUMBER

Couple-Gear Company and Others Make Tractors to Haul Trailers

To the Editor, COMMERCIAL VEHICLE:

In a recent issue of your magazine you published a Forum item in which Mr. C. C. Weigold of Charles F. Felin & Co., Philadelphia, Pa., asked for a device for replacing horses in connection with the handling of lumber which he stated was first loaded onto its two-wheel jigger trucks. At that time you stated in your reply that the Ross electric truck manufactured by the Covel Mfg. Co., Benton Harbor, Mich., as described in THE COMMERCIAL VEHICLE for April 15, 1918, seemed to answer the requirement—which we are sure is not the case. The Covel device is an automatically operated carrying device by the means of which lumber is picked up, transported to the desired spot and dropped, while what they are looking for is a device for hauling their lumber from place to place upon the trailers which it is loaded on. It seems that you have overlooked the fact that we are making the exact thing that the Philadelphia people are looking for. We are not criticising you for the error but are writing you simply as a matter of information.—J. W. BROWN, Couple-Gear-Freight-Wheel Co., Grand Rapids, Mich.

The Ross tractor mentioned is a vehicle which picks up lumber, transports it to the desired spot and drops it. The Couple-Gear company manufactures a small three-wheel electric tractor which may be employed for moving the loaded tractors from point to point.

If what is wanted is a tractor vehicle to haul the lumber on loaded trailers, there are several other makes of small industrial vehicles which could be used for the purpose. A list of the makers of electric industrial vehicles follows:

Automatic Transportation Co., Buffalo, N. Y
Baker R. & L. Co., Cleveland, Ohio.
Buda Co., Chicago, Ill.
Crescent Truck Co., Elizabeth, N. J.
Orstein-Arthur Koppel Co., Koppel, Pa
Elwell-Parker Electric Co., Cleveland, Ohio
Hoagland-Thayer, Inc., Newark, N. J.
Hunt Co., C. W., Inc., West New Brighton, N. Y.
Industrial Truck Co., Holyoke, Mass.
Karry-Lode Industrial Truck Co., Long Island City, L. I.
Lansden Co., Inc., Brooklyn, N. Y.
Lansing Co., Inc., Lansing, Mich.
Mercury Mfg. Co., Chicago, Ill.
Cowan Electric Co., Holyoke, Mass.

WEIGHTS OF METALS AND STONES

Weights of Such Materials Given in Pounds Per Cubic Foot

To the Editor, COMMERCIAL VEHICLE:

We have noticed that you have been publishing tables giving the weights of commodities, but so far you have not mentioned metals, coal and coke, rock, stone, bricks, cement, or grain. We would appreciate it if you would publish tables on these in some near-future issue, as we are very anxious to have this information.—K. KLEINER, New York City.

Metals

	Pounds per cu. ft.
Aluminum	167
Brass	523
Bronze	552
Copper	552
Iron, Cast	416
Iron, Grey Foundry	450
Lead	710
Nickel	549
Steel	490
Zinc	437

Coal and Coke

	Pounds
1 bu. (Bitum. Coal), 1.55 cu. ft.	75
Anthracite Coal, 1 cu. ft.	66
Bituminous Coal, 1 cu. ft.	55
Cannel Coal, 1 cu. ft.	50
Charcoal, 1 cu. ft.	20
Coke, 1 cu. ft.	32

Rock

	Pounds per cu. ft
Andesite	181.0
Basalt	181.0
Diabase	187.0
Diorite	187.0
Granite	168.0
Limestone	168.0
Limestone, loose	96.0
Marble, Italian	169.0
Marble, Vermont	165.0
Marble, loose	96.0
Porphyry	170.0
Quartz	162.1
Rhyolite	149.6
Sandstone	149.6
Schist	168.0
Shale	162.1
Slate	175.0

Stone, Brick, Cement, Etc.

	Pounds
Asbestos, cu. ft.	192
Asphalt, cu. ft.	100
Asphaltum, cu. ft.	87
Brick, soft, cu. ft.	100
Brick, common, cu. ft	112
Brick, hard, cu. ft.	125
Brick, pressed, cu. ft.	135
Brick, fire, cu. ft.	101-150
Brick, sand lime, cu. ft.	136
Cement (Portland) barrel	380
Cement (Portland) bag	94
Cement (Natural) barrel	285
Cement (Natural) bag	94
Concrete, cu. ft.	120-155
Lime, per struck bushel	75
Lime, per cu. ft.	53
Mortar, cu. ft.	110
Plaster of Paris, cu. ft.	93-113
Stone, crushed, cu. ft.	100

Grain

	Pounds
Barley, bushel	48
Bran, bushel	20
Corn, shelled, bushel	56
Corn, in ear husked, bushel	70
Corn, in ear unhusked, bushel	72
Oats, bushel	30
Rye, bushel	56
Wheat, bushel	60

New York's Large Truck Show

(Continued from page 14)

A good deal of interest was displayed in the matter of chain non-skids in relation to the development of attachments enabling these to be secured to steel wheels of the disc type. Non-skids, differing from each other mainly in details and method of attachment, were shown by the American Chain Co., Bridgeport, Conn.; the Rowe Calk & Chain Co., Plantsville, Conn.; the Challoner Co., Oshkosh, Wis.; the National Chain Co., New York; the Standley Skid Chain Co. and Topping Bros., New York. The Holmes grip, a non-skid in the form of an adjustable metal band, was exhibited by the Maxim Munitions Corp., New York.

General Accessories and Equipment.

A number of the exhibits of accessories applicable to both cars and trucks were continued from the passenger car show. These included a display of garage and repair-shop equipment exhibited by the Weaver Mfg. Co., Springfield, Ill.; distance recording instruments, by the Veeder Mfg. Co., Hartford, Conn.; the American Taximeter Co., New York; and the Corbin Screw Corp., New Britain, Conn.

The Westinghouse Air Spring Co., New Haven, Conn., exhibited a heavy-duty air spring designed for commercial vehicles; there were two or three new jacks shown by Lane Bros. Co., Poughkeepsie, N. Y., the Arrow Grip Mfg. Co., Glens Falls, N. Y., etc., and bearing metals, castings, alloys, etc., were exhibited on several booths.

Batteries and Lubricants

Specialties in graphite lubricants were shown by the Joseph Dixon Crucible Co., Jersey City, N. J.; Dorr-Miller differentials, by the Dorr-Miller Differential Co., New York; batteries, by the Electric Storage Battery Co., Philadelphia, and Paul M. Marko & Co., Brooklyn; and gasoline and oil pumps by the American Pump Tank Co., New York.

Electrical equipment was exhibited by the American Bosch Magneto Co., New York; Gray & Davis, Boston, and the Lauraine Magneto Co., New York. Exhibits of standard equipment and accessories were also made by a number of jobbers and distributing firms.

EXISTING RETURN-LOAD BUREAUS

List of Such Bureaus That Functioned Before the End of the War

To the Editor, COMMERCIAL VEHICLE:

We have seen a statement in a recent issue of some truck magazine in which it is stated that there are some 1700 motor truck companies operating in overland haulage. Can you tell us where a list of these names can be secured?—E. L. VIETS, Service Recorder Co., Cleveland, Ohio.

We know of no place where a list of the 1700 motor truck companies mentioned could be obtained. There are no doubt that many companies engaged in overland haulage, however.

In our opinion, perhaps the best method to obtain such a list would be to write to the various Return Loads Bureaus in cities scattered throughout the United States. While we do not know whether all of these bureaus are still functioning after the war as they did before the signing of the armistice, the list given below will give the location of all the Return Loads Bureaus which we have on record. In most cases each of these bureaus maintains a file index giving the names and addresses of the companies engaged in overland haulage and between what points the vehicles operate.

RETURN LOADS BUREAUS IN UNITED STATES.

Connecticut

City	Committee Operating
Bridgeport	Chamber of Commerce
Bristol	Chamber of Commerce
Danbury	War Bureau or Chamber of Commerce
Greenwich	War Bureau
Hartford	Chamber of Commerce
Manchester	War Bureau
Meriden	Chamber of Commerce
Middletown	War Bureau
New Britain	Chamber of Commerce
New Haven	War Bureau
New London	War Bureau
Norwalk	War Bureau
Norwich	Chamber of Commerce
Stamford	Chamber of Commerce
Waterbury	War Bureau

District of Columbia

Washington	Chamber of Commerce

Illinois

Chicago	State Council of Defense

Indiana

Indianapolis	Chamber of Commerce

Iowa

Cedar Rapids	Chamber of Commerce

Michigan

Detroit	Board of Commerce
Flint	Chamber of Commerce

Missouri

Kansas City	Chamber of Commerce
St. Louis	Chamber of Commerce

Nebraska

Omaha	Chamber of Commerce

New Jersey

Asbury Park	Board of Commissioners
Carney	State Council of Defense
Dover	Chamber of Commerce
Elizabeth	Elizabeth Motor Transportation Club
Garfield	Police Station
Jersey City	Chamber of Commerce
Millville	Maurice River Transportation Co
Montclair	Police Department
New Brunswick	Home Defense League
Newark	Motor Truck Club of N. J.
Trenton	Chamber of Commerce

New York

Albany	Chamber of Commerce
Buffalo	Chamber of Commerce
New York City	Merchants' Assn., Woolworth Bldg.
New York City	Van Owners' Assn
Rochester	Chamber of Commerce
Syracuse	Chamber of Commerce

Ohio

Cincinnati	Chamber of Commerce
Cleveland	Chamber of Commerce
Columbus	Chamber of Commerce

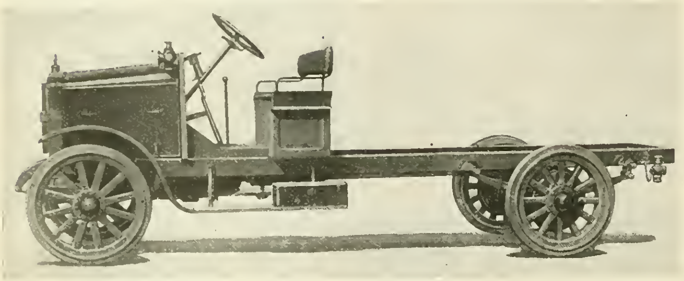
Pennsylvania

Philadelphia	Chamber of Commerce
York	Chamber of Commerce

Rhode Island

Providence	Chamber of Commerce

Acason Adds a 1-Ton Worm-Driven Model to Its 1919 Line



New 1-ton Acason chassis. Load space back of seat to end of frame is 118 in. Pneumatic tires are furnished at an extra charge.

ACASON SPECIFICATIONS

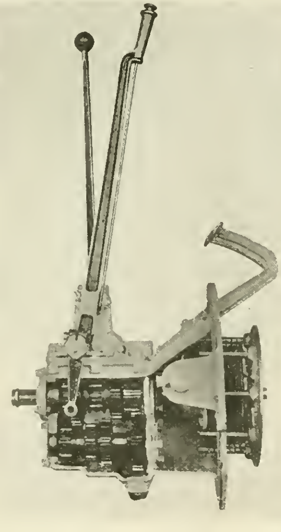
Capacity, tons	1
Price	....
Wheelbase, in.	144
Tires, front	36 x 3½
Tires, rear	36 x 5
Bore, in.	3¾
Stroke, in.	5¼
N. A. C. C. hp.	19.60
Speed, r.p.m.	1500
Speed, m.p.h.	23
Gear ratio in high gear	7 to 1
Final drive	Worm

WITH the addition of model R, a 1-tonner, the range of trucks built by the Acason Motor Truck Co., Detroit, now includes capacities of 1, 1½, 2, 3½ and 5 tons in addition to light and heavy commercial tractors. The new model, it is understood, would have been placed on the market some time ago, but was held up temporarily on account of war-time conditions. This circumstance has permitted of so much extra time for experimental and test work and the 1-tonner is now in production with a record of having undergone a thorough try-out.

The Waukesha engine, which forms, with the clutch and gearset, a unit power plant, is carried on three-point suspension and is designed to develop 35 hp. at normal operating speed. Cylinders are block-cast, the cylinder head is detachable and the three-bearing crankshaft is 2 in. in diameter. Engine lubrication is by a positive pump system with constant oil level.

Cooling water is circulated by a centrifugal pump and the cellular radiator is of special design with cast-iron case and guard. Options of either Schebler or Rayfield carbureters are offered, the gasoline tank is located under the driver's seat and fuel is vacuum-fed. The centrifugal governor is engine-driven.

Ignition is by an Eisemann high-tension magneto with hand-operated spark control, and no announcement has been made regarding the optional fitting of starting and lighting systems.



Fuller gearset used on new 1-ton Acason. It is of three-speed selective type and forms a unit power plant with the clutch and engine

Both clutch and gearset are of Fuller make, the former being of dry-disc type enclosed in a bell housing and the latter a three-speed selective sliding gear job. The drive-shaft is of three-joint type, with S. K. F. self-aligning center bearing. Universals are of Acme make.

Driving torque and propulsion are taken through the springs, the latter being of semi-elliptic type. Both hand and foot brakes are of internal expanding type, operating on rear wheel drums.

The rear axle is a Timken product having a one-piece housing and David Brown worm drive. The front axle is a drop-forged I-beam.

The frame is of Savage Arms make and pressed steel, flexible construction. Side section is 4 9/16 in. with 2½ in. flange; 3/16 in. material is used. The frame is 34 in. wide and is inswept to 31 in. between the front wheels to permit of a smaller turning radius. The overall measurement of the frame is 202¾ in.

Artillery wheels have S. A. E. standard bands and square spokes, and although solid tires are regular equipment 36 x 6 in. pneumatics are furnished, if desired, at an extra cost.

The Lavine steering gear is of irreversible worm and nut type, and the steering wheel, located at the right side, is 20 in. in diameter. The gasoline tank is of 15-gal. capacity.

Regular equipment includes a Boyce motometer, three oil lamps, horn, front fenders, jack, oil can and set of tools.

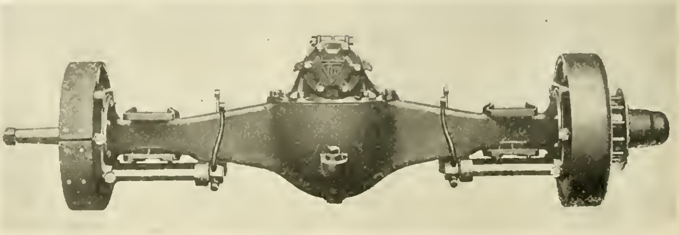
Apart from the new 1-tonner, the Acason line is substantially similar to its offering for 1918. It consists of six models made up of four conventional trucks and two tractors. Truck models include units of 1½, 2, 3½ and 5-ton capacities, while the tractors are rated at 6 and 10 tons respectively. With the exception of the 1½ and 5-tonners, four-speed gearsets mounted in unit power plants are used. Hotchkiss drive is employed on all models to take torque and propulsion.

Waukesha engines are installed on these models. Stromberg carbureters are supplied with fuel from tanks located under the driver's seat in each case. The 5-ton model is fitted with Smith cast steel wheels with hollow spokes. Artillery wheels with square spokes are used on the other models.

Nicolite lighting systems of 6-volt type may be installed on these trucks at an additional charge of $75 at the option of the purchaser.

The two tractor models are intended for use with semi-trailers and are made up of parts substantially the same as those used for the regular trucks, except for decreased wheelbases and the fitting of fifth wheels to support the forward ends of the semi-trailers.

Both the trucks and trailers are fitted with Eisemann magneto ignition, Waukesha governors of centrifugal type and vacuum fuel feed.



Timken worm-driven rear axle with one-piece housing used on the new 1-ton Acason

Texan Trucks a New Product—Two Models of ¾ and 1½-Ton Capacity Are Offered

New Texan 1½-tonner with body built for Southwestern needs. Worm final drive is used and a Lycoming engine is installed

TEXAN SPECIFICATIONS

	Junior	Standard
Capacity, tons	¾	1½
Price	....	....
Wheelbase, in	115	130
Tires, front	33 x 4p	34 x 4p
Tires, rear	33 x 4p	34 x 4s
Bore, in	3¾	3½
Stroke, in	4¼	5
N. A. C. C. hp	22.50	19.60
Speed, r.p.m	....	....
Speed, m.p.h	....	....
Gear ratio in high gear	6.9 to 1	4.3 to 1
Final drive	Worm	Worm

A LINE of trucks which includes the Junior, a ¾-tonner, and the Standard, a 1½-tonner, is marketed by the Texas Motor Car Association, with factory and offices at Fort Worth, Texas. Both vehicles are assembled from parts and units of standard make.

The larger model has a Lycoming block-cast engine with detachable cylinder head forming, with the clutch and gearset, a unit power plant carried on three-point suspension. Thermo-syphon cooling is used in connection with a cellular radiator and a four-blade fan mounted on annular ball bearings.

The Carter carbureter is fuel-fed from a 15-gal. gasoline tank located under the driver's seat by the Stewart vacuum system. Ignition is by the Delco battery system and a two-unit starting and lighting system is installed.

The clutch is a Borg & Beck dry-plate, enclosed in the flywheel housing, and the Grant-Lees selective sliding gearset has three speeds. Gears are of heat-treated nickel steel and the transmission shaft is mounted on double annular ball bearings. The tubular driveshaft is equipped with two universal joints.

Internal expanding and external contracting brakes operate on 14 x 2½-in. rear wheel drums. The frame is of pressed channel steel 5 in. in depth with a 2½ in. flange, and is constructed of material 3/16 in. thick. All attachments are heat riveted.

Artillery wheels are standard equipment, with pneumatic tires in front and solids at the rear. Steering gear is of irreversible worm type, operating in oil, having a 17-in. wheel located at the left side.

Included in the regular equipment are crowned front fenders formed of heavy steel, electric horn mounted under hood, two headlights, cowl light, tail light, Presto 6-volt, 80-ampere-hour storage battery, jack and tools. Chassis weight is approximately 3200 lb.

The smaller truck, known as the Texan Junior, has an L-head Golden, Belknap & Schwartz engine, a dry-plate clutch of same make and a Grant-Lees selective gearset. A Carter carbureter is used. Ignition is Delco battery system and the truck is equipped with Dyneto starting and lighting. The weight of the chassis is 2300 lb.

Drive is of Hotchkiss type, torque and propulsion being taken through the springs. A Salisbury rear axle is fitted. Brakes operate on 12-in. rear wheel drums.

New Panhard Twin-Frame Model E Has Buda Engine and Internal-Gear Drive

A NEW 2½-tonner has been introduced by the Panhard Motors Co., Grand Haven, Mich. This model completes a line which also includes 1 and 1½-ton trucks.

It is powered by a Buda engine with L-head, block-cast cylinders carried by three-point suspension on a sub-frame. The 3-bearing crankshaft is of ample dimensions, the effective working diameter of the valves is 1⅞ in. and pistons are removable through the bottom of the crankcase. Engine, clutch and gearset form a unit power plant.

A centrifugal pump operates the cooling system. The Perfex radiator is furnished with a cast-iron case and is of cellular type with removable core. Ignition is by a Bosch high-tension magneto with hand-operated spark control.

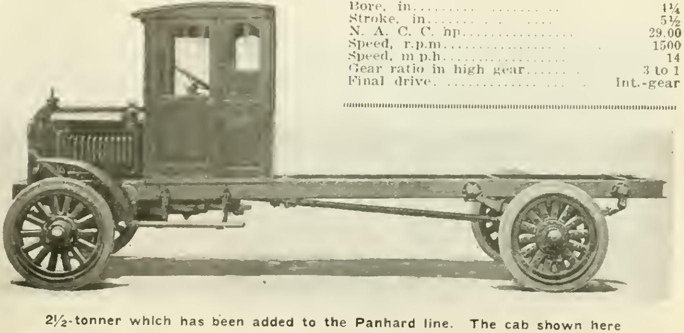
The Stromberg carbureter is fuel-fed by the Stewart vacuum system from a gasoline tank located under the seat. The Simplex governor is driven from the engine and is of centrifugal type.

Both clutch and gearset are of Fuller make, the former being of dry multiple disc type and the latter a three-speed transmission of selective sliding type. The tubular propeller shaft is furnished with three universals of Universal Product Co.'s make, and is carried at the center by an S. K. F. self-aligning bearing. The internal-gear driven rear axle is furnished with Timken bearings and the front axle is of conventional I-beam section.

The rigid, rolled-channel frame is made in the company's factory, a subframe carrying the power plant. Wood wheels with square spokes are fitted and, although solid tires are standard equipment, pneumatics may be had at an extra cost. The hood is made in three parts so that the sides may be removed without disturbing the top. The Lavine steering gear is fitted with a 20-in. wheel and is located at the left side. Fenders are made from 18-gage steel. The cab shown in the illustration is known as No. 306.

PANHARD SPECIFICATIONS

Capacity, tons	2½
Price	....
Wheelbase, in	150
Tires, front	34 x 4
Tires, rear	34 x 6
Bore, in	4¼
Stroke, in	5½
N. A. C. C. hp	29.00
Speed, r.p.m	1500
Speed, m.p.h	14
Gear ratio in high gear	3 to 1
Final drive	Int.-gear



2½-tonner which has been added to the Panhard line. The cab shown here is known as No. 306

Fruehauf Trailers and Semi-Trailers Have Many Improvements

Sunderman Nitro Carbureter, Stanweld Rim, Moore Mudhole Skid and Ekern Portable Grease Gun

Fruehauf Trailers

A NUMBER of improvements are embodied in the 1919 line of semi-trailers and 4-wheel trailers built by the Fruehauf Trailer Co., Detroit. Semi-trailers are built in four sizes, having rated carrying capacities of 70 per cent of 4, 6, 8 and 10 tons respectively. There are also four sizes in the 4-wheel line, with respective ratings of 1½, 3, 5 and 7 tons.

New 8-ton model Fruehauf semi-trailer with live-stock body

Structural steel channel frames with riveted and gusseted corners and ample cross members are used in the semi-trailers. The cross members are proportioned to the length of the frame to insure the greatest possible stability and the main frame is carried on a sub-frame to which are attached the steel spring hangers.

Springs are of special alloy steel and are so designed as to be flexible and responsive to the load, thus tending to minimize tire and bearing wear and reduce the upkeep cost generally. Spring shackles are drop forged from manganese steel, bolts are turned from solid stock and operate in steel bushings, and careful study has been made of the entire spring suspension in relation to the operating requirements.

All units having a rated capacity in excess of 4 tons are fitted with radius rods so that the springs are relieved of drawing strains. These rods are of steel and are fitted with hardened steel pins and bushings. Attachment is made at the lower end to a bracket under the axle and at the upper end to a continuation of the forward spring hanger. Wheels are of artillery type with large hub flanges and tires are of generous size in relation to the individual capacity of the trailer.

One of the features of the 4-wheel models is the absence of steering knuckles. These are replaced by solid, square axles. Axle, springs and wheels are suspended from a sub-frame or carriage which turns on twin circles and center-plate. The object of this form of construction is to eliminate side-sway and insure tracking. It also permits of the springs being placed close to the wheels, allowing the latter to cut under the trailer frame and giving a short turning radius. While these units are built both in reversible and non-reversible types, the use of the former (or double-end steer) is rendered less necessary on account of this feature.

The design is so arranged that frames of any width can be installed, a circumstance which reduces the expense where platform bodies are required.

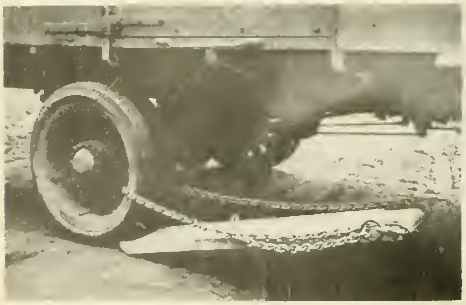
Sunderman Nitro Carbureter

THE Sunderman Corp., Newburgh, N. Y., has introduced a new type of carbureter, known as the "Nitro" for the reason that it is designed to deliver a highly explosive mixture of great power, instant acceleration and maximum economy through the adoption of a new principle which is incorporated in the design.

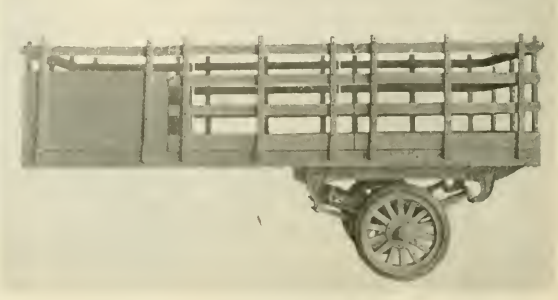
The Nitro carbureter is of plain tube type and simple construction. It employs a floating venturi and a mushroom nozzle for compensating the ratio of air to gasoline and for breaking up the fuel to produce a fine fog or gas.

At low or idling speeds the venturi rests upon its seat with its narrowest diameter opposite the mushroom jet, leaving a very small air passage with consequent high suction on the jet for starting and idling purposes. This suction may be moderated by an air bypass and its adjusting screw.

As the throttle is opened and the vacuum in the carbureter is increased the venturi commences to rise on the airstream and draw away from the nozzle. This action opens up the air passage around the nozzle (owing to the taper walls of the venturi) and compensates for correct ratios of air and gasoline. At higher speeds the venturi blocks the air bypass and puts it out of action. Then, under full suction, it quickly lifts to its highest position and gives the maximum air passage required by the engine. The venturi is of true stream-

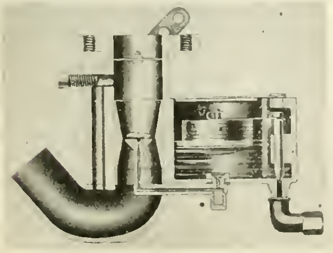


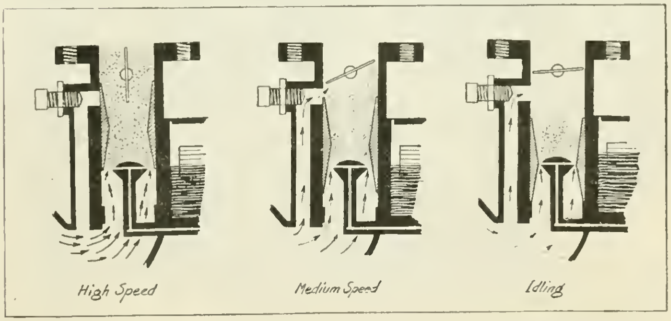
Moore's mudhole skid, showing method of operation



New 6-ton Fruehauf semi-trailer, showing spring suspension line shape and offers no restriction to the inflow of air, while increasing its velocity at the narrow throat. It also centers itself around the nozzle and has ample clearance for full freedom of action.

The mushroom nozzle has a calibrated hole drilled in the end of the jet tube for the individual requirements of the engine upon which the carbureter is installed. The jet feeds into the mushroom head and out through four small holes, spreading the gasoline by capillary action in a thin fan-film to all sides of the under surface of the slot, where the ascending air picks it off at right angles to its path in a fine vapor or fog.



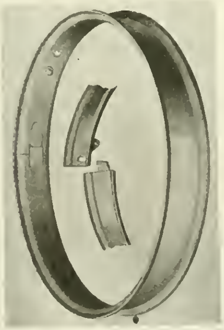


Sectional views of Sunderman Nitro carbureter, showing the action of the sliding venturi in relation to various rates of speed and the drilled mushroom nozzle with its four small holes

New Features Embodied in Stanweld Rim

SEVERAL refinements have been embodied in the new Stanweld rim which is now being marketed by the manufacturer, the Standard Parts Co., Cleveland, Ohio. The locking device, shown in the illustrations herewith, is designed to combine ease of operation with absolute security. Its mechanical construction is such that all possible danger to the tire from rough surfaces at the point of contact is eliminated. The driving stud is separated from the locking parts and is interchangeable on all standardized rims.

The wedge is designed to furnish an even and secure alignment of the rim upon the wheel. It has extra large bearing surfaces to minimize the possibility of squeaking. Another distinctive feature is the permanent attachment of the wedge-nut within the wedge itself. This form of construction permits of the more rapid removal or application of the rim in addition to preventing the wedge-nuts being misplaced or lost.



Showing new locking device on Stanweld rim

Moore's Mudhole Skid

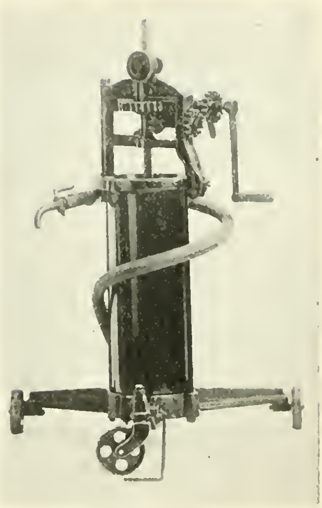
This skid consists of a board about 6 ft. in length, 2 in. thick and 12 in. wide. At one end there is a bar of ¾-in. iron bent to shape and fitted with rings to which a ⅜-in. cable is attached. This cable is sufficiently long to reach from the iron to the other end of the skid and back. In operation the chain is passed through the wheel spokes as shown in the illustration, brought back, pulled tight and fastened to the other side of the skid. When the engine is started the wheel travels along the board and also pulls the board underneath, thus enabling the truck to pull out of the mudhole. The skid can also be used to back out. It can also be adapted as a towing chain or the chain can be wrapped around a wheel as an anti-skid in cases of emergency. If the skid is fitted with hooks at the upper end it can be used to assist in the loading of boxes or barrels. It is obvious that a pair of skids are necessary, except in the case of a truck fitted with a locking differential.

The equipment is made by Langley & Schultze, 426 South Third Street, Louisville, Ky. The price per pair for trucks of from 1 to 2 tons capacity is $25; for larger trucks, $30. The skids can be carried conveniently under the truck.

Ekern's Portable Garage Grease Gun

MODEL N Ekern garage grease gun, distributed by the H. G. Paro Co., 1410-14 South Michigan Boulevard, Chicago, holds 56 lb. of grease or 7 gal. oil. The head is equipped with two sets of gears, one of which, of worm type, is used when forcing the contents of the gun out. The other is used for refilling. Change of gears is made instantly by raising or lowering the lever.

The cylinder is 30 in. long and 8 in. in diameter and the piston is provided with a cup-shaped leather with an expansion ring to prevent leakage by the piston. The latter also has an automatic air vent for releasing the vacuum in the cylinder.



Ekern's portable grease gun

A register indicates the exact amount of grease or oil taken out of the gun. It may be reset by simply turning it to zero. When grease is used the register indicates in pounds, oil is registered in pints and the same instrument registers both oil and grease. The weight of the outfit is 175 lb. and the list price is $65.

A smaller equipment, known as model K, has a capacity for 20 lb. of grease or 2½ gal. of oil. It is similar in design to model N and sells at $47.50.

Another Ekern specialty is a portable work-bench and engine stand which is provided with two large trays for tools, engine and axle parts, etc. The stand is mounted on three 4-in. wheels, one of which, a caster wheel, is so designed that the operation of a lever raises it from the floor and permits the stand to rest firmly on its legs. Kicking the lever down places the stand again on its wheels and locks it in position.

Men and Makers

STERLING MOTOR TRUCK CO., Milwaukee, at the annual meeting elected the following officers: President, R. G. Haussen; vice-president, E. M. Sternberg, and secretary and treasurer, Frank Luick. The company will be busy on Government orders until March 1, when it will again shift to peace-time orders. There are enough of these on hand to permit the company to run indefinitely at full capacity.

Acme Motor Truck Co., Cadillac, Mich., sees a big manufacturing year ahead. Approximately four trucks are being produced daily. The 1919 production schedule calls for the manufacture of 1400 trucks.

Nelson Motor Truck Co., Saginaw, Mich., maker of the Jumbo truck, was incorporated, changing the status of the company from a copartnership to an incorporation. The capitalization was boosted from $200,000 to $500,000. The officers of the company are: President and general manager, H. B. Nelson; vice-president, J. J. Nelson; secretary and treasurer, C. J. Nelson. The company is making a truck a day, but anticipates producing 1200 vehicles this year. A new factory addition is under construction, and plans for building a complete new plant are being considered.

Atterbury Motor Car Co., Buffalo, N. Y., has increased its capital from $250,000 to $500,000.

General Motors Corp., Flint, Mich., has purchased property of the Civic Builders' Association on the northwest edge of the city and proposes to erect homes to be sold to employees on liberal terms. The city street railway is being extended to the property.

Baker R. & L. Co., Cleveland, Ohio, makers of B. R. & L. electric industrial trucks and tractors, has made several changes in its administrative staff. C. L. F. Wieber has resigned as president and is now acting as chairman of the board. Fred R. White, previously vice-president and in charge of production, is now president. E. J. Bartlett, previously manager of the commercial department, is now vice-president and general manager. R. M. Owen and D. C. Durland remain as vice-presidents of the company as heretofore. Robert C. Norton remains as treasurer, but for some time has been in France as a major of artillery. His active duties are being performed by W. P. Southward, assistant treasurer. F. W. Treadway remains secretary and counsel of the company.

Walker Motor Co., Woburn, Mass., will place the Bay State truck on the market in the near future.

Bollstrom Engineering Co., St. Louis, Mich., is being organized there and all stock in the new concern has been sold. The company proposes to manufacture a four-wheel-drive truck. A 40-acre factory site has been purchased and work upon plant buildings will start soon.

Napoleon Motors Co., Traverse City, Mich., although in the midst of a general re-organization, is now producing ten trucks a week. Enough orders are on hand to run the company at capacity until October, 1919. The company has increased its capitalization to half a million and has launched a stock sale campaign.

Dependable Truck and Tractor Co., Galesburg, Ill., has completed its factory and the first truck was produced early in January. Fifteen men were employed while the plant was under construction and this number will be rapidly increased sufficiently to produce 300 trucks, planned as the output for 1919. At the outset, two types of trucks will be manufactured, one of 1½-ton size and the other, 2½ tons.

Pan-American Motor Corp., Decatur, Ill., has abandoned the production of trucks for the present year and will produce passenger cars only. This decision was reached at the annual meeting of the stockholders.

Pioneer All-Steel truck is the new name of the motor truck recently put on the market by the Harry Newman Corp. Mr. Newman has arranged to use steel disc wheels on the truck. This does away with the last piece of wood used in construction, so that the new name is justified.

International-Mack Corp., Pittsburgh, Pa., has just been formed by the International Motor Co., New York City, for the sale of Mack trucks in the Pittsburgh territory. The J. F. Sweeney Co. of that city previously handled the sales of the Mack trucks for Pittsburgh. J. F. Sweeney, president of the former company, will be branch manager of the new International Mack Corp. A new branch has also been opened in Knoxville, Tenn., with D. C. B. Van Duzen in charge, who is Southern district manager of the International company, and has his offices in the Holston National Bank Building, Knoxville, Tenn.

International Motor Co., New York City, has opened a new branch at Providence, R. I., in charge of L. C. Bent, who for a number of years has been associated with the Cambridge branch. The new organization will operate under the name of the Mack Motor Truck Co. The International company also opened a new Mack Motor Truck Co. branch in the State of Connecticut in charge of J. A. Morris, with sub-branches at New Haven, Bridgeport and Hartford. Mr. Morris has been distributer for Mack trucks in

It takes lots of push to get ahead these days, but the Duplex trucks in Lansing, Mich., were not stopped by Michigan blizzards. They just coupled snowplows to the front of the chassis and let 'er go the State of Connecticut for several years.

International Harvester Co. has appointed three more I. H. C. truck dealers in the Ohio territory. They are the Ottawa Garage Co., Ottawa; W. E. Ellis, Findlay, and W. H. Hobart, Pemberville.

Atterbury Truck Sales Co., Portland, Ore., has been organized by F. H. Nash, president and general manager, and W. S. Reichert, vice-president and sales manager. The company will handle only Atterbury trucks and do both a wholesale and retail business throughout Oregon, southern Washington and western Idaho.

St. Louis Selden Co. has been appointed distributer of the Selden truck in the St. Louis district, and has leased the building at 4525-27 Delmar Boulevard, which was formerly occupied by the Motor Truck Sales Co., distributer of the Smith Form-a-Truck. The firm is a partnership composed of B. M. McNabb and J. L. Mason.

Elbert S. Hatcher Co., Springfield, Ill., has been organized and opened a truck agency at 207-209 Washington Street. The company will be distributer for the Republic truck.

Triangle Motors Co., Bloomington, Ill., has taken the agency for the Service truck and will have five central Illinois counties for territory.

Golden Motor Sales Co., Grand Rapids, Mich., will handle G. M. C. trucks for that territory. Joseph M. Golden, president of the company, which was recently organized, closed a contract last week granting exclusive sale of these trucks.

R. E. Taylor Corp., New York City, has been made distributer for the Signal Motor Truck Co., Detroit, in territory comprising New York City and State, western Connecticut, New Jersey, Pennsylvania, Delaware, Maryland and District of Columbia.

Barger-Mitchell Motor Co., Toledo, Ohio, has taken the distributing agency and a broad adjacent field for the Acme line of motor trucks.

C. S. Ransom, Inc., Boston, Mass., will distribute in that territory the Fulton trucks made by the Fulton Motor Truck Co., Farmingdale, Long Island, N. Y.

Harry Montague and Clayton Mogle, Freeport, Ill., have formed a partnership and will distribute the Nash truck in the Stephenson County territory. They have leased the building at 22 Stephenson Street.

Payne Motor Co., Des Moines, has closed a contract to distribute Paige trucks for the entire State of Minnesota and the western half of Wisconsin, in addition to the Iowa territory already held. The Wisconsin and Minnesota business will be handled from Minneapolis, where the company has taken over the five-story Frederick E. Murphy Building.

The special 12-ton Freuhauf semi-trailer shown mounted on the 5-ton G. M. C. truck chassis pictured does the work formerly performed by three 5-ton motor trucks owned by the Detroit Creamery Co., Detroit. The tractor and trailer outfit is employed for hauling milk to a large branch of the creamery company. It is said that the cost of transporting milk to the branch by the tractor-trailer outfit has been reduced nearly two-thirds and that the saving will amount to several hundred dollars a year

Scudder Motor Truck Co., St. Louis, Mo., has made several changes in its personnel. C. I. Albach has been appointed sales manager, succeeding L. H. Amrine, who becomes general manager; E. C. Dann has been appointed manager of the wholesale department; W. C. Ahlmeyer has been made superintendent and E. W. Galloway has been appointed assistant secretary treasurer. These changes in the company were necessitated by increased business.

General Tire & Rubber Co., Akron, Ohio, has increased its capitalization from $1,000,000 to $2,500,000.

Miller Rubber Co., Akron, Ohio, is building 38 x 7 in. cord tires for motor truck use and plans to add to its cord truck tire line a tire of 40 x 8 in.

Carlisle Cord Tire Co., New York City, has appointed the following officers for the year 1919: President, J. S. Brets; vice-president, C. A. Gilbert; treasurer, Lewis H. Homer; secretary, E. R. Sorles; assistant secretary and treasurer, C. V. Tuthill. Since the company has been relieved from war contracts, its factory has been working continuously to make up on production.

Lee Rubber & Tire Corp., New York City, showed earnings of $250,000 for 1918, as compared with $220,000 for 1917, after all necessary deductions were made. Sales for January, 1919, are about 30 per cent larger than for the same month last year. Although the company's financial position is understood to be good, there are no prospects of a disbursement to the stockholders for some time.

Economy Motor Co., Tiffin, Ohio, has elected the following officers for the year 1919: President, R. W. Miller; vice-president, Frank Clever; secretary, George C. Wiseman; treasurer and general manager, John A. Manecks.

Standard Parts Co., Cleveland, Ohio, is placing its operations on a peace-time basis and is again operating under the plan of separate management for each of its various plants. During the war the company centralized all activities in the general offices at Cleveland in order to conserve man power, and particularly because the greatest part of all production was for one customer—the Government. The executive and supervisory officers, credits, collections, disbursements and contractings for the larger material supplies will remain in the general offices. Under the plan there will be separate general management for each plant. The various plants will be under general management as follows: Standard Welding Plant, H. H. Newsom; Perfection Spring Plant, F. F. Grimmelsman; Bock Bearing Plant, George H. Kleinert; American Axle and Cincinnati Axle Plants, both producing Stan-Par axles, D. K. Moore, with headquarters in Cleveland, Ohio; Canton Spring and Canton Forge Plants, J. B. Childe; Connersville Spring and Axle and Wheeling Axle plants, E. V. Overman, with headquarters in Cincinnati, Ohio; Pontiac Spring plant, B. A. Litchfield; Flint Spring plant, R. T. Armstrong; St. Louis Spring plant, N. B. Champ; Perfection Heater plant and Spring Jobbing division, B. R. Winborn.

Pierce Governor Co., Anderson, Ind., has just completed a two-story brick addition to its factory, giving it an additional 5000 sq. ft. of floor space. The new building will be used for storing raw material and finished parts. The tool making and pattern making departments will also be moved into it.

Edison Storage Battery Co., New York City, has moved its sales office from 209 West Seventy-sixth Street to 247-251 West Thirty-fifth Street.

Detroit Steel Products Co., Detroit, held its annual meeting, at which reports were submitted showing a very successful year. Officers were elected as follows: President, John G. Rumney; vice-president and general manager, Victor F. Dewey; secretary, H. F. Wardwell; treasurer, E. R. Ailes; assistant general manager, Mason P. Rumney; production manager, A. L. Baldwin.

Columbus Commercial Body Co., Columbus, Ohio, is the name of a $25,000 corporation recently chartered for the purpose of manufacturing commercial bodies. The incorporators are Curtis C. Beach, John S. Dawson, George R. Hedges, Herman R. Tingley and K. Henderson.

Standley Skid Chain Co., Boone, Iowa, has established an assembling plant in Pittsburgh, Pa. The products of the company will be sold in the East by the American Sales Co., Inc., 334 Second Avenue, Pittsburgh, Pa.

Matt R. Korshin, formerly Eastern district sales manager of the Atterbury Motor Car Co., Buffalo, N. Y., has been appointed Eastern district sales manager of the Paige-Detroit Motor Car Co., Detroit. He will have charge of sales in the Middle Atlantic and New England States.

Joseph A. Anglada, general manager of the Commercial Car Units Co., Philadelphia, Pa., is designing a line of motor trucks to be put on the market in the near future.

S. Ervin Diehl has taken over the business of the Rush Motors Corp., Philadelphia, and the Diehl Motor Truck works will bring out a line of 1½- and ¾-ton trucks for the American market, using Continental motors and standard parts.

C. B. Harvey has been made sales manager of the O. Armleder Co., Cincinnati, Ohio, and will handle Armleder truck sales in the Middle West, with headquarters in Chicago. Formerly he was connected with the Evertight Piston Ring Co., St. Louis.

J. M. Case, former sales and advertising manager of the United Motors Co., Grand Rapids, Mich., has become advertising manager of the Garford Motor Truck Co., Lima, Ohio.

Capt. Harold J. Vogler was appointed district sales manager for the Service Motor Truck Co., and assigned to district No. 3, which includes Maryland, Virginia, District of Columbia and the Carolinas. He took up his work there on Jan. 1.

B. V. Osborne, formerly with the Fulton factory and now released from Government service, has been appointed assistant sales manager of the Fulton Motor Truck Co.

W. B. Wood, for seventeen years Detroit manager for Fairbanks, Morse & Co., has joined the sales force of the Commerce Motor Car Co. and will represent that company in the Western territory.

Robert E. Page, for four years assistant foreign sales manager for Dodge Bros., has joined the staff of the Commerce Motor Car Co., Detroit. He will look after the Canadian Commerce truck business.

Lafayette Markle has been appointed general manager of the Oneida Motor Truck Co., Green Bay, Wis.

George J. Kellogg, Detroit, for eight years secretary and treasurer of the Commerce Motor Car Co., died on Feb. 7 at Grace Hospital following an operation. He was an official of the Commerce company from the day of its incorporation.

F. U. Rosebery has just been appointed Western sales manager for the Maccar Truck Co., Scranton, Pa. He was formerly Eastern manager for the Signal Motor Truck Co., Detroit, Mich.

H. Flint, Detroit, former distributer of Hupp motor cars in Michigan, is now Western sales manager of the Abbott-Downing Truck & Body Co., Concord, N. H.

A. E. Creeger, identified since its organization with the Nash Motors Co., Kenosha, Wis., as special traveling representative, has resigned his connection with the home office. He leaves to become associated with the Ohio Nash Co., and will assume full charge of truck sales for that territory.

Chicago's Exclusive Motor Truck Show

(*Continued from page* 9)

engine has a total of 290 parts as compared with 357 parts in the Class B engine. The engine is particularly designed for use on 5- to 7-ton trucks and on 5-ton trucks mounted on pneumatic tires. A smaller unit of 4¼ by 6¼ will also be offered for trucks of 3½-ton capacity and will use many of the parts employed on the larger engine, so that the total number of parts used in both engines numbers only 320 as compared with the 357 parts in the Class B job.

Four makes of engines were shown by the Wisconsin Motor Mfg. Co., Milwaukee, Wis. These included a six-cylinder job of 160 hp. with cylinder 5.1 by 5½ for fire service; two four-cylindered engines 4¾ by 5½ to develop 60 hp. at 1600 r.p.m. The Wisconsin company is also manufacturing a modified Class B type of engine for commercial service.

Two makes of truck axles were shown, including the Clark internal-gear-driven type and the Badger external-gear-driven type. The Clark axle, made by the Clark Equipment Co., Buchanan, Mich., was shown in one complete 2-ton axle together with separate displays of the various parts.

The Clark metal wheel was also exhibited at the same booth. The Badger axle is made by the Reliance Motor Truck Co., Appleton, Wis., and is built with the jackshaft in front of the solid load-carrying member on which the rear wheels are mounted. The spur gears are bolted to the rear wheels and the driving pinions teeth to the ends of the jackshafts. The gears are inclosed and run in grease. The West Steel Casting Co., Cleveland, Ohio, showed seven different sizes of its spoke type metal wheels, one a new design for mounting 44 by 10 in. pneumatic tires. The Budd Wheel Corp., Philadelphia, Pa., showed five of its disk-type wheels, three with pneumatics, two with dual solid rubber tires and one with a single solid. It also exhibited its metal truck cabs and seat risers. The Dayton Steel Foundry Co., Dayton, Ohio, had a large exhibit of eleven of its metal wheels, three of which were shown in cut sections.

In the way of new body material a panel design made out of Pantasote was exhibited to give an idea of the texture and strength of the material as compared with wood. The Haskelite Mfg. Corp., Chicago, also exhibited slabs of its Haskelite body material, which is made up of laminations of thin gum wood made integral by an insoluble blood glue. It can be bent into shape for body tops with a double curvature or used for straight panel sides. The Parry Mfg. Co., Indianapolis, Ind., showed five types of its standardized bodies, some for Fords and others for larger trucks.

The Chicago Mfg. Co., Chicago, showed several types of its tubular cored radiators with horizontal fins used in connection with cast or sheet metal cases as furnished to twenty-eight different truck makers. The Perfex Radiator Co., Racine, Wis., showed six of its truck type radiators, including one built for a Class B war truck.

Truck hoists were exhibited by the Wood Hydraulic Hoist & Body Co., Detroit, with a sample hoist and body electrically operated; by the Hydro Hoist Co., Milwaukee, Wis., with an actual hoist fitted on a 3½-ton service truck and by the Horizontal Hydraulic Hoist Co., also of Milwaukee. There were several exhibits of traction chains and devices for trucks, among these being the Arrow-Grip, made by the Arrow-Grip Mfg. Co.; the Giant Grip, by the Challoner Co.; the Flashon, by the National Chain Co.; Weed chains by the American Chain Co. and the Rowe chains made by the Rowe Calk & Chain Co.

A new type of steam engine was shown by the Dunning Engine Co., Chicago, and a new type of hub odometer by the American Taximeter Co. The Hilliard Clutch & Machinery Co. showed three models of its clutches for trucks; the Trindl Machine Works, valve-grinding machines; fan belts by the Mechanical Belt Co., single and chime cylinder whistles by the Buell Mfg. Co. and horns, fans, vacuum system and cellular radiators by the Sparks-Withington Co. Stromberg and Schebler carbureters were also exhibited. Magnetos were shown by the Simms Co., the Splitdorf Company and the Eisemann Company. Spark plugs were shown by the Champion Ignition Co. and starting and lighting units by Gray & Davis. Piston rings were on display by the Inland Machine Works and graphite for bearings by the Joseph Dixon Crucible Co. Special types of wheels were shown by the Sewell Cushion Wheel Co. and by Morand Bros. Martin Cushion Wheel Co. Batteries were shown by the Vesta Accumulator Co. and by the Electric Storage Battery Co. Forgings were displayed by the Anderson Forge & Machine Co. and wrenches and tools respectively by the J. H. Williams Co. and the Taft-Pierce Co. The Corbin Screw Corp. showed odometers and the Seelow Mfg. Company two partly finished truck cabs. The Ahleberg Bearing Co. and American Bronze Corp. exhibited bearings and the Alemite Die Casting & Mfg. Co., die castings.

The Commercial Vehicle
Read by Business Men

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Vol. XX. March 1, 1919. No. 3

Speed and Radius of Action Enable Texas Transferman to Increase Business

Location of Three Flying Fields and Army Camp 10 to 16 Miles Out of Fort Worth Forces Rapid Motorization of the City's Delivery Equipment

THE ability of a motor truck owner to increase his business through being able to enter a new field by reason of having trucks instead of horses is strikingly illustrated in the case of the Binyon-O'Keefe Fireproof Storage Co., Fort Worth, Tex. That company had constructed one of the most modern fireproof storage warehouses anywhere in the Southwest and had done exclusively a warehouse and local transfer business until the American declaration of war on April 6, 1917. Shortly after that date the Government decided to locate one cantonment and three flying fields in close promixity to Fort Worth. It was not until the spring of 1918 that the work of carrying the materials to these four fields and of providing the labor to construct the various buildings was begun. It was in this work that the Binyon-O'Keefe company was able to expand its business by hauling laborers and carpenters from Fort Worth to the three flying fields.

Impossible With Horses

It could not have taken on the work had it used horses, since all three of the flying fields are from 10 to 16 miles out of Fort Worth. The three flying fields mentioned are as follows: Taliaferro Field at Hicks, 16 miles north of Fort Worth; Carrouthers Field at Benbrook, 12 miles west of Fort Worth, and Barron Field at Everman, 10 miles south of Fort Worth. Camp Bowie, a cantonment for drafted men, was located 3 miles southeast from Fort Worth.

Due to the scarcity of labor at the three fields and the lack of barracks at which to house the men, those employed in the laying out and construction of the fields and their buildings had to be hauled from Fort Worth in the morning and brought back to the city again each night. At the beginning several hundred men were moved back and forth from Fort Worth every day until the field buildings were completed. The work lasted well over 6 months, beginning in April, 1918, and running full blast until September of the same year. Late in October, 1918, men were being carried to Taliaferro Field only.

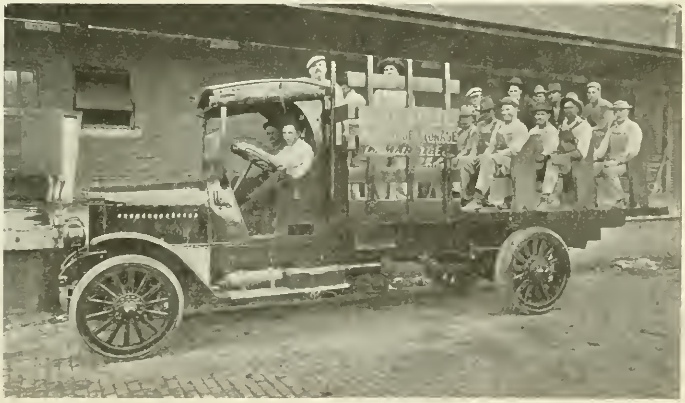
Forty Men Carried on Truck

From thirty-five to forty men were carried on each truck by means of heavy crosswise seats with projections at each end which fitted into the openings holding the side stakes of the platform body ordinarily used on the trucks. The type of the seat construction is well shown in the illustration of the Acme 3½-tonner on this page.

Each of the trucks left Fort Worth at 6 o'clock in the morning and arrived at its respective field, unloaded the men, and was back in Fort Worth at 8 a. m. They again left Fort Worth at 5 p. m. to bring the men back after their day's work and arrived at Fort Worth at 7 p. m. By making the crosswide seats removable it was thus possible to make other use of the trucks during the regular working day from 8 a. m. until 5 p. m. The seats were simply taken off and stored in the company's garage. By substituting the ordinary side stake panels, they were employed for general transfer work around the city. While the carrying of the men paid for cost of the entire truck operation of the day, the work performed during the period between the morning and evening trip also brought in the usual remuneration, so that each truck practically doubled its previous earning capacity.

Much Moving Done

When the fields were put into operation there was a great influx of officers, who sought to obtain their own private residences rather than put up at the army barracks. This put a great pre-



The Binyon-O'Keefe Company's 3½-ton Acme, fitted with removable crosswise seats to carry from thirty-five to forty laborers or carpenters from Fort Worth to the three aviation fields from 10 to 16 miles distant

One of the Packard 3½-tonners with a load of merchandise being unloaded at the Binyon-O'Keefe warehouse from which it will later be distributed to jobbers in the northern and central Texas territory

mium on the houses near the different fields and it was not long before these were occupied. As a result, the men had to seek other houses farther and farther away from the fields, and it was in this work that the trucks of the Binyon-O'Keefe company secured much additional work in moving the household effects of the officers to them from the Fort Worth railway terminal.

Fort Worth Motorized Quickly

While this work was going on, the regular business of the company remained constant, so that the added earnings of the concern were due in a great measure to the ability of its trucks to expand their work capacity to meet the new conditions. With the necessity for speed in almost every operation and on account of the comparatively long hauls from Fort Worth, none of the business could have been accepted had horses been employed.

The location of the flying camps and cantonments near Fort Worth did more to motorize the city's delivery equipment than any other one thing. The case of the Binyon-O'Keefe company is not an exceptional one, since practically every builders' supply company in the entire city of Fort Worth was forced to buy motor trucks in order to obtain any of the Government work. Great quantities of lumber, cement, glass, machinery and other miscellaneous equipment was hauled from Fort Worth to the fields by means of motor trucks because of the lack of proper railroad facilities and the congestion on what trackage was already available.

First Truck Bought in 1911

The Binyon-O'Keefe bought its first truck in 1911. It was a Packard 3½-tonner, which is still owned by the company and still in active operation. Since that time the motor truck fleet of the company has been increased to fourteen trucks and two trailers. Twenty head of horses are still maintained for the railroad depot and freight delivery work from the railroad terminals to the places of business of the Fort Worth merchants. It is expected that the horse equipment will be reduced to sixteen head, or eight double teams, which will continue to be employed in hauls to and from the railroads on account of existing congestion and consequent delays which do not enable motor trucks placed in the service to realize their full efficiency.

The present truck fleet of the Binyon-O'Keefe consists of seven Packards, two 2½-tonners with van bodies, four 3½-ton models with side stake bodies and one 6-tonner with a platform side-stake body; two Service 2-ton models, one with a van and the other with a stake body; one Acme 3½-tonner with stake body; one White 1½-ton model; two Fords, one a Model T passenger car with delivery body and the other a chain-driven converted Model T car with a Dearborn rear end, and one converted Buick passenger car. The two trailers are Troys, one of 3½-ton capacity and the other of 5 tons.

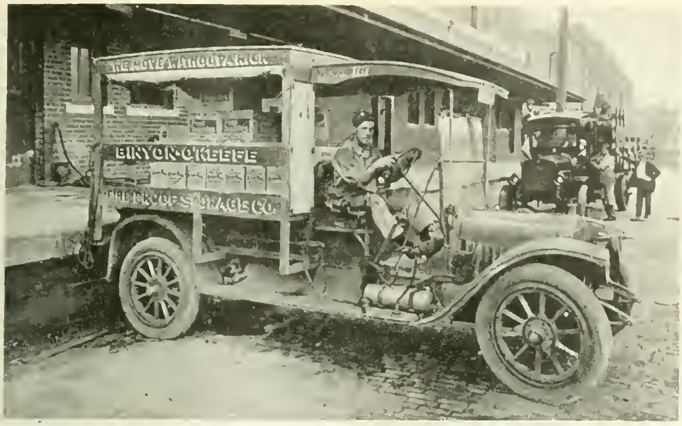
Early in 1913 the Binyon-O'Keefe company disposed of its Wichita and White trucks then owned and began to standardize exclusively on Packards of the various sizes. After October, 1917, it could not purchase any other Packard trucks on account of that company's large volume of war orders. The Binyon-O'Keefe company simply had to have trucks, however, in order to take on the additional work which was available, and purchased the two Service 2-ton trucks, the Acme 3½-tonner and the two Troy trailers.

At the present time the Binyon-O'Keefe company handles approximately 85 per cent of the freight received by railroad and consigned to Fort Worth merchants. Approximately 60 per cent of its warehouse business is given over to merchandise and 40 per cent to the storage of household goods. It is the merchandise which is hauled from the railroad depots to the merchants in the city or brought direct to the company's warehouse. The latter goods are sorted at the warehouses and then shipped out to other jobbers in the central section of Texas, for which Fort Worth is a great distributing center. The company's trucks also handle on an average of two cars a week of fresh meat consigned to the various depots of Morris & Co. from the Oklahoma territory. Some Cudahy dressed meat is also handled, the meat being burlap wrapped.

The Dallas to Fort Worth Line

In addition to the company's regular work and that of hauling men and materials to the flying fields and to Camp Bowie, considerable goods are also moved by trucks between Fort Worth and Dallas, the latter city being the largest distributing point in the entire northern half of Texas. On account of the large amount of Government material passing from Dallas to Fort Worth, the Government assisted in the surfacing of a good motor truck road between the two cities. This proved to be a great impetus to overland truck haulage between the two

A Service 2-tonner with a side stake body, with top that can be used either for furniture or merchandise haulage. Roll-up side curtains are provided to protect the goods in stormy weather



The White 1½-tonner, which is used for special merchandise or light household goods haulage. Note the width of the body top and how it is supported from the frame

cities, which are approximately 40 miles apart.

Many of the Dallas companies which previously shipped to Fort Worth by rail are now employing motor trucks, and one large concern, the Motor Freight Lines, maintains a daily truck service between the two cities. There are no serious grades on the road and the Motor Freight Lines and the Binyon-O'Keefe companies use trailers with such vehicles as make the trip between the two cities. Return loads are carried by the Motor Freight Lines trucks and the Binyon-O'Keefe company also seeks to carry loads back in order to reduce the one way rate by reason of obtaining a revenue on the otherwise empty trip back to Fort Worth.

Has Own Garage

The Binyon-O'Keefe Co. maintains its own garage for the upkeep and repair of its trucks. One mechanic and a helper are employed continuously to keep the fourteen trucks and two trailers of the company in good running order. The vehicles are not completely overhauled in the sense that they are taken down once a year and every part inspected. Instead, they are looked over each night and repairs made the moment any trouble appears or seems likely to occur.

Each of the company's trucks is operated by a white driver, who is paid at the rate of $20 a week, which is $2 above the union rate of $18 a week. All of the trucks have helpers in order to reduce the loading and unloading time, and these men are paid from $15 to $18 a week, with the union wage set at $15. By paying its men more than the required union wage, the company is able to pick its drivers and choose the best qualified and most experienced men.

Two extra van bodies are kept on hand and can be placed on either the Service 2-tonner or the Acme 3½-tonner when household goods are to be moved. Special fastenings are used on these bodies so that they can be put on and taken off readily when the change back to an ordinary side stake body is to be made.

Each of the company's trucks averages between 40 and 45 miles a day. In the work outside of Fort Worth proper one of the difficulties of truck operation has been the excessive wear on the inside right rear tire, which is caused by the road shoulder on the narrow highways leading out of the city.

Hour Rates for Trucks

All of the company's truck work is done by the hour. This includes moving household goods and all freight haulage except depot work. No estimates are furnished and no moving is done by load, piece or contract except in special cases, as, for instance, that of moving the laborers to the various military fields, which was done on a contract basis. The 3½-ton Packard with a driver and helper does work at the rate of $4 an hour. The two 2½-ton Packards and 2-ton Services cost the customer $3 an hour, while the Fords are rated at $2 an hour. For the 3½-ton truck, this basis gives a total income of $40 for a 10-hour day, which is sufficient to cover all overhead charges, including insurance on the goods, supervision and profits. A two-horse van with two men costs $2.50 an hour.

Basis of Charging

When the truck loads are to be put into storage at the company's warehouse, the charge per load for the 3½-ton trucks and over is $8. On goods sent into storage with 2-ton trucks and horse wagons the charge is $5 per load.

All packing is done on the hour basis. Special packing rates are adhered to as follows:

Barrels, each	$0.50
Barrels and Excelsior	.75
Boxes—	
Upright Piano, each	6.00
Square or Grand Piano	10.00
Packing Boxes, each	.75
Picture Boxes, each	.75
Book Boxes, each	.50
Excelsior, per pound	.03
Excelsior Pads, each	.03
Labor, Packer's time per hour	.90
Twine, per ball	.25
Paper (heavy wrapping), per lb.	.15
Paper (blank news), per lb.	.06
Newspapers, per lb.	.05
Tissue, per lb.	.35
Lumber, all kinds, per foot	.04
Packing Camphor, per lb.	.50
Rug Poles, each	.25
Tacks, per package	.05
Nails, per lb.	.08
Screws, per doz.	.10

Special rates are also made for moving pianos as follows:

Charges for moving Upright Piano by two men	$3.00
Charges for moving Square Piano by two men	3.50
Charges for moving Grand Piano by three men	7.50

No upstairs work is done at the above prices except that all additional labor is charged for at the rate of 60 cents an hour for each additional man. Where a piano has to be hoisted or skidded outside or through a window a minimum charge of $15 is made.

Absorption of Gasoline from Waste Gases

A SUCCESSFUL use of naphtha as an absorbent for gasoline lies in the absorption in the naphtha of waste gases from compression plants treating casing-head gasoline.

Some tests were made in which natural gas was simply passed into naphtha with a gravity of about 55 degrees Baumé scale. When the naphtha had absorbed all the gasoline that was desired it was removed and fresh naphtha substituted. The yield of gasoline was 300 to 500 per cent greater than that by the oil absorption and distillation process. In some tests the naphtha besides being increased in volume owing to the absorbed gasoline, was raised in specific gravity to 60 or 62 degrees Baumé scale. An objection to the process lies in the fact that a large amount of naphtha has to be handled—at least seven tanks of naphtha for each tank of gasoline obtained. If the naphtha is permitted to absorb too much gasoline its vapor pressure is raised too high for safe transportation.

There are possibilities in the application of the absorption method to casing head natural gas, much of which is too lean to be treated by compression and condensation methods.

The Density of New York Population

Map of New York City, Metropolitan District, showing the density of population according to the Census of 1915, has been published by Ward & Gow, New York City. On the map are marked the Interborough Rapid Transit Company's subway and elevated lines; the boundary of the metropolitan district of the City of New York and the boundary of the City of New York. The population of the metropolitan district, according to the census taken in 1915, was 7,173,272.

Four Michigan Truck Lines Use One Warehouse

Four Companies Running Trucks to Flint from North, South, East and West Combine to Maintain Warehouse for Holding Goods Going Beyond Route of First Handler—Business Agent Secured

THE economy of a combination of overland haulage companies to handle goods going beyond the route of any one of the companies is strikingly shown by the co-operation of four such concerns operating in the middle peninsula territory in Michigan. The combination was brought about last fall through the effort of F. G. Pick, manager of the Traffic Department of the Flint Chamber of Commerce. The four concerns combined to hire a warehouse in Flint and to employ a general agent to obtain business for the four concerns. At the beginning, the general agent was paid at the rate of $150 a month and expenses, although at this writing he was expected to be paid on a commission basis so that his earnings would be in direct proportion to the amount of business secured. The four companies in the combine pay for the services of the general agent in ratio to the total volume of business secured by him for each of the separate companies, none of which run in competition with the others.

The Concerns Co-operating

The four trucking concerns in the combination included: 1—Rural Motor Express Service; 2—Inter-City Trucking Service; 3—Overland Motor Express, and 4—The H. A. Ward General Cartage Co.

The Rural Motor Express Service operates between Flint and Lansing, approximately 68 miles to the southwest. The Inter-City Trucking Service Co. operates between Flint and Detroit, 68 miles to the south. The H. A. Ward company also operates between Flint and Detroit, although over a different route than that of the Inter-City Trucking Service. The distance of the Ward route between the two cities is 78 miles as compared with 68 miles of the Inter-City Truck Service. The Ward company at this writing intends to install a new service between Flint and Port Huron, approximately 60 miles to the east at Lake Huron tidewater. The Overland Motor Express Co. operates between Flint and Saginaw, about 35 miles to the north. It will also tap the territory directly to the west of Saginaw in which Alma, Mich., approximately 45 miles away and the location of the Republic Motor Truck Co., is the principal city.

How Combine Started

When these lines were started in the mid-summer and fall of 1918, it was found that a certain percentage of the goods hauled were to be shipped beyond the terminus of the truck company hauling them. For instance, there might be a shipment from Lansing to Port Huron by the Rural Motor Express Service, whose trucks normally stop at Flint. Under ordinary conditions, the goods would have to be delivered to a public warehouse or to the railroad depot for the final leg of the journey eastward to Port Huron, but by the establishment of a warehouse in Flint paid for jointly by the Rural Motor Express Service and the H. A. Ward General Cartage Co., which runs from Flint to Port Huron, the goods could be routed straight through from Lansing to Port Huron.

If the time of the arrival of the truck from Lansing to Flint did not coincide with the leaving time of the Ward truck from Flint to Port Huron, the goods could be kept under the control of the two concerns by storing them in the commonly-maintained warehouse in Flint. Similarly, goods hauled from Owosso to Flint, 30 miles away, on the trucks of the Rural Motor Express, could be routed through to Detroit by the vehicles of the Inter-City Trucking Service or the H. A. Ward company.

The 3-ton Denby, owned by the Inter-City Trucking Service, which is one of the four truck concerns in the Rural Motor Express Service. The truck operates daily between Flint and Detroit, a distance of 68 miles. Stops are made at intermediate points on the route

The Rural Fleet

The Rural Motor Express Service operates a fleet of five Republic trucks of from 1 to 2 tons capacity and a United tractor with a 3-ton semi-trailer. Two of the trucks are of 1-ton capacity, two of 1½-ton size and one 2-tonner. The 1-ton trucks were found to be too small for the express business if any profits were to be earned and if the rates charged were to be anywhere near those by rail, considering the more direct truck service offered. Five-ton trucks were found to be too large for the carrying capacity of the roads. Eight miles of the route between Lansing and Flint is laid in ordinary dirt road. In rainy weather 5-ton trucks met with great difficulty in getting through this 8-mile stretch, although the remainder of the run made over rolled crushed stone road could be covered without trouble.

The company intends at this writing to install pneumatic tires all around on the 2-ton trucks in order to secure greater speeds and make a round trip between Lansing and Flint in a day as compared to one a day with solid tires. The governor on the 2-ton truck is set at 10 miles an hour, and it is planned to reduce this to 8 miles an hour when a semi-trailer is employed.

Drivers Changed on Route

The trucks do not run through from Lansing to Flint but meet at a predetermined point, where drivers are changed. For instance, the truck which leaves Lansing at 7:30 in the morning meets the truck which leaves Flint at the same time at a point on the road near Pitts Corners. There the driver on the truck from Flint changes to the truck from Lansing and brings it into Flint, where it arrives at 2:30 p. m. Similarly, the driver leaving Lansing at 7:30 in the morning changes to the truck which left Flint at the same time and brings it into Lansing, which it reaches at 2:30 the

A Signal 3-tonner, operated by the Overland Motor Express, Inc., between Flint and Saginaw, Mich. It is shown being loaded with soap at the commonly-maintained warehouse of the Rural Motor Express Service in Flint

same afternoon. Since the line has been in operation none of the trucks have had to wait more than 10 minutes at Pitts Corners for the change of drivers. This method of swapping the drivers of the trucks enables the drivers to be at home every night, and in this way eliminate hotel expenses at the other end, as would be the case if he drove clear through.

The materials so far carried on the Flint-Lansing line have been made up of castings and various machine parts picked up at the Lansing factories and carried to other factories in Flint. Prest-O-Lite tanks have formed the major portion of the loads going in the reverse direction from Flint to Lansing. In order to secure other business, the Rural Motor Express Service has sent out series of cards to the farmers along the route giving the times at which the truck will pass certain points on the route. This was intended to enable farmers to bring their goods to the roadside, where they can be loaded into the truck for shipment to either city.

The Inter-City Trucking Service began operation between Flint and Detroit on July 12, 1918. Two 3-ton Denby trucks are employed, one leaving the Detroit warehouse and garage every morning at 9 o'clock simultaneously with one leaving Flint. The load carried consists of miscellaneous goods such as groceries, dry goods, hardware and, on some occasions, furniture. At the beginning very little of the original load put in the truck at Detroit remained when the vehicle arrived in Flint, as most of the merchandise is consigned to Clarkson and Holly, two towns situated slightly more than half way on the trip out from Detroit. Both of these towns now depend on Detroit for their groceries and supplies by

(*Continued on page* 23)

78 British and U. S. Trucks Sold in Great Britain

Specifications Show About One-Third of Makes Are American

IN any discussion as to the exportation of American trucks for sale in Great Britain, it is interesting to know that twenty-seven American makes are already offered for sale during 1919 in Great Britain. There are seventy-eight makes of both British and American gasoline-driven trucks offered for sale, according to the specifications contained in the 1919 Year Book and Diary as published by *The World's Carriers*. It is thus seen that almost exactly one-third of the makes of the gasoline trucks sold in England are of American manufacture.

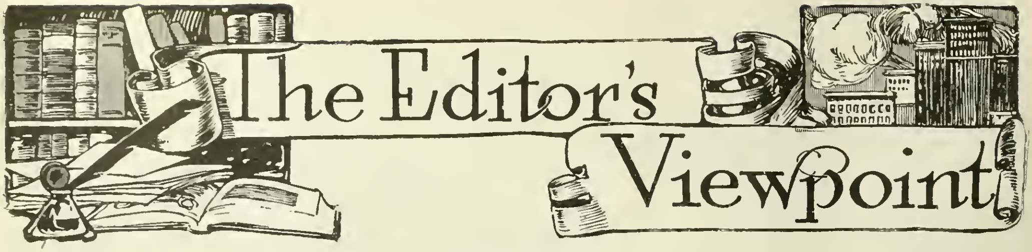
The specifications referred to above as published in *The World's Carriers* Year Book also include sixteen makes of British steam trucks with a grand total of thirty-eight models and fourteen makes of steam tractors offered in twenty-three models. In the way of electric trucks there are six makes, of which three are of American manufacture. In all there are twenty-six different makes of electric trucks offered.

American Data More Complete

The specifications of gasoline trucks sold in England as contained in *The World's Carriers* Year Book are not as complete as those published yearly in the November 1 issue of THE COMMERCIAL VEHICLE. Only nineteen specifications are given on each model in the British tabulation as compared with forty-nine in the specifications as published in THE COMMERCIAL VEHICLE. One of the most noticeable points in the British specifications is that the names of the various component parts entering into the construction of the trucks are left out. Both sets of tables have in common the name of the truck; its load capacity; size of engine; make of carburetor; type of clutch; number of gearset speeds; final drive; type of ignition; kind of wheels; type of tires and tire sizes. There is also space in the British sheets for the price of the chassis complete with tires.

One item contained in the British specifications which is not contained in those of THE COMMERCIAL VEHICLE is the road clearance. Other items included in the British but not in the American tables are the overall length of the chassis, its overall width, total length of body space and wheel track or tread.

While we know of no American publication which prints the yearly specifications of either gasoline or electric trucks offered on the British market, a copy of these specifications as published in *The World's Carriers* Year Book for 1919 is open for reference at the office of THE COMMERCIAL VEHICLE.



The Editor's Viewpoint

Good Roads on the Boom

AS predicted in the Jan. 1, 1919, issue of this magazine, the present year has already given much promise of being the greatest in the annals of road construction in this country. It bids fair to outstrip any two years in the history of highway building. And well it might, if we are not to lose the many benefits of motor transportation over the highways as taught by the lessons of the great war. Road building was practically at a standstill during 1918 because of the many restrictions thrown about the shipment of road materials of all kinds.

Incomplete estimates prepared for the Department of Agriculture for twenty-one out of the forty-eight states already indicate that at least $300,000,000 will be spent for road construction and maintenance during 1919. Even this amount will not entirely make up for deferred construction as the result of the war. But it is a fine start. When the complete estimates for all of the states are in, including both Federal-aid, state and county funds, it is probable that the amount to be expended during the year will be close to $500,000,000. And every cent of it will be returned a hundredfold in the great economic benefits accruing to every individual in this great nation!

We are now living in a new era. The motor car and the motor truck have carried us with them to a new mode of transportation over the highways that was unknown 10 years ago. Voters who were brought up during the period preceding the last decade are just beginning to feel or sense the change. It is the duty of every motor truck owner or operator to help in further educational work along these lines.

This can be done along general economic lines in addition to the benefits accruing directly to the motor truck operator. Let the latter point out how almost every article of food we eat, clothes we wear or tools and materials we use are at some time carried by trucks from their point of origin to the final consumer. Roads help to reduce truck costs. Reduced truck costs help to reduce the final sale prices, so that every man, woman and child in the big United States is vitally interested in good roads.

The Recent Truck Shows

THE two exclusive truck shows recently held in the two largest cities of the country were a success or a failure from the way they are viewed. From the owner's or prospective purchaser's viewpoint the shows were successful in that there were a surprisingly large number of new models, and a fair representation of the more prominent makes now offered on the market.

They were not a howling success from the attendance standpoint, because they were compared with the passenger car exhibitions held the week previous in each instance. This was to be expected and it is doubtful if a motor truck show will ever draw as well as a passenger car exhibition. Some form of conference with discussions on the various phases of truck operation and maintenance, new bodies and labor-saving devices, perhaps illustrated by motion pictures, would have helped swell the attendance with transportation officials, just the kind of men who should attend.

The Coming of the Closed Cab

ONE of the most important lessons which a visitor to either one of the recent exclusive motor truck shows in Chicago or New York could take away with him was the growing popularity of some form of closed cab for winter truck use. No matter whether these cabs are built-in, are of the convertible type with removable sashes and doors or are of the roll-up curtain type, they are worth a great deal more than they cost.

This greater worth than is apparent on the surface exists in the greater amount of work which satisfied drivers, agreeable in humor or temper and dry of body, will render as compared with disagreeable men, cold or with wet clothes.

This greater work ability is of the utmost importance to the average truck owner because it means greater profits in cases where trucks are rented out for hire or reduced delivery costs when owned by the concerns whose goods they move. Truck cabs are a fixture in the trucks of to-day and will increase in the years to come. Refinements in detail are the bait which lands the fish.

Must Build Highways for Motor Trucks

Convention Realizes That Mechanically Propelled Road Transportation Is of Primary Importance in the Country's Economic System and That Efficiency Means a Perfect Highway System

A SINGLE thought dominated each session of the Sixteenth Annual Convention of the American Road Builders' Association, held during this week at the Hotel McAlpin, New York. This thought has been expressed in one form or another by practically every road engineer attending the convention, and may be summed up in the statement that the roads of to-day must be constructed with due regard to the strains and stresses imposed by heavy motor-truck traffic.

Whether the road surface be bituminized or brick, or whether the foundations be macadam or cement, or whether other forms of construction be employed, the engineers, one and all, are satisfied that the measure of service demanded not only on the highways but on connecting crossroads shall be ability to stand up satisfactorily under the heaviest kind of automotive transport.

In his address of welcome to the visiting highway engineers, the Hon. Francis M. Hugo, New York's Secretary of State, said in effect that it was the duty of the country to build its roads in such a manner as to guarantee their capability of maintaining full efficiency irrespective of the traffic, implying that the margin of safety should be such that heavily loaded trucks could operate under all climatic conditions with the full assurance that there would be no failure of the highway. He made the significant statement that approximately 90 per cent of the increased motor vehicle registration in 1918 in the State of New York was represented by trucks, and gave figures indicating that an expansive program of highway construction is scheduled at Albany. New construction will include many miles of main highway, and especial attention is to be given to the improvement of those minor roads which serve to connect main systems.

P. St. J. Wilson, acting director, U. S. Bureau of Public Roads, in his paper, entitled "Operations of the Bureau of Public Roads Under the Federal Aid Act," stated that legislation now pending in Washington meant that Federal financial aid would be afforded in connection with road building throughout the country and that it was the plan of the Government to stimulate road construction and maintenance on a scale far greater than ever before. He said "the years 1919 and 1920 will mark the most progressive era in road building that the United States has yet known."

It was announced at the convention that the U. S. Bureau of Public Roads plans to launch a campaign to obtain an appropriation of $2,000,000,000 from the Government for general road building and improvement throughout the country, and that in the event of this sum being obtained Federal financial aid would be available in the construction of transcontinental highways.

A good deal of attention was given to the question of labor in connection with the extended road-building program, it being considered that the present prevailing rate for unskilled labor would, if maintained, have a serious effect on the extent of new road mileage contemplated. The hope was expressed by several engineers that in the general scheme of after-war reconstruction of the nation's industries there would be a satisfactory readjustment of living and labor costs which would permit of the full road program being carried out at a more normal cost than has been possible recently. It was also stated that owing to labor and material shortage existing during the war it was not possible to do more than the minimum necessary to keep our road systems in fair condition, and that for this reason the 1919 highway programs involved a great deal of work in bringing more or less neglected roads into a state where they could be relied upon to carry heavy motor-truck traffic.

Evidence of the extreme service expected and obtained from city streets was given in the course of an address entitled "Foundations for Heavy Horse-Drawn and Motor Truck Traffic," by C. M. Pinckney, chief engineer of highways, Borough of Manhattan, New York City, who stated that the average weight imposed by traffic on West Street is as much as 550 tons for each square foot of surface. He added that, in his opinion, concrete formed the best foundation material in comparison with old stone pavement or macadam.

During one of the many discussions which followed the reading of the various papers there were a few remarks made which had particular significance when uttered, as they were, by experienced highway constructors. One engineer said, in effect, "If I were engaged in the building of a stretch of roadway extending for, say, fifteen or twenty miles, I should build with due regard to the environment and the existing conditions, yard by yard or mile by mile, as might be found advisable."

This number of COMMERCIAL VEHICLE goes to press before the concluding sessions of the convention, and for this reason it is not possible to review the proceedings in detail. The attendance was large and representative, and discussion on the various addresses was highly instructive, the prevailing thought being that expressed by the Hon. Francis M. Hugo: "You cannot separate automobiles from good roads. The terms are synonymous."

High Spots at the Convention

Trucks accounted for 90 per cent of the increase in New York State registrations in 1918.

The duty of this country is to build roads which will insure maximum efficiency under heavy motor truck traffic.

Our road-building program for 1919 and 1920 far exceeds in mileage the schedules for any previous year.

Especial attention to be given to the maintenance of crossroads which connect two or more highway systems.

Federal aid to be given for the development and construction of road systems throughout the country.

City roads carry as much as 550 tons of traffic per square foot of their surface, and must be constructed to afford an ample margin for extra-heavy transport.

Townsend Bill Favors Better Roads

Provides for Road Commission of Five Members

WASHINGTON, D. C., Feb. 25—The bill to create a Federal highway commission, to establish a national highway system and promote road construction, introduced by Congressman Townsend, provides for a commission of five members, to be appointed by the President. Provisions are made for a complete system of highways and post roads, and specifies that no less than two main trunk line roads are to be in each state. The commissioners will receive $10,000 yearly salary. They will have complete control of highways with power to determine types of construction and improvement, repair and maintenance.

The War Department is authorized to deliver to the commission any vehicles needed for use in the construction and control of highways, without charge, and, in addition, any road machinery and equipment requisitioned.

No state will benefit from expenditures of Federal money for highway construction until it approves this bill. The bill was read to the House and referred to the Committee on Post Offices and Post Roads. There is little chance that it will pass during this session.

Road building along economic, scientific lines will be given a tremendous impetus the country over by the passage of the bill, in the opinion of Roy D. Chapin, former chairman of the Highways Transport Committee of the Council of National Defense and chairman of the Highways Committee of the National Automobile Chamber of Commerce.

"The United States is on the eve of a revolutionary epoch in highways transportation," said Mr. Chapin. "Hundreds of millions of dollars are available now for construction throughout the country, and scarcely a day passes that we do not hear of some new movement looking toward better highways.

"So rapidly has the movement come to a head with the effective aid of the Department of Labor and other agencies interested in the assimilation of labor, that our past methods of procedure have become antiquated and we are left face to face with the need of a definite policy which will assure the taxpayers of the United States that the very best results will be obtained from these expenditures.

"My experience on the Highways Transport Committee demonstrated to my own satisfaction that the future road building of the country must be done with an eye to developing the enormous latent resources of the country, which means scientific location coupled with scientific construction to meet the needs of new traffic. Further than that, we must recognize the fact that state lines are political, not physical, and accordingly we must link up state highways, one with the other, into an effective whole.

"The Townsend bill provides a sure means for such a program, and it is safe to say that all who understand the importance of efficient highways transportation will be solidly in favor of its adoption by Congress at the earliest possible moment."

$100,000,000 FOR ROADS

MINNEAPOLIS, MINN., Feb. 18—The House of Representatives, by a vote of 110 to 70, passed the $100,000,000 amendment to the state constitution. The Senate passed the bill by a vote of 58 to 3. The bill as passed by the House received some unimportant amendments which it is thought the Senate will concur in without delay. In this case the amendment will be referred to the citizens of the state and, if approved, the first $10,000,000 annual appropriation under the amendment will be available in less than 2 years.

The Minnesota amendment contemplates one of the most ambitious road-building programs contemplated anywhere in the country. The proposed system of truck roads is 60,000 miles in length and reaches every county. The plan is to issue bonds not to exceed $10,000,000 annually until the whole amount carried by the bill shall be issued.

TANKS FOR ROAD WORK

ST. LOUIS, MO., Feb. 24—The use of military tanks for clearing cut-over lands in southeast Missouri was proposed to the Government at a convention of civic and commercial organizations held recently at Poplar Bluff, Mo., under the auspices of the Federation of Missouri Commercial Clubs.

Coming Events

March 1-8	Detroit, Motor Truck Show, Crosstown Garage.
March 3-5	Quincy, Ill., Motor Truck Show.
March 3-8	Muskegon, Mich., Motor Truck Show.
March 3-9	Dayton, O., Motor Truck Show.
March 4	Newark, N. J., Monthly Meeting, Motor Truck Club of N. J.
March 10-15	Omaha, Neb., Motor Truck Show, Auditorium.
March 10-12	Lancaster, Pa., Motor Truck Show.
March 12-15	St. Joseph, Mo., Motor Truck Show, Auditorium.
March 15-22	Harrisburg, Pa., Motor Truck Show, Overland Bldg.
March 17-18	Peoria, Ill., Motor Truck Show.
March 17-22	Philadelphia, Pa., Motor Truck Show, Commercial Museum.
April 1-5	Brooklyn, N. Y., Motor Truck Show, Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory.
April 5-12	Montreal, Can., Motor Truck Show, Victoria Rink. Wilmington, Del., Motor Truck Show, Hotel du Pont.
April 10-12	Philadelphia, Pa., Meeting Motor Truck Sales Managers, Bellevue Stratford Hotel.
April 14-19	Bristol, Va.-Tenn., Great Southern Automotive Show.
April 24-26	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.

Result of Government Liberty Fuel Test

Fuel Tested in Aeronautic and Motor Truck Engines

WASHINGTON, D. C., Feb. 21—At the request of the general engineer depot of the War Department, the Bureau of Standards has made tests of several gasoline substitutes of the same general characteristics as were developed under the direction of the engineer depot, one of which has been designated by them as Liberty Fuel. Tests of this fuel made by the Bureau of Standards seem to have been confused with those made by other parties. Tests made by the Bureau of Standards were run only in truck and aeronautic engines, coupled to electric dynamometers. The results obtained did not differ materially from those with corresponding grades of gasoline. Road tests and flying tests reported in some publications were not made under the direction of the Bureau of Standards. The bureau has no information as to the characteristics of these fuels, as to the cost and availability of the materials of which they are composed, and as to road and flying tests not made under its supervision.

TO BUILD NEW TRUCK

NEWARK, OHIO, Feb. 18—The American Motor Truck Co., a new concern, will place a new truck on the market within 60 days. The new truck will be made in two sizes, a 1½-ton and a 2-ton. Later a 3½- and a 5-ton truck will be produced, but not before the first of next year. About a year ago this company purchased the assets of the Blair Motor Truck Co., but it will not make the truck manufactured by Blair. Since incorporation the American Motor Truck Co. has been running 20 hr. daily on two-man tanks for the Government. This contract was recently canceled, and the company is now busy tearing out Government machinery and equipping the plant throughout for truck work.

The officers of the new concern are: President, J. D. Potter; vice-president and production manager, E. B. Alspach; secretary and treasurer, H. S. McCoy; chief engineer, C. H. Doty; superintendent, H. E. Cavendish.

SPECIAL COURSE IN TIRE REPAIR

DETROIT, Feb. 16—The Reliable Tire Repair School, Detroit, has opened a special course for discharged soldiers and sailors to fit them to engage in the tire repair business.

GOVERNMENT TRUCK FIGURES

WASHINGTON, D. C., Feb. 18—According to a report made public by the War Department there were motor vehicles valued at $69,567,173 on hand on Nov. 1, 1918, and $79,908,070 on Jan. 1, 1919.

Delivery Conference Held in Chicago

Approve Central Wrapping Department Plan

CHICAGO, Feb. 25—The endorsement of the one-delivery-a-day plan and the adoption of a central wrapping department instead of clerk-wrapping at the counters where goods are sold were the two outstanding results of the Third Annual Delivery Conference held here at the Hotel Morrison under the auspices of the International Retail Delivery Assn.

Fifty-three representatives of department stores were present from all parts of the country and even six representatives from Canada. Men came from New Orleans on the south, Boston on the northeast, Canada on the north, and Vancouver, B. C., on the west.

To-morrow's session, the last meeting of the conference, will be given over to a discussion of motor truck deliveries for department stores. Joseph Husson, editor of THE COMMERCIAL VEHICLE, will discuss Truck Operation and Garage Standards together with P. S. Fay of the White company, who will talk on Truck Operating Standards. Mr. Husson threw a bombshell into to-day's meeting when he opposed a motion of the chairman to the effect that motor truck delivery costs be kept secret. He pointed out that secret costs were of a by-gone day, and that the only way in which the association could be of real service was to lay all of the cards on the table and discuss costs freely, stating the items included in any costs given, so that some real comparison of figures could be made.

He also pointed out that the association at its first meeting 3 years ago took up the question of a common form on which department store men could keep their costs, but that to date nothing had been accomplished along these lines. He also stated that the very life of the association depended on the service it rendered its members, and that a frank discussion of motor delivery costs was a service which it could render provided the members actually exhibited some cooperation instead of talking about cooperation and then attempting to kill the first move toward it in truck costs by making the costs secret.

The conference was presided over by Walter Rosenbaum of the Rosenbaum Co., Pittsburgh, Pa. Economic Aspects of Delivery Problems were discussed by S. H. Ditchett, editor of *The Dry Goods Economist;* One or Two Deliveries a Day, by L. E. Studley, Jordan-Marsh Co., Boston; Handling the Package at the Counter, by B. E. Stewart, National Cash Register Co., Akron, Ohio; The Relation of Service to Good Will, by J. A. Hanley of the J. L. Hudson Co., Detroit; The Package from the Wrapping Desk Through the Shipping Department, by F. G. Whittuer and Mr. Hirschberg of the Lamson Co., and Maximum Efficiency in Motor Truck Operation, by S. S. Merithew, Packard Motor Car Co., Detroit.

CONFLICTING VEHICLE LAWS PROVE A BURDEN

BLOOMINGTON, ILL., Feb. 23—Conflicting motor vehicle regulations are creating much annoyance to owners of passenger cars and trucks which move back and forth between Rock Island and Moline in Illinois, and Davenport, Iowa. The three cities are bunched on the banks of the Mississippi River, and there is a steady movement of trucks across the bridge. Rock Island authorities are strictly enforcing the Illinois laws and have made numerous arrests due to the fact that the trucks and drivers are not carrying the proper licenses. Louis G. De Armand, traffic commissioner of Davenport, has decided to retaliate in kind, and all vehicles owned outside of Iowa must carry Iowa license plates if they enter the limits of that state. All chauffeurs of such vehicles who drive in Iowa must also carry the proper license.

The law with reference to license plates on trucks applies only to corporations. Vehicles owned by unincorporated firms or by individuals may be operated in Iowa under the same regulations as apply to passenger cars, carrying the single plate of the state in which they are licensed. Enforcement of the Illinois laws was commenced a year ago and warning sent to all outside concerns that they must comply with the Illinois laws. For a time this was done, but of late, with a laxity in inspection, trucks from Iowa have been coming into Illinois without licenses, and this has led to another campaign of prosecution. An effort will be made to secure uniform laws governing motor vehicles in both Illinois and Iowa at the sessions of the legislature this year and thus prevent the confusion now existing.

UNIVERSITY TO ESTABLISH ROAD BUILDING COURSE

TORONTO, ONT., Feb. 24—Queen's University intends establishing a course in road-making in connection with its practical science department, and Prof. Thomas Scott, who has been in Halifax for the past year in connection with the reconstruction work there, is to return and take charge of the new course.

SHOWROOM DISPLAYS FOR SHOW

BALTIMORE, MD., Feb. 22—More than a score of motor truck dealers held successful shows in their showrooms during the week, while the thirteenth annual passenger car show was in progress in the armory. These individual shows paid better this year than previous, for many of the firms that had passenger cars at the armory had commercial salesmen on hand, and when commercial cars were discussed they were ready to handle the situation.

National Movement to Improve Roads

Committee Made Up of Three Men from Each State

WASHINGTON, D. C., Feb. 21—As a result of the meeting of various organizations interested in highway construction in Chicago recently the National Highway Committee is being organized to represent practically every organization for the construction of roads and those interested in this work.

S. M. Williams, president of the Highways Industries Assn., has appointed the State Highway Commissioners and Engineers and various prominent men throughout the country to the committee, giving each state representation of three or more and in each case selecting men known for their present interest and activity in highway development. Total membership of the committee will be about 300, and will include the presidents of various prominent national organizations such as the American Road Builders' Assn., National Automobile Dealers' Assn., etc.

It is planned to form smaller committees for the more concentrated work, and these special committees will be charged with lining up the organizations of their individual groups.

Although the organization is not yet completed, it is already assuming important proportions, as indicated by the fact that committees have been appointed throughout the country.

ST. LOUIS TO HAVE MOTOR TRUCK MAIL ROUTES

ST. LOUIS, MO., Feb. 17—The establishment of seven motor truck mail routes in St. Louis was recommended to the Post Office Department by Colin M. Selph, postmaster of St. Louis, in a recent visit to Washington. The motor truck routes proposed by Mr. Selph will cover all points in St. Louis County. He proposed that the mail trucks make trips 50 miles beyond St. Louis and return each day in the collection of mail. Postmaster Selph also recommended to the department the purchase of additional motor vehicles for parcel post service in St. Louis proper.

P. O. HAS 1200 ARMY TRUCKS

WASHINGTON, D. C., Feb. 19—The War Department has turned over 1200 army trucks of various types and sizes to the Post Office Department for use in rural mail delivery. Announcement will be made in the near future by the post office of the routes to be covered by these vehicles. The trucks are turned over by the War Department in compliance with a provision in the Army Appropriation bill of 1918 which ordered all trucks delivered to the Post Office as they are requisitioned.

Pneumatics to Be Made to Meet Demands

Restrictions on Tire Sizes to Be Entirely Lifted

NEW YORK CITY, Feb. 19—The limits set on the manufacture of tires by the War Industries Board during the war will not be followed in the future, and all sizes of tires demanded by the public will be manufactured, according to an announcement by the National Automobile Chamber of Commerce, made public to-day.

This decision followed a meeting of tire and automobile makers in Detroit late last week. The restrictions placed on tire manufacture by the War Industries Board in an effort to conserve rubber, labor and factory facilities in the spring of 1918 called for a reduction of pneumatic tires from a range of 200 sizes and types to nine sizes and types, the reduction to be made over a period of 2 years. Truck tires were reduced by a similar order from over 100 types and sizes to fourteen, affecting chiefly those tires used on 1- and 2-ton trucks.

The representatives of the N. A. C. C. and the tire industry present agreed also that for the time being it will be most wise to continue export of tires in metric sizes only, as has been the custom. This question of shipping tires abroad marked similarly to those used in this country for domestic consumption is to come again in the near future when members of the tire industry will confer with J. Walter Drake, chairman of the tire committee of the N. A. C. C.

ONTARIO TO BUILD ROADS

TORONTO, CAN., Feb. 17—The Ontario Government will spend $5,000,000 on highway construction this year. This means that with federal aid $8,333,333 will be expended for roads in Ontario this year.

K. C. GOOD ROADS COMMITTEE

KANSAS CITY, MO., Feb. 25—A central committee on good roads, consisting of representatives of all local organizations having good roads committees, was organized in Kansas City on Feb. 20. A committee of six was appointed to draft rulings for the organization. The men appointed are: J. S. Adsit, chairman, representing the Chamber of Commerce; Frank A. Davis, representing the Kansas City Automobile Club; Frank E. Lott, representing the real estate board; Estel Scott, representing the Motor Car Dealers' Assn.; S. C. Blackburn, representing the Warehouse Men's Assn.; Albert Mebus, representing Kansas City, of the Kansas Chamber of Commerce.

The general organization includes the forty representatives of good roads committees of fifteen associations who were present at the meeting; on Feb. 20 other representatives will be included as associations appoint such committees. The first association to appoint such a committee as a result of the constructive plans demonstrated was the Merchants' Assn., the representatives being three of the leading merchants, two of whom are former presidents of the association. Associations which heretofore have not seen any interest for themselves in highway improvement are finding such interest now. The discussion of the return loads bureau is perhaps the most important factor in awakening such attention, since facts disclosed display the bearing of highway transportation problems on all industries.

CO-OPERATION NEEDED

NEW YORK CITY, Feb. 19—The resolution that the President of the United States was to call a joint meeting of capital, labor and legislators to discuss means of hastening industrial peace was proposed by David Beecroft at the meeting of the New York Business Publishers' Assn. on Monday evening, Feb. 17, and was passed.

PLAN TO OVERCOME ABSENCE OF TRUCKS FROM SHOW

BOSTON, MASS., Feb. 24—Manager Chester I. Campbell of the Boston Automobile Show is trying to work out some plan to aid the truck dealers during the week of the exhibition as long as it is not possible to have motor trucks in the show. Some of the plans under consideration are to have a booth of some sort in the show at which information will be given to visitors regarding where the trucks can be found, or to have a big signboard with the names and addresses of all truck agencies posted in a conspicuous place, and possibly a map of the city showing the districts. A number of the truck dealers plan to have shows in their own salesrooms during the week, and to advertise in the show issues so as to attract dealers and buyers. It is possible that a jitney service may be worked out to carry people from the show to some of the truck salesrooms at stated hours.

GROSVENOR JONES PROMOTED

WASHINGTON, D. C., Feb. 24—Grosvenor H. Jones of Ohio, who has been Second Assistant Chief of the Bureau of Foreign and Domestic Commerce, Department of Commerce, has been promoted to First Assistant Chief, to take the place of Chauncey D. Snow, who is now working for the bureau in Europe. Roy S. MacElwee of New York succeeds Mr. Jones as Second Assistant Chief.

N. A. C. C. 16TH TRUCK HANDBOOK

NEW YORK CITY, Feb. 19—In the 16th annual handbook of trucks and automobiles just issued by the National Automobile Chamber of Commerce are shown details and specifications of the principal models of trucks and cars in the United States. The commercial section includes seventy models with illustrations, and there are four models in the electric vehicle section.

Truckmen Will Fight Unjust Laws

Bills Would Legislate Trucks Off the Road

PHILADELPHIA, PA., Feb. 22—Protests against the Dithrich and Buckman bills regulating motor truck traffic in Pennsylvania, now pending in the State Legislature, were made at a mass meeting of motor truck men representing 4000 owners held in the Crozer Building of this city. The gathering was under the auspices of the Philadelphia Motor Truck Owners' Assn. Resolutions were passed calling on the Senate and House of Representatives at Harrisburg to amend the proposed legislation, which is deemed not only inimical to but destructive of motor truck traffic in Pennsylvania.

The following committee of nine was appointed as the legislative committee to work toward effecting the amendment of the legislation: H. W. Hayden, chairman; R. E. Eggleston, E. F. Bird, Harold S. Shertz, B. J. Wilson, William P. Vees, James Orr and William Arrott, Jr.

The resolutions, which emphasize the importance of the motor truck industry in the development of a comprehensive transportation system, were sent to Governor Sproul, Highway Commissioner Sadler and the chairman of the legislative committee having in charge the Buckman and Dithrich bills.

The Dithrich bill provides that the overall dimensions of a motor truck shall not exceed 26 feet. It also provides that the limit weight shall be 12 tons, and when loaded 20 tons, and that trucks from other states shall not be allowed to remain longer than 24 hours in Pennsylvania.

The Buckman bill provides for increased license fees to a limit of $400 for 7-ton trucks. Both bills make it possible for boroughs to increase the taxation on passing trucks.

The resolutions adopted by the meeting of protest ask for:

1—A maximum overall length of 28 feet.

2—A maximum weight of 28,000 pounds.

3—An increase of no more than 100 per cent in the license fees, with the provision that if more funds be required to carry out road-extension projects the additional burdens be placed on the owners of passenger cars.

BIGGEST NEWARK SHOW

NEWARK, N. J., Feb. 17—Although handicapped by inclement weather on Saturday, the opening night of the Newark show, the attendance record exceeded that of any previous show. More than 150 vehicles were displayed on the immense floor of the First Regiment Armory. These included 117 passenger cars and 41 trucks. The accessories were in booths in the balconies.

Good Roads Plans Are Under Way

$320,000,000 Appropriated by Seven States for the Work

WASHINGTON, D. C., Feb. 19—A nation-wide ambition for a complete network of good roads and highways through the country is evidenced by reports received here of state appropriations for highways and by the popular approval that has been expressed in favor of the national highway bills now before Congress. It appears that as a result of the work of the various associations the expression of President Wilson in favor of good roads and the activities of the Highways Transport Committee during the war, the plan for good roads has suddenly become crystallized in the minds of the entire country. Reports received here indicate that all the states are considering road appropriations and several have already passed the necessary bills for funds covering the next few years.

Minnesota has appropriated $100,000,000; South Carolina, $40,000,000; Illinois, $60,000,000; Pennsylvania, $50,000,000; Georgia, $40,000,000; Colorado, $20,000,000, and Alabama, $10,000,000, to be used in conjunction with the funds appropriated by the 1917 Federal road act for the development of the highways.

It is estimated that between $200,000,000 and $300,000,000 will be available for highways during 1919. The Federal road act appropriated $5,000,000 in 1916-17, $10,000,000 in 1917-18, $15,000,000 in 1918-19, total of $30,000,000, of which $1,487,336 has been actually paid out by the Treasury and a total of $10,303,379 has been set aside.

To date 827 projects for road construction have been submitted, of which 760 were approved at an expenditure of $21,112,795.30 of Federal funds and $35,069,051.42 of state funds, a total of $56,171,846.72. These funds are for projects covering 7869 miles. The money actually expended to date was for ten projects of 44 miles, which have been completed. The reason for the delay in completion of highways and for the small amount actually expended is found in the war, during which it was impossible to use freight cars or secure materials for highway construction.

The new Bankhead bill, which most probably will be passed by Congress and which already has been passed by the Senate, provides for $200,000,000, with $50,000,000 available at once for 1918-19, $75,000,000 in 1919-20 and $75,000,000 in 1920-21. This bill, which has been described in these columns before, is practically an amendment and continuation of the original Federal road act of 1916. The states must provide appropriations on a dollar-for-dollar basis to secure their share of the national funds.

In consequence of the Bankhead bill and funds already available, there will be at least $200,000,000 to be expended in 1919 if the states comply immediately with the conditions of the Federal road act and provide dollar-for-dollar state funds.

Of the $30,000,000 originally appropriated by the Federal Road act, $20,000,000 is still available, and in addition $35,000,000 appropriated by states is still available, making a total of $65,000,000.

Fifty million dollars is appropriated by the Bankhead bill for 1919, and an additional $50,000,000 will be voted by the various states, making a total of $100,000,000. Consequently, $165,000,000 will be available in 1919, and as the states usually exceed the dollar-for-dollar basis by 50 per cent, it is probable the total sum available will be over $200,000,000.

The National Highways Commission bill which was the result of the highways meeting in Chicago is to be rewritten to meet the legal requirements. This bill may be presented at this session of Congress or may be held over until the next session, depending upon the opportunities presented. It is quite certain that, even though presented at this session, it will not be considered until some future date.

WAR CONTRACT SETTLEMENT

DETROIT, Feb. 18—J. J. Crowley, president of the Michigan section, National Assn. of Manufacturers of War Materials, says that sub-contractors of war material are not making proper efforts to secure the settlement of their claims. Figures have been received from Washington showing that the Ordnance District Board in Detroit has 276 contracts to settle of which only eighty-two have been presented to the board by the contractors. Contractors declare they are delayed because their sub-contractors are negligent in making speedy returns. Of the eighty-two claims presented twelve have been allowed, while work on the others is progressing rapidly.

ATTORNEY FOR N. A. D. A.

ST. LOUIS, MO., Feb. 17—The N. A. D. A. is going to have an attorney on its staff. Not that a run of litigation is expected, but Business Manager Moock has concluded that if there is any one thing the motor car dealers need to-day it is a man to answer their questions which border on the legal, if not entirely legal. Also he has been unable to put his hands on anything that looks like an intelligent digest of the various laws of the states and cities governing and affecting motor cars.

PYKE JOHNSON IN WASHINGTON

WASHINGTON, Feb. 19—Pyke Johnson, a former newspaper man of Denver, Col., has been made the secretary of the Roads Committee of the National Automobile Chamber of Commerce, with headquarters at the Washington office of the National Automobile Chamber of Commerce. Johnson will compile all kinds of valuable road data and watch the development of highway legislation.

Revenue Tax of 3% on Trucks and Parts

Bill Signed by President on February 25

WASHINGTON, D. C., Feb. 26—The new Revenue Bill, carrying among its provisions a tax of 3 per cent on trucks and parts, passed by the Senate on Feb. 13 and was signed by President Wilson yesterday. The bill contains the provisions relative to motor trucks just as they were published in THE COMMERCIAL VEHICLE of Feb. 15.

CANADIAN TRUCKMEN MUST PAY MUNICIPAL TAX

QUEBEC, CAN., Feb. 24—Power to impose a tax or license fee on owners of motor vehicles used by them in carrying on the business of cabmen or common carriers is given to municipalities in a bill which Hon. Walter Mitchell, provincial treasurer, has introduced in the Legislative Assembly. This follows a request from several municipalities that they should be allowed to get some revenue, at least from motor trucks which replaced wagons and carts which had paid the municipalities taxes. When a man in the cartage business gave up his horses and bought a truck to transport materials, he paid a tax to the Provincial Government under the Motor Vehicle Act, but nothing to the municipality. Thus the municipality lost the revenue it had obtained from him when he had used horses. It is now proposed to remedy this state of affairs. There is a proviso that the municipalities can tax the owners of motor trucks if they tax a like amount upon the owners of other trucks put to the same use in the same municipality.

The payment of such tax to, or the obtaining of a license issued by, a municipality, shall not have the effect of discharging the person named in the license, or the person who has paid the tax, from the obligation to obtain a license under the law respecting motor vehicles, and to comply with all the provisions of such latter law.

MERCHANTS START TRUCK ROUTE

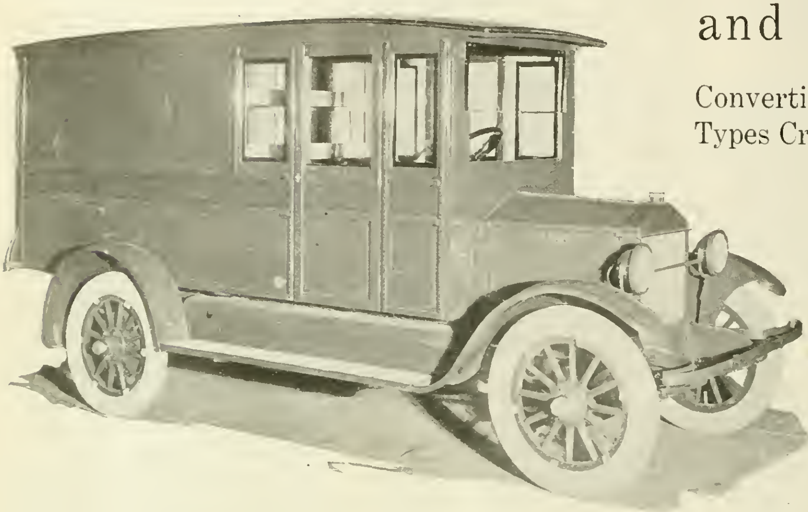
MT. PLEASANT, MICH., Feb. 18—Business men of this city have organized a motor truck express company to run between Mt. Pleasant and Grand Rapids. Over 1600 subscribers have contributed $500,000 for the purpose. The line is now in operation.

92,277 WAR TRUCKS IN 1918

WASHINGTON, D. C., Feb. 17—Ninety-two thousand, two hundred and seventy-seven trucks, ranging from ½- to 5-ton capacities, were completed for the United States Army during 1918, according to a report issued by the War Department. Total probable truck production for military use for 1919 will include 28,679 trucks.

Many New Bodies Seen at Truck Shows in Chicago and New York

Convertible Steel Dumping Types Create Much Interest



An unusual type of very light closed cab as mounted on a finely-finished panel body fitted on an Atlas ¾-ton, pneumatic-tired delivery truck

BODIES, as usual, played an important part in both of the recent exclusive motor truck shows in Chicago and New York. In this respect, the New York show was more interesting than that at Chicago because more of the vehicles at the New York exhibition were fitted with bodies than was the case in the Windy City. Of the 161 complete vehicles on exhibition at New York, ninety-one, or approximately 57 per cent, were equipped with some form of body. At Chicago, however, the great majority of the trucks were shown in chassis form. Over 50 per cent of the Chicago trucks were without bodies.

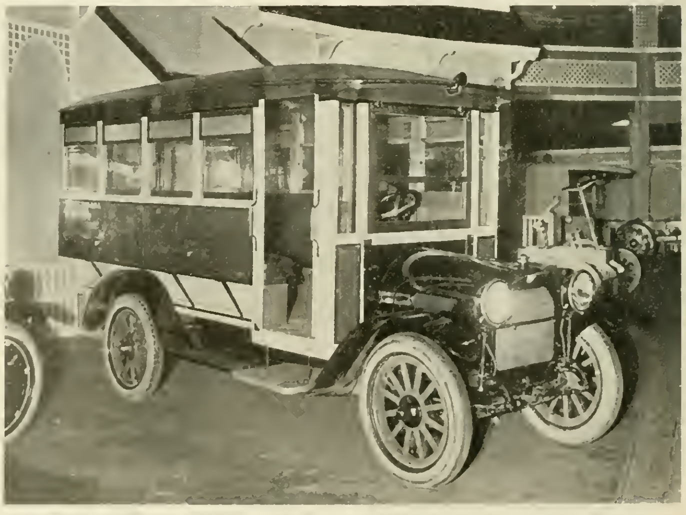
Bodies for almost every conceivable purpose were on exhibition at one or the other of the shows. There were several exhibits of convertible farm bodies. In this respect, the eight-in-one farm body made by the American Wagon Co., Dixon, Ill., and shown on the All-American 1-ton truck and the 1- and 1½-ton convertible bodies as exhibited by the Parry Mfg. Co., were the most conspicuous examples.

Great Body Variety

Then there were hearse bodies and special fire equipment units shown complete with ladders and chemical tanks. At Chicago one of the Nash exhibits was a four-wheel-driven Quad fitted with an all steel ammunition body in the form in which the complete vehicle was employed by the Ordnance Department of the United States Army. There were two or three van bodies and a dozen stake types with the stakes joined by longitudinal members to form individual stake panels. In some cases the center panels on each side could be removed for quick side loading or unloading. While the side stake bodies were in predominance at Chicago, dump bodies were a close second. The great majority of these were of the all steel type and operated by means of one of the several designs of hydraulic hoists. The Garford company exhibited a novel steel coal body which will be described more fully in detail later on in this article.

Closed Cabs Gain

One of the most noticeable trends at the show was the great increase in the use of closed cabs for winter driving. These cabs were of many different types. Some were built up of wood and others of metal. These designs were to be removed in the summer and a new type of light top fitted. Many others were of the convertible type with removable doors and sashes, so that the same top member could be employed all year round. One or two of the convertible types were provided with fabric doors with transparent window material not made of glass. In these units the entire doors on either side could be rolled up



A pay-as-you-enter bus body mounted on a Reo ¾-tonner. This type of body is particularly adapted for passenger carrying in rural communities out of the way directly underneath the cab top when it was desired to open the cab for driving during pleasant summer weather.

The evident increase in the popularity of the closed cab as shown at the two truck exhibitions should mean much to the present or prospective truck owner. Closed cabs are in most cases worth much more to the truck owner than the price he has to pay for them. The reason for this is that a closed cab enables the driver to do more and better work, thereby increasing the truck efficiency and increasing the owner's profits if the truck is hired out on contract work or reducing the cost of delivery if the truck carries goods of the company owning it. A driver who is warm and dry will be in a much better humor to perform his work than one who is cold and wet by reason of having to operate his vehicle without proper protection. The wise motor truck owner will provide his trucks with some form of inclosed cab.

Closed Cabs a War Lesson

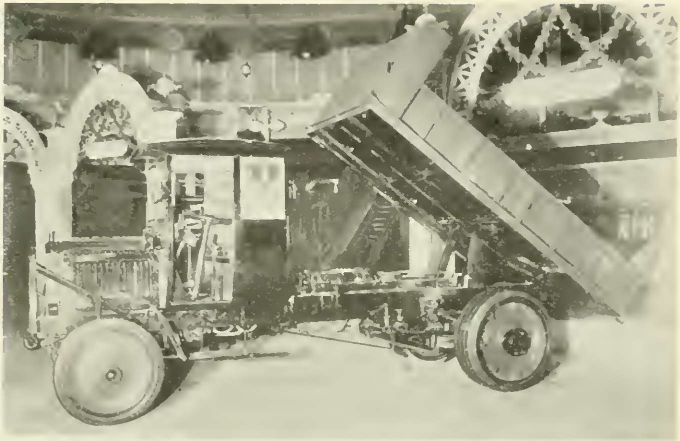
One of the greatest lessons which the average commercial truck owner can take from the operation of the war trucks abroad is the great pride of the military truck driver for his vehicle. Those who have seen the drivers at the front say that they are just as proud of their trucks as is the locomotive engineer of his huge engine. The war truck drivers were supplied with the best quality of rubber coats and rubber curtains hung in front of the cab to keep him dry and fairly warm.

Many of these men returning to the commercial service in this country will be dissatisfied in operating trucks unless they are provided with at least as good or better protection than they were while abroad. Many of the closed cabs exhibited at the two recent shows are much more comfortable than those of the war truck abroad. This is but natural, due to the individual taste of the owners and the advertising value which they secure from the spick and span appearance and general outline of their truck bodies. No matter how elaborate, the inclosed cab is a good investment which returns its cost manyfold in the better quality and larger quantity of work performed by the drivers having such cabs.

Three Exhibits at Chicago

At the Chicago show there were three exclusive body exhibits shown by the Parry Mfg. Co., Indianapolis, Ind.; the Lee Loader & Body Co., Chicago; the Horizontal Hydraulic Hoist Co., Milwaukee, Wis.; the Heil Co., Milwaukee, Wis., and the Wood Hydraulic Hoist & Body Co., Detroit.

The Parry company exhibited five of its various body models. These included a panel design with cab for Ford trucks; a Ford flareboard express model; a live stock body for a 2-ton truck; a convertible universal type of body for 1- and 1½-ton trucks, and a grain body for Ford 1-tonners. The grain body is designed particularly for use by farmers in hauling grain products such as wheat and corn, and has a capacity of 65 bushels. It is also adaptable for a variety of farm work and is made up of three side panels placed one on top of the other. It is 46 in. wide and 96 in. long, outside measurements, and 40 in. wide and 90 in. long, inside measurements. A special end gate is provided for giving a large rear opening to permit the grain to run out into the chute of the grain elevator. The 1½-ton, 1- and 1½-ton convertible or universal bodies were described in greater detail in the Dec, 15, 1918, issue of The Commercial Vehicle. In brief, they each consist of a platform upon which can be mounted side stakes, racks or side panels. The special feature of the racks provided for hauling live stock is an end gate with a sliding door which when opened gives an entrance space 25 in. wide and 45 in. high, large enough for hogs or medium sized stock. The Parry company also manufactures a 25-in. universal cab built up separately from the body. Both the cab and body are shipped in knocked-down form.

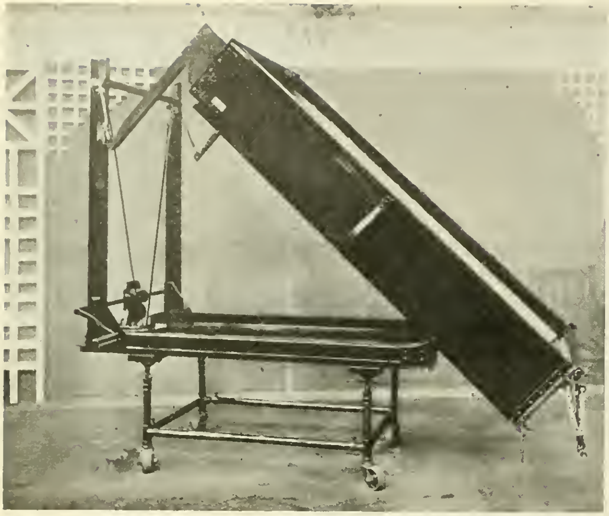

A 6-ton Packard fitted with an all-purpose steel body and horizontal hoist as made by the Horizontal Hydraulic Hoist Co., Milwaukee

The five-way unloading coal body, made of steel and mounted on a 6-ton Garford chain-driven chassis exhibited at the Chicago truck show

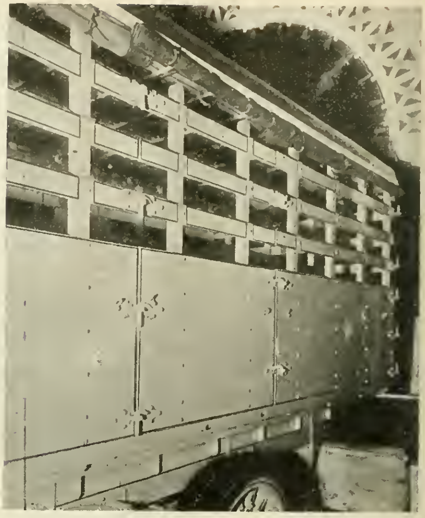
The Lee Loader & Body Co. had on exhibition a new series of three trailers consisting of a 5-tonner of the four-wheeled type, with a special side and end dump steel body; a dropped frame trailer and a new type of contractor's trailer which may be used as a semi-trailer, with the forward end carried on the rear deck of a tractor or as a four-wheeled trailer by the utilization of an extra pair of front wheels. This latter outfit was provided with a power dump steel body with a special tailgate which could be opened to spread material such as stone over the road to any desired depth.

The Horizontal Hydraulic Hoist Co., Milwaukee, Wis., which also manufactures wooden and steel bodies, some of the latter of the all-purpose type, exhibited one of its dumping hoists with the body support but without the body, so that the mechanism of the hoist could be examined closely.

The Heil Co. showed a steel combination dump body made of No. 8 gage steel. It had a capacity of 5 cubic yards and was provided with two sets of side-



The Economy steel body for small trucks. It comes complete with a hand-operated worm-driven hoist and retails at $250



A removable center side panel on this body makes side loading and unloading easy

boards and a double-acting tailgate with a manual control.

The Wood Hydraulic Hoist & Body Co., Detroit, exhibited a sample hoist and body, electrically operated. The Hydro Hoist Co., Milwaukee, Wis., showed an actual hoist fitted on a 3½-ton Service truck.

Haskelite Slabs for Bodies

In addition to the actual types of bodies sold on the commercial market as types, the Pantasote Co., New York City, exhibited an unpainted body to give an idea of the strength and texture of its special body material as compared with wood or sheet metal. The Haskelite Mfg. Corp., Chicago, also exhibited slabs of its Haskelite body material. These slabs are made of laminations of thin gum wood made integral by an insoluble blood glue. One of the characteristics of Haskelite is its ability to be bent into shapes with double curvatures such as are required on panel body tops with a crowned section which flares to a straight section at the front where the windshield is attached.

One of the unique body exhibits seen at Chicago as a part of a truck exhibit was an all-steel coal body mounted on a 6-ton Garford chain-driven chassis. The body had five chutes for the unloading of the coal carried. Two of these were fitted on each side, one at the extreme rear and one near the front. The fifth point of unloading was at the rear, with a hinged tailgate having an additional center opening with a sliding door. The body was fitted with a Wood hydraulic hoist so that it could be raised about its rear end pivot to discharge the coal more readily. The shapes and location of the side chutes are clearly shown in the illustration on page 17.

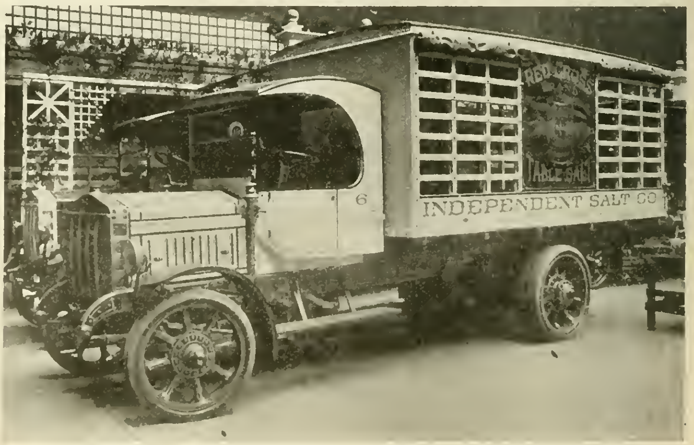
The new 3½- to 4-ton tractor of the Fulton Motor Truck Co., Farmingdale, L. I., was fitted with a square wood cab with four vertical end posts to support a permanent top. Side curtains were provided to be buttoned across the two sides and rear with a permanent built-in windshield at the front. The Mutual Truck Co., Sullivan, Ind., exhibited a complete built-in cab made of wood. The doors on either side were made in two parts, each hinged to the front corner upright. The upper half of the door contained a fixed glass sash. The upper half could be removed separately from the lower half to provide better ventilation in the summer without removing the lower or door panel.

At the New York show there was a wider diversity of body models than at Chicago. There were bus bodies of the pay-as-you-enter type; convertible bodies made of both wood and steel; several very elaborate panel designs, some with interior shelving; express types; hearses and general utility designs with removable seats for carrying passengers.

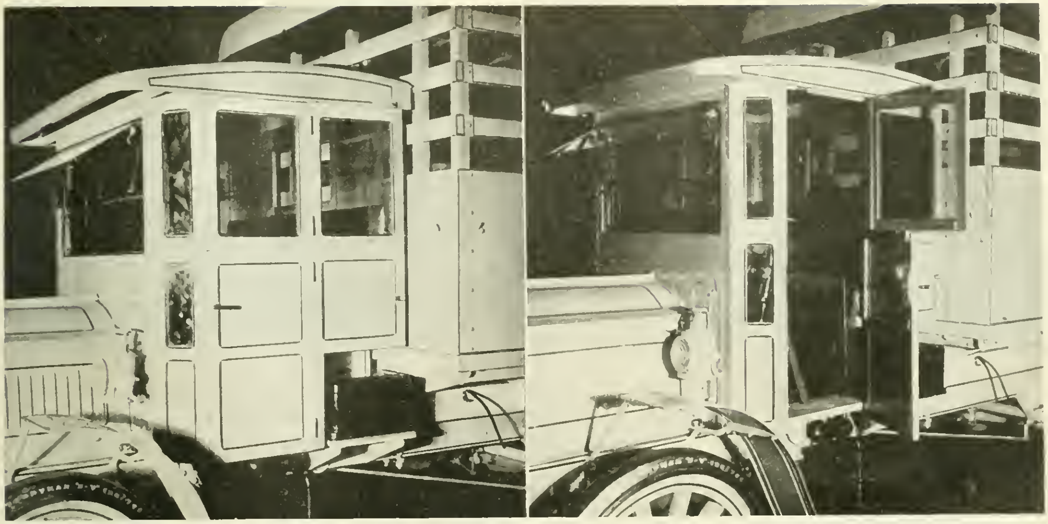
Exhibitors of Exclusive Bodies

Exclusive body exhibits were shown by the following companies: H. H. Babcock Co., Watertown, N. Y.; Economy Body Sales Co., New York City; Metropolitan Body Co., New York City; Mifflinburg Body Co., Mifflinburg, Pa., and the Pantasote Co., New York City.

The Babcock company exhibited a one panel job on a Hayes-Diefenderfer Co.'s Ford adapter and three elaborate hearse bodies.



An especially fine Roeder body mounted on a 5-ton Sterling at the New York truck show. The body and truck is painted white with striping in green



Closed and open views of a novel chamfered-corner closed cab mounted on a Packard at the New York show. The glass panels in the chamfers enable the driver to see the fenders on both sides without leaving his seat

A side-curtain cab as shown on one of the new Tower trucks

Another type of inclosed cab as fitted to a van body on a Sterling truck

The standard type of built-in cab as fitted on Wilcox trucks

The Economy Body Sales Co. exhibited one of its steel bodies with a hand-operated dumping gear. The exhibit at the show was mounted on a small framework and was raised and lowered to show its ease of operation. The body is characterized by its moderately low price of $250, including a hand-operated worm-gear hoist. The body is of box type, 7½ ft. long, 4 ft. wide and 14 in. deep. It is made of No. 12 gage steel riveted and welded. The tailgate can be hinged either from the top or the bottom, according to the class of goods to be carried. The tailgate is also provided with a shuttle door which can be opened against the pressure of the goods inside the body even when it is elevated to its full height.

The hoisting arrangement consists of two vertical uprights at the front of the body. A horizontal crosswise shaft is provided between the two vertical uprights and has a worm gear at its midpoint. This gear meshes with a worm wheel integral with a drum around which are wound two cables, the other ends of which are fastened to two angle lines placed vertically near the sides on the front end of the body.

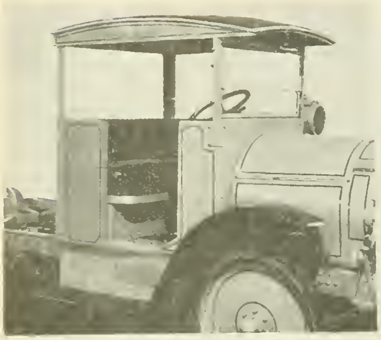
Convertible Steel Dump

The Metropolitan Body Co. and the Mifflinburg Body Co. also exhibited several different types of bodies, some for model D Ford passenger cars converted for light delivery use. The Pantasote Co. exhibited a panel body with the sides and ends made of Pantasote slabs instead of wood or metal.

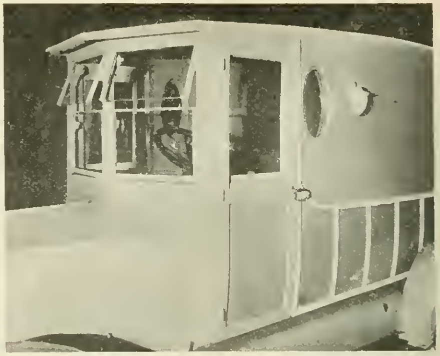
Of the interesting bodies shown mounted on truck exhibits, perhaps one of those which attracted the most attention was a convertible steel dumping type mounted on a 6-ton Packard. The body was raised and lowered by means of a Horizontal Hydraulic hoist placed underneath the bottom of the body between the side frame members of the truck. Both the hoist and the body were furfinished by the Horizontal Hydraulic Hoist Co., Milwaukee, Wis.

The body is known as the all-purpose type and consists primarily of a level steel platform built on a heavy structural steel sub-frame. The platform has stake pockets on both sides and is provided with wide rectangular-shaped metal posts at the front end of the body on each side and with similar triangular-shaped posts at the rear on each side. The front end of the body is closed by means of a steel plate extending for the full height of the front side posts.

When used as a stake platform body the stakes are merely dropped into their



At the left, the cab as fitted on the new Fulton tractor. Side curtains are buttoned on it and inclose it



At the right, a special V-shaped closed cab with a two-part rain-vision type of windshield

pockets. However, when it is to be used for carrying bulk goods, removable sideboards are put in place and held in position in pockets in the side posts. Two sets of sideboards are furnished, the lower set being equipped with pressed steel stakes which fit into the stake pockets on the sides of the platform. Each set of sideboards is made in two sections so that they may be handled with the least effort. The two sets of sideboards for each side are placed one on top of the other. When only one set is used, the body has a capacity of 108 cubic feet, or 4 cubic yards. When the upper sideboards are added, the capacity of the body is increased to 189 cubit feet, or 7 cubic yards.

Special Two-Way Tailgate

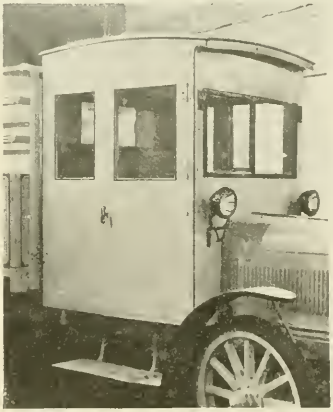
The body attracted considerable attention because it was made entirely of steel and could be converted for carrying almost any kind of material. The rear tailgate is of the double-acting type or hinged at both top and bottom so that it may be swung from the top when the body is used for dumping bulk goods or hinged at the bottom when it is desired to drop it to add to the loading length of the body platform. The body is also provided with a tailgate latch, which, by means of a longitudinal rod, may be operated by hand from the driver's seat so that the tailgate may be released at the bottom while the body is being elevated to dump its load. The horizontal hydraulic hoist, by means of which the body is raised and lowered, will be described more fully in the next issue of THE COMMERCIAL VEHICLE.

Many Fine Roeder Bodies

The Fred Roeder Mfg. Co., Brooklyn, N. Y., exhibited many fine examples of the body builder's art on several of the various truck makes, particularly the Sterling and the Riker. The feature of one of the bodies mounted on a 4-ton Riker owned by the Walsh Transportation Co., New York City, was the removable racks placed on top of an ordinary wood dump body to enable it to be converted into a closed rack type by the use of tarpaulin covers.

The length of the body in back of the hoist is 10½ ft. The width at the front is 5 ft. 4 in. and at the rear 5 ft. 6 in. The height of the stationary box sides is 22 in. Two removable risers, each 9 in. high, are provided to be mounted one on top of the other above the top of the permanent low sides. The racks are mounted on top of the risers with the side members extending down through U-shaped plates mounted one above the other on the two risers. The total height of the body with the racks in place is 6 ft. from the top of the floor to the top of the rack. Two additional risers of the same depth as those provided for the sides are also furnished for the front end of the body and the tailgate. The tailgate is mounted so that it can be hung from either top or bottom. It is fitted with an automatic self-closing device with a special coil spring. Five of the bodies have been manufactured for mounting on as many Riker trucks owned by the Walsh Transportation Co. Each body is lined with sheet iron on the sides, front, floor and tailgate. Arms are mounted on the front end of the body for the attachment of the cables leading to the hydraulic hoist.

Another one of the Roeder bodies was mounted on a 5-ton Sterling owned by the Independent Salt Co., New York, and employed to deliver large and small quantities of salt throughout the Metropolitan territory. The truck and the body was painted in pure white with a high finish. The body, as shown in the illustration at the bottom of page 18, is of the permanent top type with sides made up of open horizontal and vertical stiffeners. The body is provided with roll curtains over the front and rear panels on each side, the center one being a solid panel carrying the advertising trade-mark of the Independent company. The cab and engine hood were also painted white with green stripings and the body frame and wheels also of green to correspond.



A built-up type of cab as fitted on the new 2-ton Mutual truck seen at the Chicago show. The doors are in two separate parts, each of which can be opened independently of the other

Removable Side Panels

Another novel body designed particularly for grocery concerns or warehousemen handling merchandise goods consisted of a side rack type with top in which the center side rack panel was removable. This body is shown in the illustration in the upper right hand corner of page 18. As seen, low solid panels are provided at the bottom with the open racks above. The center removable panel is provided with hooks on the solid panels and also on the horizontal side rack members. Roll curtains are furnished in three sections for the full length of the body on each side so as to protect the goods in stormy weather.

An Elaborate Closed Cab

The Packard truck on which the body mentioned just above was mounted was also fitted with an elaborate closed cab in which the front corners were chamfered off, as shown in the illustration at the top of page 19. Each of the chamfers was provided with two glass panels, the lower one in each case ending below the outer edge of the engine hood. These glass panels permit the driver to get a good view of the front fenders of the truck on both sides without making it necessary for him to open the cab to see his way in backing into narrow spaces.

Each of the cab doors is made in two parts, which are hinged separately so that the upper half containing the window may be opened independently of the lower or door member.

Part of the fleet of Reo experimental inclosed-drive trucks which were tested out during last summer and fall in a successful overland haulage line between the Reo plant in Lansing, Mich., and the railroads, boat line docks and parts makers in Detroit. The distance between Lansing and Detroit is 104 miles by road

Reo Company Operates Own Overland Haulage Line to Get Incoming Goods from Detroit

Return Loads of Empty Oil Barrels and Defective Castings Are Taken from Lansing, 104 Miles Away—Cost 35 Cents per 100 Lb.

IT is a wise concern which takes its own advice. The Reo Motor Car Co., Lansing, Mich., is in such a position, since it put into operation last summer and fall its own overland haulage truck line at the same time it was advising others to do likewise in their respective communities. The introduction of the line had a dual purpose in that the Reo company found it the only method by which it could get materials quickly from Detroit and at the same time test out an experimental model of truck which it expected to manufacture at a later date.

Trucks Give Quick Deliveries

The route of the line was from Lansing to Detroit, a distance of 104 miles one way, by road. The route led from Lansing through Williamston, Fowlerville, Howell, Brighton and thence through New Hudson to Detroit. On other occasions a detour was made from Brighton through Highland and Millford to New Hudson and thence by way of Novi and Farmington to Detroit. The line was started during the period of the great railway congestion due to the tremendous movement of government material. During that period it was practically impossible to tell within any degree of certainty when goods shipped to Detroit by railroads could be re-shipped by rail to Lansing. The Reo company had large government contracts for motor vehicles and particularly Ordnance Department tractors. Many of the castings and other parts required in these automotive products originated in Detroit, and it was necessary to have them reach the Lansing factory in sufficient time to permit them to be used without delaying any of the manufacturing operations.

Since the company could not get them without serious delays if it relied upon the railroad, it decided to put in its own motor truck line. At that time the Reo company had discontinued the manufacture of its 2-ton chain-driven truck on account of turning over that truck plant to the manufacture of the Government tractors. It had on hand a fleet of some ten to twelve 2- to 3-ton worm-driven trucks with which it was experimenting. These vehicles were used to carry supplies in Lansing and it was decided that no better test could be given than by running them overland to Detroit.

Never less than two of the trucks made the trip between Lansing and Detroit every day of the week. On some occasions four or five were employed. As shown in the accompanying illustration, the trucks are very similar in appearance to the 2-ton chain-driven vehicles which the Reo company had previously manufactured for many years. The same type of frame front end and characteristic radiator was used. Each of the trucks was equipped with an ordinary stake body with side unloading gates.

A 9-Hour Trip

The trucks left Lansing between 6:30 and 7 o'clock in the morning and arrived in Detroit between 3:30 and 4 o'clock in the afternoon of the same day. Each truck was governed to a speed of 18 miles an hour, but the conditions of the roads and time taken out for the noonday meal made the average speed about 10 to 11 miles an hour, or a total time for the 104-mile trip of somewhere between 9 and 10 hours. The trucks were generally loaded-up with goods for the return trip on the same afternoon as they arrived in Detroit and lay over until 6:30 the following morning before beginning the trip back to Lansing.

The goods moved from Detroit to Lansing consisted of various finished or semi-finished parts or tools made in Detroit or shipped to the Michigan Central Railroad warehouse in Detroit from Cleveland, or received at the Detroit and Cleveland boat wharfs in Detroit. On the return trips from Lansing to Detroit empty oil barrels, defective castings, etc., were carried, and it was not long before the material carried from Lansing equaled in weight that brought from Detroit.

Truck Rates High

When it came to the question of costs, it was found that shipping by truck was almost double the rail rate between Lansing and Detroit. The one way rate by railroad was 17 cents a hundred with 4½ cents a hundred for delivery at the Detroit end, making the total rail charge 21½ cents as compared with a cost of 35 cents per hundred delivered direct to the shipping point by means of trucks.

The excessive cost of the truck haulage as compared with the railroad was to be expected, and was due in part to the poor condition of the roads and to the relatively small tonnage carried per truck. With the Reo company, however, it was not a matter of cost, but rather of obtaining the materials when needed. In this respect the truck was the only means available upon which the company could place any reliance, and from this angle the truck operation was therefore a complete success. Besides, it subjected the trucks used in the work to tests which they would receive under actual operating conditions. Perhaps when the roads between Lansing and Detroit are developed to a greater state of perfection, the overland trucking costs can be greatly reduced to a point more nearly equal to that of the railroad. It is possible that even at the present time the haulage of 5-ton loads instead of 2- to 3-ton loads would make the truck movement as attractive as the rail shipments considering the direct truck deliveries with no delays in loading or unloading at either end of the line.

Figuring of Costs

It is interesting to determine how the truck costs of 35 cents per 100 pounds between the two cities were calculated. This is shown in the calculations as given on the two sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping for Motor Trucks published on these two pages. The trucks averaged from 8 to 10 miles per gallon of gasoline with average loads of 4900 pounds, or almost 2½ tons. The driver was paid at the rate of 36 cents an hour. Tires cost 2 cents a mile, those on the front being 36 by 4 in. and those on the rear 36 by 7 in. A charge per day of $1.90 for each truck is also included to take care of the driver's room and supper when he remained over night in Detroit. The truck and its body was valued at $3,000, so that the interest on the investment at 6 per cent amounted to 60 cents a day. Depreciation on the vehicle and body was figured at $1 a day, or approximately 1 cent a mile. The total cost of truck operation per day was $16.54. A total average poundage hauled one way per truck per trip was 4,900 over a period of several months, so that the actual cost per 100 pounds moved was 35 cents.

Profits Must Be Added

Any concern interested in operating a motor truck haulage line over the same route should bear in mind that the cost of 35 cents per 100 pounds is merely the truck operating charges and does not include any overhead expense, money for promotion work, advertising or profits. Experience has shown that the successful motor truck company must practically double the cost of truck operation per 100 pounds in order to safeguard itself against loss by including charges for the various items mentioned above. If this were done with the small size of truck used, the paying rate per 100 pounds would be 70 cents, or almost three and one-half times the rail cost. These rail costs, however, will undoubtedly be increased so that the truck and rail charges will be more nearly equal.

Four Trips of 225 Miles Each

The Reo company also made four overland trips from Lansing to the plant of the Remy Electric Co. in Anderson, Ind. The run between these two points is 225 miles and the truck took 5 days for the complete return trip. The runs were made during last spring, when the roads were in very poor condition. The material carried to Anderson consisted of parts turned out by the Reo company and empty packing boxes. Return loads were hauled, the goods on the run back to Lansing being finished products used on the Reo vehicles.

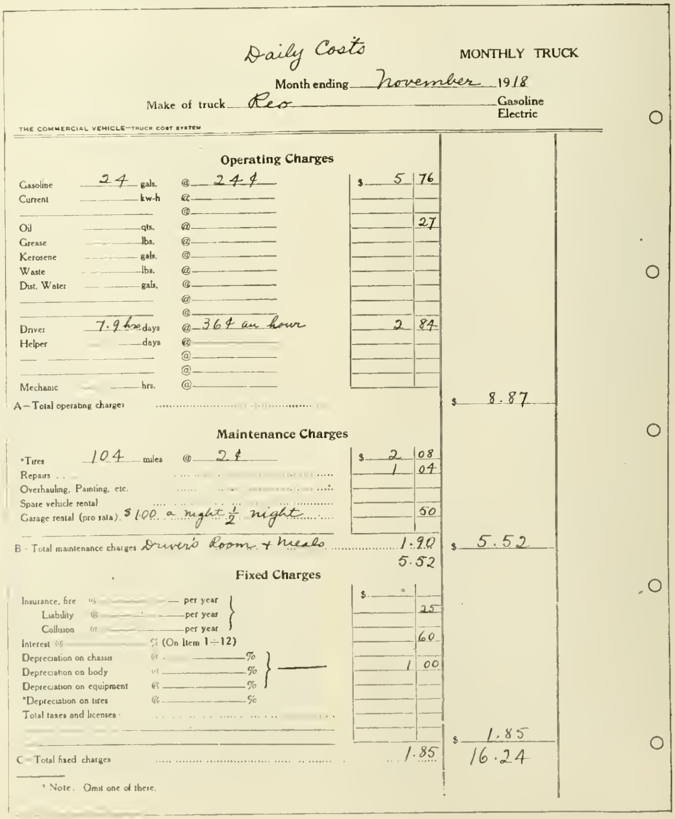
Trucks Speedier Than Railroads

The express rate between the two cities was $1.75 per 100 and the freight rate 90 cents. By trucks the cost was $1.32 a 100 pounds, or midway between the freight and express charges. It took, however, from 10 days to 2 weeks to get goods between Anderson and Lansing by railroad freight and about the same time for express shipments. Compared with these disproportionate shipping periods, in view of the small mileage covered, the time of truck delivery of 2½ days one way was from one-quarter to one-fifth of the railroad time by either freight or express.

The Reo line between Lansing and Detroit is only one of the few which began operation in the lower peninsula area of Michigan during 1918. The Inter-City Trucking Service operates a fleet of 3-ton Denby trucks between Detroit and Flint, a total distance of 68 miles. The charge per 100 pounds either way between Detroit and Flint is 65 cents, or approximately 1 cent per 100 pounds per mile. This charge, of course, includes all items entered into the operation of the trucking company, including actual truck charges, office plant, overhead expense, advertising and profits. It checks up very well with the Reo costs, which, as pointed out above, would have been 70 cents a 100 pounds exclusive of the profits. If 10 cents a 100 pounds profit had been added, the cost would have been 78 cents a 100 pounds.

Short Distance Rates

The rates for shorter distances are slightly greater per mile than is the total all-way rate between Flint and Detroit. For instance, from the Detroit end, the rate to Royal Oak, 13 miles, is 20 cents per 100 pounds; to Birmingham, 17 miles, 20 cents, and to Clarkston, 35 miles, 35 cents. From the exact 1 cent a 100 pounds rate to Clarkston the rate to Flint drops slightly below the 1 cent a 100 pounds ratio.



Daily Costs

MONTHLY TRUCK

Month ending November 1918

Make of truck Reo Gasoline Electric

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline	24 gals.	@ 24¢	$ 5	76	
Current	kw-h	@			
		@			
Oil	qts.	@		27	
Grease	lbs.	@			
Kerosene	gals.	@			
Waste	lbs.	@			
Dist. Water	gals.	@			
		@			
		@			
Driver	7.9 hrs days	@ 36¢ an hour	2	84	
Helper	days	@			
		@			
		@			
Mechanic	hrs.	@			
A—Total operating charges					$ 8.87

Maintenance Charges

*Tires	104 miles	@ 2¢	$ 2	08	
Repairs			1	04	
Overhauling, Painting, etc.					
Spare vehicle rental					
Garage rental (pro rata)	$1.00 a night ½ night			50	
B - Total maintenance charges	Driver's Room + meals		1.90 5.52		$ 5.52

Fixed Charges

Insurance, fire	@ per year		$		
Liability	@ per year			25	
Collision	@ per year				
Interest	@ % (On Item 1÷12)			60	
Depreciation on chassis	@ %				
Depreciation on body	@ %		1	00	
Depreciation on equipment	@ %				
*Depreciation on tires	@ %				
Total taxes and licenses					
C—Total fixed charges			1.85		$ 1.85 16.24

* Note. Omit one of these.

The average daily cost of operation of each of the Reo inclosed-drive trucks used in the 104-mile overland haul between Lansing and Detroit

Michigan Truck Lines Use Common Warehouse

(*Continued from page 9*)

Two of the Reo overland fleet loaded to full capacity with heavy castings on their way back to Detroit from Lansing

means of motor trucks. The complete run of 68 miles between Detroit and Flint is made within 6½ hours, including the stops made along the road. This is at an average of slightly over 10 miles an hour. The rates charged average about 1 cent a mile per 100 pounds, which is sufficient to cover all charges, including the truck operating costs, insurance, promotion work, overhead expenses and profits. Early last fall the Inter-City company hauled on an average of 65 tons of machine castings a week from Owosso to Flint at $4 a ton.

The Overland Motor Express Co. operates a 3-ton Denby as an individual truck and another with a 6-ton semi-trailer. The truck rate for the run to Saginaw is 75 cents a 100 pounds as compared with 85 cents a 100 pounds by railway express. The company also receives shipments from Saginaw for Detroit and routes them either through the Inter-City Trucking Service or the H. A. Ward Company.

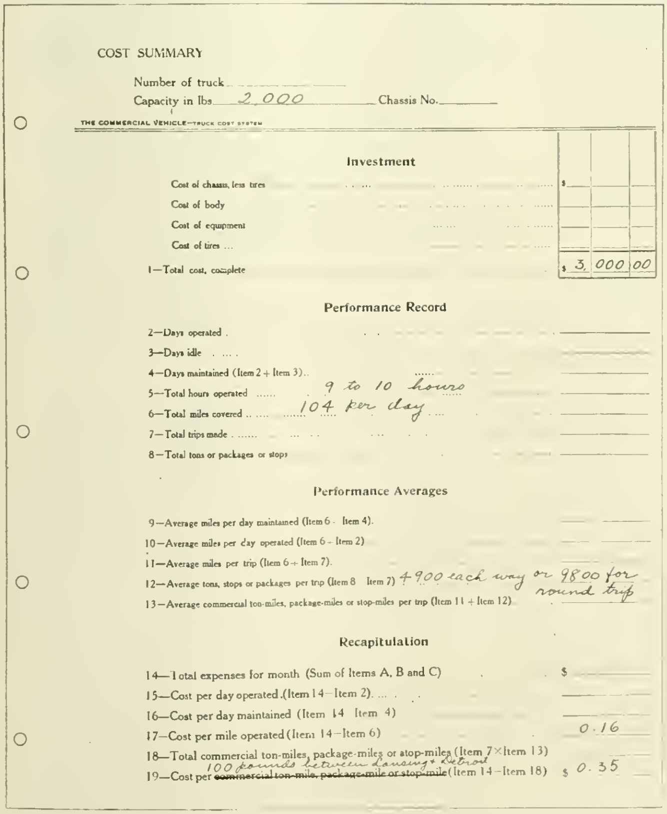
The Ward route between Flint and Detroit runs through Fenton, Holly, Rose Center, Clyde, Highland, Millford, New Hudson, Northville, Novi, Farmington and Redford. The length of the haul along this route is 78 miles as compared with 68 miles as by the more direct route of the Inter-City Trucking Service. The through rates to Flint, however, are the same, 65 cents, even though one route is 10 miles longer than the other. This uniformity of rates was established by agreement between the two companies.

The truck fleet of the Ward company is made up of two 5-ton Hall trucks and three 3½-ton Packards. The trucks alternate between the two cities. For instance, while the Halls are leaving Flint, the Packards are departing from Detroit. This means that almost equal loads start from each terminal simultaneously. Castings consigned to the Chevrolet plant in Flint compose the greatest portion of the northbound load. The castings are picked up at the docks along the Detroit River, where they are discharged from the boats bringing them from Cleveland and points further East. On the southbound runs food products, dry goods, drugs and miscellaneous articles are carried.

How the Start Was Made

The manner in which the Inter-City and the Ward companies got a start in the business is interesting. Both concerns solicited business along the routes by the aid of motor cars. Folders of printed matter were left at every prospective shipper's place of business when he was visited. The Inter-City company obtained its first large contract, which more than covered its initial cost, from a large munition factory in Flint. Similarly, the Ward company started in business on the strength of a contract secured from the Chevrolet Motor Car Co. of Flint. In each case the initial contracts provided sufficient business to enable the trucks to be run at a profit, even though capacity loads were not carried on every trip. This ability to carry more goods enabled the companies to pick up various classes of goods at points along the line.

Contrary to the practice followed by the Rural Motor Express Company running between Lansing and Flint, the trucks of the Inter-City and Ward companies run clear through and stop overnight at the end of the line, returning the following morning. In cases where the Ward trucks have to stand overnight under loads, the axles of the truck are jacked up by the driver before he leaves the garage.



COST SUMMARY

Number of truck

Capacity in lbs. 2,000 Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires $

Cost of body

Cost of equipment

Cost of tires

1—Total cost, complete $ 3,000 00

Performance Record

2—Days operated

3—Days idle

4—Days maintained (Item 2 + Item 3)

5—Total hours operated 9 to 10 hours

6—Total miles covered 104 per day

7—Total trips made

8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 - Item 4).

10—Average miles per day operated (Item 6 - Item 2)

11—Average miles per trip (Item 6 + Item 7).

12—Average tons, stops or packages per trip (Item 8 Item 7) 4900 each way or 9800 for round trip

13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 + Item 12)

Recapitulation

14—Total expenses for month (Sum of Items A, B and C) $

15—Cost per day operated (Item 14—Item 2).

16—Cost per day maintained (Item 14 Item 4)

17—Cost per mile operated (Item 14—Item 6) 0.16

18—Total commercial ton-miles, package-miles or atop-miles (Item 7×Item 13)

19—Cost per ~~commercial ton-mile, package-mile or stop-mile~~ 100 pounds between Lansing + Detroit (Item 14—Item 18) $ 0.35

The Reo costs are put down on the above forms of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. The two sheets make a complete record showing the cost to be 35 cents per 100 lb. between the two points

S. A. E. Discusses Truck Engineering—Use of Pneumatics—Maintaining Army Trucks

Papers by Cornelius T. Myers, G. E. Randles and B. B. Bachman Deal with Subjects of Great Importance to the Trade Generally

THREE papers covering truck subjects were presented recently at a meeting held at the Automobile Club of America, under the auspices of the Metropolitan Section, Society of Automotive Engineers. Cornelius T. Myers, consulting engineer, Avenel, N. J., presented a general summary of truck engineering development; B. B. Bachman gave a paper on pneumatic tires and trucks, and G. E. Randles, until recently director, Division of Maintenance, Motor Transport Corps, told of some of the problems in keeping 40,000 army motor trucks in operation.

Mr. Bachman reached some important conclusions in the field of the pneumatic tire for the motor truck. He gave it as his opinion that for vehicles up to 1500 lb. capacity pneumatic tires only are proper. From 2000 to 3000 lb. inclusive there is a strongly marked tendency toward pneumatics which it is believed will develop continuously. On the 2 and 2½-ton trucks they are just making an appearance, and are still in the experimental stage, while on the larger size there is practically no evidence apparent that the heavy pneumatics will be used. The reasons given for these conclusions were taken up definitely in Mr. Bachman's paper.

The subject is one of intense importance because of the growing use of motor trucks for long-distance carrying. Furthermore, as the use of pneumatic tires is a factor in the decrease of gasoline consumption, and also lessens the depreciation of roads, it is a matter of extreme importance at the present time, when both the fuel and road problems are being given as close as possible study both independently and as co-related matters.

Room for Detail Improvement

Cornelius T. Myers covered a broad field in his paper, this being in many ways a result of his varied experiences, including that in the design of the Class B truck. Mr. Myers stated frequently that while we have fairly satisfactory development along many lines of truck construction there is a great necessity for detail improvement. Digesting his remarks, they covered the following points:

One of the phases of truck design which has not been given all the attention which it deserves is that of accessibility. In a very large number of instances the question of cost of construction vs. accessibility comes up, and the decision is not always in favor of the accessible method of construction. Mr. Myers made a plea for simplicity, stating that this not only resulted in fewer parts but also in more accessibility. He mentioned a certain concern in New York which is a large buyer of motor trucks which makes a practice of removing from the trucks several parts which in its opinion are superfluous and selling them to other users of the same make of truck.

Comfort for the driver is a highly essential matter in truck design, particularly when it is remembered that trucks are operated for much longer spaces of time than passenger cars; and furthermore, they must be out in all sorts of inclement weather. The driver is compelled, during his attention to his duties, to exert a tremendous amount of nervous energy, and for the general safety of the other occupants of the streets, and for the general good of the apparatus handled, as much should be done as possible to relieve the driver of mental strains.

Mr. Myers touched for a moment on the gain in speed possible with the use of giant pneumatics. The further use of these, he predicted, would result in more attention on the part of designers to the layout of the brake and steering. The speed proposition, however, is a matter of extreme importance when it is realized that for real efficiency it is necessary to keep the trucks moving. The faster the average speed the better paying is the truck. The average speed in taking into consideration the entire period over which the trucks operate is not only governed by the time it spends on the road but also what is lost by waiting or by overhauling.

According to the author, the cost of transportation by truck should be put first and the cost of the truck next. That is, in laying out a truck transportation system the first cost of the truck should be figured not as standing alone but as being only part of the entire problem of determining exactly what truck transportation is costing the owner of the vehicle or fleet of vehicles. This is a broad gaged method of calculating the value of the truck or fleet of trucks to the owner, but one which is forgotten frequently by the truck purchaser.

In the design of a truck it is very often possible to combine units so that there are parts with double and triple functions. This results in a reduction in weight and increase in simplicity, and often because of the combination of functions a designer is enabled to allow a greater factor of safety and still have finally a lighter part.

Suggests Improvements in Construction

In taking up details of construction, Mr. Myers pointed out several directions in which future improvements in truck construction are necessary. Better cooling systems are required, and it is particularly necessary to look into the design of radiators, to see if they cannot be lightened, as a great amount of weight over the front axle results in making the truck hard to steer. Spring suspensions can also be improved. The use of longer springs is increasing, but lubrication of the spring eyes is often faulty; in fact, he stated many spring breakages are directly traceable to the neglect of oiling the spring eyes. This causes the bearing at this point to seize, giving an action which overstresses the main leaf, allowing it to break.

Hearty approval is being given the use of oil fittings instead of grease, but one of the criticisms offered on this method of lubrication is that the oil fittings, in many cases, admit dirt and water. They are also very frequently of such construction that they are apt to be knocked off and broken.

The magazine system of oiling the spring brackets, as utilized on the Class B truck, was explained in detail, and was shown to have worked out generally satisfactorily except at one minor point, which is readily corrected. This is in the use of too close a fit of the wick, in the case of the front springs. When his wick is too loose the oil rapidly siphons from the reservoir, thus emptying it, and necessitates the renewal of the wick, giving it a tighter fit.

As an example of the real influence of this method of oil lubrication on ease of spring suspension Mr. Myers mentioned a truck utilized in transporting berries on the Pacific Coast. He stated that in this work the trucks using the magazine oiled suspension were allowed an increased rate per crate owing to the easier suspension, which prevented injury to the delicate berries.

There are other points on the chassis which should be lubricated in some way more closely, like the spring brackets, just described. These are such inaccessible points as the brake rocker mechanism, and so forth, which are seldom touched, but which would probably be lubricated more consistently were it necessary to renew the supply in the reservoir but once in two or three months.

Axles are generally good, according to Mr. Myers, but it would be well to look further into the matter of unsprung weight and see if more cannot be done in this respect. The paper concluded by pointing out that the time has now come to build for future development and permanent business. Mr. Myers cited the appeal for higher standards of quality voiced by an article by H. M. Swetland, president of the Class Journal Company, in an article in AUTOMOTIVE INDUSTRIES for January 23.

Keeping Army Trucks in Operation

Systematized maintenance in the army had reached a high state of development when the armistice was signed. This is made evident by the report given by Mr. Randles on keeping 40,000 army motor trucks in operation.

Obviously, keeping in repair 40,000 trucks, motorcycles, and any other motor equipment coming under the care of the Motor Transport Corps meant processing, standardization and quantity-production methods. The maintenance division of the corps adopted methods based on the experience of the foremost manufacturers of motor vehicles in the country. Motor experts were called on to give the results of their experience, and their advice adapted to that of army men who had observed motor transportation on the Mexican border. These men brought together the best practices, eliminated the faulty, and kept those that had stood the test. They picked the best standards and established definite limits to work to. Accuracy was adapted to production. A system of thorough inspection of every part was established and the final test made practically error-proof.

In the standardized repairshops the vehicle receives a complete rebuilding in all of its parts, including engine, transmission, body, upholstery, electrical apparatus, etc., and when finished, barring hidden flaws in some of the parts not replaced, it has at least the original capacity, and in many cases is capable of greater length of service than when new. The work, from the time the vehicle reaches the dead line until it passes through its process of rebuilding, is on the progressive system. In fact, in this plan modern manufacturing methods are applied to repair work.

The schedule and routing department from the time a truck or other motor vehicle arrives in the storage yard, or "dead line" of a mechanical repairshop, keeps a record of it. As soon as it is assigned a position in the storage yard the arrival is noted in the production and schedule office and a record is made of the truck make, manufacturer's number, job number, and United States truck number. It is then surveyed and inspected by the survey board, which reports on the condition of the truck and recommends either rebuilding or salvage.

This report, approved by the shop commander, is the basis of the repair instructions. An identification memorandum is issued by the production department to the battery repairshop, advising that the truck is on the "dead line."

This shop removes the battery from the trucks, puts it in A-1 shape, holding it until the overhauled truck is ready for test. When the chassis-bay foreman has space for another job the production department assigns the truck to a vacant stall in the chassis bay. All these stalls are numbered consecutively, and the truck is tagged with its stall number.

A memorandum is then sent to all the departments, bearing truck make, manufacturer's number, job number, United States truck number and stall number. Every department then has full data on any unit which may come to it, identified only by its staff number.

All Units Tagged as Removed

As the various units are removed they are tagged with the stall number and placed on trailers in the center aisle of the bay. These trailers are picked up by tractors and taken to the distributing point in the main aisle, whence they are moved to their respective shops to be overhauled. The engine, transmission and drive shaft, rear axle, brake, front axle and steering column all go into the general overhaul and machine shop. Each part is tagged with a metal tag bearing the stall number. Parts coming from repair are inspected before being sent back to the stall. New parts are also inspected. After the engine, transmission and other units are put together in the sub-assembly and final assembly departments they are returned by trailer and tractor to the stall from which they originally came. The truck is put together again by the same gang that tore it down.

Organization of Division of Maintenance

The final test is thorough and intended to check repairs. It is given by a separate department and a group of men who had nothing to do with the actual repairing. The tested and approved truck goes back into service as good as new, and probably in better condition than 95 per cent of the trucks repaired in civil life.

The maintenance division of the Motor Transport Corps is organized for overhauling and rebuilding motor equipment in the United States and to supply parts, tools and personnel of mechanical repair units for overseas service. Maintenance repairs in the field are made by service park units which are mobile, or semi-mobile, and consist of thirty-five men with equipment. These units can be taken into the field, close behind the lines, where repairs can be made as the emergency demands.

Mechanical repairshops for overhauling in the United States are standard in size, equipment and personnel. Each is housed in a building of thoroughly modern, fireproof, concrete construction, so planned that considerable extensions can be made without disturbing the original floor arrangement. The original unit is 497 feet square, providing space to carry on 120 truck overhaul jobs at one time.

Within this enclosure is assembled equipment for completely rebuilding any style of motor vehicle. The men are so organized in all departments that the work is understudied all the way through; they are equipped with hand tool kits which are just as much a part of their equipment as a rifle is for an infantryman. The tool kits have been standardized for various classes of work and give each man the necessary tools for the job to which he is assigned and more or less confine his activities so that he will work as instructed.

Pneumatic Tires on Trucks

The most pertinent questions that arise in connection with determining the feasibility of the use of pneumatic tires are probably these:

(1) On what sizes of trucks can they be used?
(2) In what class of service?
(3) On what kinds of roads?
(4) What advantages are obtained?
(5) What disadvantages become evident?
(6) Will it be necessary to radically modify truck construction to use pneumatic tires most economically?

From the available data it would seem to be safe to say that for vehicles up to 1500-lb. capacity pneumatic tires only are proper. From 2000 to 3000 lb. inclusive there is a strongly marked tendency toward pneumatics, and on two- to two and one-half-ton trucks they are just making an appearance, while on the larger sizes there is practically no evidence apparent from this source. We have all seen large trucks of three, four and possibly five tons' capacity with pneumatic equipment, and the fact that makers are not listing them would indicate that the proposition is still in the experimental stage.

The advantages claimed for the pneumatic tire are numerous. Some of these claims are so obviously correct as to need practically no discussion; others are open to considerable question. Also, as with every matter of this sort, the answer is not to be obtained from any one factor in the problem, but after the bearing which each factor has upon all the others has been given consideration.

The claims of advantage which are made may be listed as follows: (1) Reduction in mechanical repairs, (2) Increase in permissible speed, (3) Decrease in gasoline consumption, (4) Decrease in oil consumption, (5) Less fatigue for men, (6) Lessened depreciation of roads and (7) greater tractive ability.

The reduction of mechanical troubles can be accepted as a fact almost without comment, but a point to be considered is that while the net trouble is reduced it is apt to change in characer owing to the greater engine speeds attained when pneumatics are used.

Concrete Roads with Proper Foundations Increase Motor Truck Efficiency

In Most States Concrete Highway Is Built with Local Material with the Exception of the Cement

By H. Colin Campbell

This Wayne County, Michigan, concrete road, together with the motor truck, enabled Henry Ford to carry thousands of men quickly and economically to and from his big shipbuilding plant near Detroit

MOTOR trucks are fast motorizing America. They are pushing out into the rural districts, achieving economic victories against the odds of uneven roads, and by this achievement in the face of difficulties are foreshadowing still greater economic victories when all obstacles in the road shall have been removed and the roadbed made permanent.

Serviceable as the motor truck is in the face of odds, it cannot hope to further increase its serviceability to any great extent until existing road conditions are improved. The motor vehicle has gone as far as it can toward maximum usefulness on old types of road, and the manufacturer, to increase his sales, is now confronted with the necessity of aiding in the improvement of the roadbed rather than making improvements in the vehicle.

By aiding in roadbuilding the manufacturer will be helping the user buy insurance against restricted hauls and bad weather, and thus increase prospects for the use of his product, while at the same time the user will profit by reduced fuel cost, lessened tire expense and lengthened life of his investment.

Both maker and user are therefore brought face to face with the fact that further economies in truck operation are only possible with road improvement. And having arrived at the only remaining obstacle to the full use of the truck—the roadbed—the selection of the type of surface that will give the vehicle the greatest latitude in weight and speed without excessive wear on the road becomes of the utmost importance. If, as U. S. Food Administrator Hoover says, 50 per cent of our farm products is wasted because of slow hauling, more will be wasted if we add to the farm products waste the additional waste of costly mistakes in the building of roads that go to pieces quickly under a denser and heavier traffic.

Mission of the Concrete Road

All of which brings us to the main point, the concrete road and its mission. It should be borne in mind always, in considering the various types of road, that with the exception of cement, which is only a small part, the materials used in the construction of the concrete road, stone, sand and water, are near at hand in most localities, and that in this sense the concrete road is a true community product. No other type of durable road surface so nearly approaches all home construction. The concrete road is a valuable by-product of nature, a use in its construction of practically otherwise useless material in the neighborhood, and when put together in accordance with modern engineering practice it then enters upon a period of lasting service. So that, in the use of nature's idle material found nearest at hand, the taxpayers' interests are conserved, a point also to keep in mind because every taxpayer is a community stockholder. Whether he rides or walks, buys two eggs and carries them home, or orders a case delivered, he votes the same amount of citizen stock in the road as the manufacturer who make motor vehicles by the minute, or the neighbor who may own a whole fleet of trucks. Therefore, when you go to him and say: "We are going to use home material on this job, and when we get through with it there will be no trouble in getting to market, and no more big road repair bills," you will have his co-operation.

That road repair burdens are lifted from the taxpayer where concrete is adopted as the standard surface has been proved repeatedly by experience. The latest instance comes from Wayne County, Mich., where, under the direction of Edward N. Hines, chairman of the Board of Road Commissioners, an extensive system of concrete roads has been built. In the twelfth annual report of that board this statement is made:

> "Following the precedent established last year, we do not recommend the levying of a county road tax for construction and maintenance purposes for our 1918-1919 season. Through the moneys received as Wayne County's share of motor license fees we will have enough funds available to properly and adequately maintain all roads previously improved, together with such new construction work as will be necessary to increase food production, to facilitate traffic between the farmer, the market and the consumer, to provide a suitable and satisfactory highway for our numerous war industries in and around Detroit, and to serve other military purposes. The type and quality of the roads improved by this Commission is of such a nature (concrete) that the funds realized from motor license fees are much greater than are necessary for maintenance purposes."

As every motor vehicle manufacturer and dealer knows, sales prospects increase as shipping areas are widened, making the purchase of self-propelled vehicles necessary if the additional marketing points thus opened are to be placed within practical reach of the farm. And if this practical reach is to be maintained every day in the year the roads will be built of concrete.

The extent to which motor vehicles widen the shipping range of communities is shown by some very interesting facts gathered by the U. S. Department of Agriculture, facts which should be on the tip of every motor vehicle salesman's tongue. And we might remark, parenthetically, that any salesman with a good vehicle who thinks that he is merely putting over a sale when he sells a motor vehicle is putting one over on himself in not fully appreciating his own work, for the very good reason that so long as 50 per cent of what we grow is wasted by slow hauling, it will be not only the salesman's job but his duty to sell trucks.

Going back to the facts brought out by

This concrete road near Spokane, Wash., aided materially in the huge movement of lumber by motor trucks in that territory for war purposes

the Department of Agriculture in a comparison between motor truck and wagon hauling it was found that the average range of the motor truck haul to shipping points is 11.3 miles, making 3.4 trips per day as against 9 miles by wagon making only 1.2 trips per day. The cost of hauling per ton-mile was found to average 15 cents by motor truck against 30 cents by wagon. These figures are based upon 1918 hauling on ordinary roads. With resistance to traction removed to a minimum by concrete roads, even the 15 cents per ton-mile cost would be still further reduced by the motor truck, to say nothing of the greater number of marketing points that would be brought within practical, every-day range of the farmer.

It's a Long Road!

These facts are so clear to everyone that it would seem to be a waste of time and space to repeat them here, but unfortunately it takes about as many "little drops of water" to wash mud out of the road and keep it out as it does to wear out a rock. We have this consolation, however, that it is a long road that has no turn in public opinion, and that opinion is now turning to the economy of hard, permanent roads, as was shown by the voters of Illinois and Pennsylvania who on Nov. 5 voted a total of $110,000,000 for road building.

No Saturation Point

When the motor vehicle manufacturer and his dealers shall have exhausted their individual prospects—that is, sales among the smaller users of trucks—they will still be on the edge of a much larger field, the field upon which the rural motor express is now entering as fast as the condition of the roads will permit.

The prediction has been made that, given a rigid, wide and permanent roadbed, the gasoline engine and motor truck will revolutionize transportation. In this transformation lies a great opportunity for the manufacturers and dealers in highway equipment. Already the manufacture of such equipment has become one of the amazing developments of the decade, a development out of all proportion to that of the roadbed over which the new equipment is operated. Some idea of the immensity of the field now opening to the motor vehicle may be had when we stop to consider that it is estimated that highway mileage exceeds railway mileage by 2,220,482 miles, that highway building is beginning where railway building left off, and that already the public owns its own right of way, which needs only to be surfaced with a rigid, durable material to hasten the full use of the new freight carrier.

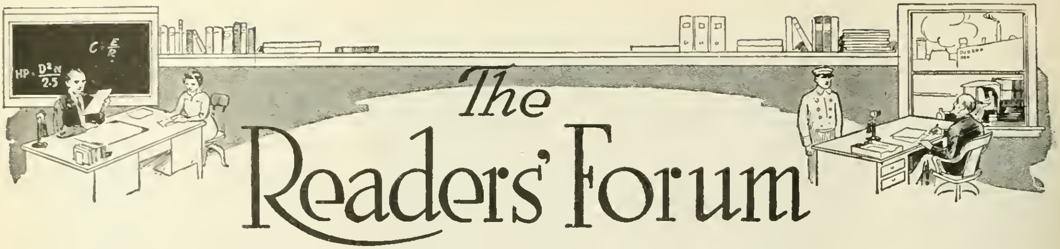
Standardize Roads First

But there is one fact as hard as concrete itself: the fact that no standardized rate for hauling can be made until the roadbed is standardized. The rate confusion, which bars truck freight lines from reaping the full harvest which awaits them, only emphasizes the need of building a type of roadbed that will eliminate the element of chance in reaching a given point within a given time with a maximum load.

Moreover, it is one thing for a shipper to waste his own time and fuel, but when the rural motor express must include a charge to cover a fuel waste of 200 per cent in excess of what would be consumed if the roadbed were right, the situation is altogether different. The reason for that excess charge must be removed before the new transportation agency can proceed with its traffic development upon a sound basis, and until the restrictions which retard its growth are removed the public will not come into the full possession of the great economic advantages which the motor truck has to offer.

The vehicles wait, only the roads delay. To eliminate this delay permanently, together with the attendant waste of millions of dollars worth of perishable produce and more millions in fuel waste on what is hauled, thus bringing maker and user of the motor truck into full possession of all the advantages it holds for both, is the mission of the concrete road.

A portion of the National pike about 18 miles west of Zanesville, Ohio, where it is laid in concrete. The army trucks driven overland used this road and about 1500 heavy trucks passed over during June, July and August, 1918



The Readers' Forum

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

STATE LAWS REGARDING BRAKES

Only Seven States Require Brakes on Rear Wheels of Motor Trucks

To the Editor, COMMERCIAL VEHICLE:

Please digest the motor vehicle laws of the different states with particular reference as to the requirements for brakes. I am anxious to know what states require the use of brakes on the rear or driving wheels and in what states two sets of brakes, one on the jackshaft of a chain-driven truck and the other on the propeller shaft, would be permitted?—MR. BURRELL, New York City.

The States of Colorado, Florida, Georgia, Louisiana, North Dakota, Oklahoma, Pennsylvania, Tennessee and Virginia do not mention any ruling on the use of brakes.

The states of Connecticut, Maine, Massachusetts, Mississippi, Montana, New Jersey and Rhode Island say that: "Every motor vehicle of more than 10 hp. while in use upon any public highway, shall be provided with at least two brakes, powerful in action and separate from each other, of which one brake shall act directly on the driving wheels or on parts of the mechanism which are rigidly connected with such wheels. One of such brakes shall be so arranged as to be operated with the foot. On any motor vehicle not exceeding 10 hp. one brake shall be sufficient."

In the rest of the states, the law is that the brakes must be adequate and sufficient and in good working order.

INDIVIDUAL TRUCK PRODUCTIONS

Cannot Give Figures Because They Were Furnished in Confidence

To the Editor, COMMERCIAL VEHICLE:

Will you please tell me the number of trucks either manufactured or assembled during the year 1918 by the following companies: Packard Motor Car Co., Detroit; Pierce-Arrow Motor Car Co., Buffalo, N. Y.; Kelly-Springfield Motor Truck Co., Springfield, Ohio; Reo Motor Car Co., Lansing, Mich.; Nash Motors Co., Kenosha, Wis.; Maxwell Motor Co., Detroit; International Harvester Co., Chicago; Republic Motor Truck Co., Alma, Mich., and Ford Motor Co., Detroit.—W. L. FERGUSON, International Harvester Co. of America, Salina, Kans.

It is impossible for us to give you the information you desire in spite of the fact that we have it on file in our office. This information was given to us confidentially by the various companies so that we could determine a total truck production figure for the year and with the understanding that the individual outputs would not be made public as such.

AMERICAN TRUCK ASSOCIATIONS

Only Five Owner Organizations of Any Prominence—One of Makers

To the Editor, COMMERCIAL VEHICLE:

Will you please give me a list of the motor truck associations throughout the United States.—WINTHROP H. PICKERING, Boston, Mass.

Below are the names of seven motor truck associations. The first five mentioned are composed of owners and dealers; the sixth is an association composed of sales managers and the seventh has a special truck section made up of motor truck makers.

Motor Truck Assn. of America, Inc.,
1790 Broadway, New York City.

Motor Truck Club of Philadelphia,
1022 Chestnut St., Philadelphia, Pa.

Motor Truck Club of New Jersey,
22 Washington Place,
Newark, N. J.

Motor Truck Owners' Assn.,
2135 S. Michigan Ave.,
Chicago, Ill.

National Team & Motor Truck Owners' Assn., Inc., Sixth St. and Duquesne Way, Pittsburgh, Pa.

National Assn. of Motor Truck Sales Mgrs., 1344 Wells Bldg., Milwaukee, Wis.

National Automobile Chamber of Commerce.
7 East Forty-second St.,
New York City.

TABLE OF WEIGHTS OF GOODS

Miscellaneous Materials With Their Weights Per Lb. and Cu. Ft.

To the Editor, COMMERCIAL VEHICLE:

In the operation of our trucks to carry loads from point to point at so much per ton we are often at a loss to determine quickly what a fair rate will be on the load by pounds. We are often called upon to carry liquids, earth-filling materials or miscellaneous goods, and we are addressing you in the hope that you can tell us the weight in pounds, or pounds per cu. ft., of the above-mentioned materials.—M. MERRIMACK, New York City.

In reply to your recent inquiry we are giving you below tables showing the weight in pounds of liquids, the weight in pounds per cu. ft. of earth-filling material and the weight in pounds of a miscellaneous list of items. For your information we are also giving you the tables on cubic measure, liquid measure and measures of weight.

Liquids

	Pounds
Beer, cases, 24 pints	60.0
Beer, cases, 24 quarts	100.0
Beer, ⅛ barrel	50.0
Beer, ¼ barrel	100.0
Beer, ½ barrel	200.0
Beer, one barrel	380.0
Beer, casks	760.0
Gasoline, cu. ft. 44 lbs.; per gal.	6.2
Milk, 10 gal. cans	110.0
Milk, case 12 qt. bottles	60.0
Milk, case 20 pint bottles	60.0
Molasses, barrel	650.0
Muriatic Acid, cu. ft.	75.0
Nitric Acid, cu. ft.	76.0
Oil, Fuel, cu. ft.	54.6
Oil, Linseed, cu. ft. 59 lbs.; gal.	7.5
Oil, Petroleum, cu. ft. 55 lbs.; gal.	7.0
Oil, Turpentine, cu. ft. 55 lbs.; gal.	7.0
Sulphuric Acid, cu. ft.	115.0
Tar, cu. ft	62.0
Vinegar, cu. ft. 67 lbs.; per bbl.	450-500.0
Water, cu. ft. 62 lbs.; per gal.	8.3

Weight of Earth Filling

	Pounds per cu. ft.
Earth, common loam, loose	72- 80
Earth, common loam, shaken	82- 92
Earth, loam, rammed moderately	90-100
Gravel	90-106
Mud, dry, close	80-110
Mud, wet fluid	104-120
Sand, well shaken	100
Sand, wet	118-129

Miscellaneous

	Pounds
Ashes, cu. ft.	40- 45
Bricks, 26 = 1 cu. ft.	118
Bricks, per 1000	4500
Clay, cu. ft.	120-150
Clay, fire, cu. ft.	130
Emery, cu. ft.	250
Flour, in barrels	200
Garbage, cu. ft.	50
Hay, baled, cu. ft.	95
Hay, pressed, cu. ft.	25
Ice, cu. ft.	58
Potatoes, sweet, bushel	55
Potatoes, white, bushel	60
Rosin, cu. ft.	45
Salt, Syracuse, per struck bu.	80
Salt, Turks Island, per struck bu.	56
Snow, fresh, 1 cu. ft.	5-12
Snow, wet, 1 cu. ft.	15-20
Sugar, in barrels	360
Sugar, in half barrels	150
Tile, cu. ft.	110-120

Cubic Measure

1 cu. yard = 27 cu. feet.
1 cu. foot = 1,728 cu. inches.
1 cord of wood = 4 × 4 × 8 ft. = 128 cu. ft.
1 perch of masonry = 16½ × 1½ × 1 foot = 24¾ cu. ft.

Dry Measure

1 bushel = 1.2445 cu. ft. = 2,150.42 cu. in.
1 bushel = 4 pecks = 32 quarts = 64 pints.

Liquid Measure

1 gallon = .1337 cu. ft. = 231 cu. in.

Measures of Weight

1 gross or long ton = 2,240 pounds.
1 net or short ton = 2,000 pounds.
1 gallon of water weighs 8.33 lbs.
1 cu. ft. of water weighs 62.5 lbs.

MOTOR TRUCK LOADING METHODS

Mechanical Devices, Hoppers, Tipples, All Superior to Hand Work

To the Editor, COMMERCIAL VEHICLE:

We have just sold to our county a 3½-ton truck for hauling gravel. The truck is equipped with a dump body. The chairman of the road committee wants some information with regard to methods of loading which have proven satisfactory. It occurs to me that you can refer me to articles which appeared in THE COMMERCIAL VEHICLE which have to do with this subject, and I am therefore addressing you and ask that you give me a list of such articles.—M. D. H., Waterloo, Iowa.

THE COMMERCIAL VEHICLE has devoted a large number of pages to the subject of truck loading. Some of the articles are specifically mentioned below.

Not knowing the actual conditions under which the truck you mention will be operated it might be best to outline briefly the various forms of motor truck loading. These may be divided into three general classifications as follows:

1—Loading by hand.

2—Loading by means of overhead hoppers.

3—Loading by means of mechanical equipment, such as mechanical belt loaders, derricks, cranes or locomotive cranes and steam shovels.

Hand loading is to be avoided whenever possible because of its slowness and expense and because it holds up the truck for longer periods than would be the case if some mechanical means were employed.

We assume that the truck mentioned in your letter will be used to haul different kinds of road materials from some central yard or depot to various points along the highway where construction work is going on. If this is the case, it would seem that the greatest truck efficiency could be secured by the use of some form of overhead hoppers or mechanical belt loaders, similar to those manufactured by the following companies:

Galion Iron Works & Mfg. Co., Galion, Ohio.
Haiss Mfg. Co., George, New York, N. Y.
Lee Loader & Body Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.

In cases where the materials to be handled from the central yard have to be unloaded from railroad cars before being stored, mechanical belt loaders (sometimes arranged in pits under the tracks for bottom-dump gondolas or placed directly inside of the car), locomotive cranes or inclined tipples may be used. The use of inclined tipples is only employed where the material has to be carried some distance from the loaded freight car. The motor truck runs up frontward or backs up, depositing its load into hoppers, from which the truck to carry it away is loaded from a lower level. Locomotive cranes for such unloading work are applicable only when there is a large amount of material to be unloaded daily and it is sufficient to keep the crane busy for the greater part of the working day.

Some particular references in the more recent issues of THE COMMERCIAL VEHICLE to either one or more of the methods mentioned above are made in the following issues:

Oct. 15, 1918, pages 26 and 27, treats of the economies of loading coal by mechanical means in Louisville, Ky. Savings of mechanical over-hand loading are given, and while the material handled is different from that used in road building, no doubt the loading method will be of interest.

Sept. 1, 1918, pages 5 to 8, treats of the hauling of minerals in California. Descriptions and illustrations of tipples and overhead hoppers are given.

July 1, 1918, page 23, treats of the work of contractors' motor trucks in the city of Pittsburgh.

June 1, 1918, page 34, treats of the type of overhead hopper designed by Ward C. Hill, Superintendent Public Works, Lansing, Mich. The hopper used was built for use in connection with motor trucks employed in road construction work.

May 15, 1918, pages 22 and 23, treats of the various loading methods employed by contractors in various parts of the country.

May 15, 1918, pages 16 and 17, treats of the loading methods employed by the Rogers Sand Co., Pittsburgh, Pa.

April 15, 1918, page 31, shows graphically a typical example of overhead hopper loading and tipple unloading. The feature of the sketch shown is the use of the turntable to prevent waste of truck time in backing up or down the incline or in maneuvering to position for dumping.

March 1, 1918, page 37, treats of the loading of motor trucks by means of steam shovels on the backfill and road work at the plant of the Bethlehem Steel Co., Sparrows Point, Md.

Dec. 15, 1917, pages 5 to 8, treats of the several loading methods employed by the Youghiogheny Coal Co., one of the largest coal concerns in Pittsburgh, Pa. Both hand and hopper methods are employed.

Nov. 15, 1917, pages 5 to 8, treats of hauling coal and building supplies by motor trucks in Hartford, Conn.

Sept. 1, 1917, pages 24 and 25, treats of the use of a 4-ton Packard on a road construction job at Grosse Isle, Mich.

TRUCK REGISTRATION BY STATES

New York First with Close to 96,000, Including Buses and Trailers

To the Editor, COMMERCIAL VEHICLE:

Will you please answer the following questions regarding truck registrations in the United States?—H. JUDSON, New York City.

1—How many trucks are registered in the United States?

2—Which state has the most trucks registered?

3—How many trucks are registered in New York State?

4—How many trucks are registered in New York City?

The answers to your questions in the order stated are as follows:

1—As told in THE COMMERCIAL VEHICLE for Feb. 1, 1919, there were 322,857 trucks registered in the United States to Dec. 1, 1918. That figure is obviously incomplete and far too small, since only twenty-three of the forty-eight states register passenger cars and motor trucks separately, and the 322,857 total is the total of the trucks in only twenty-three states. THE COMMERCIAL VEHICLE estimates that there were 480,000 trucks of all kinds and sizes in service in this country on Jan. 1, 1919.

2—New York State has the most trucks registered.

3—The registration of motor trucks, omnibuses and trailers in New York State as of Jan. 1, 1919, is as follows:

	1917	1918	INCREASE, NUMBER	INCREASE, PER CENT
Trucks	55,402	75,268	19,866	36
Omnibuses	11,932	18,084	6,152	52
Trailers	985	2,218	1,233	125
Totals	68,319	95,570	27,251	

4—The trucks, trailers and omnibuses registered in New York City as of Jan. 1, 1919, are as follows:

	1917	1918	INCREASE, NUMBER	INCREASE, PER CENT
Trucks	25,078	31,412	6,334	32
Omnibuses	4,437	6,435	1,998	45
Trailers	299	622	323	107
Totals	29,814	38,469	8,655	

MAKERS OF POWER TAKE-OFFS

Such Devices Usually Made by Hoist or Body Manufacturers

To the Editor, COMMERCIAL VEHICLE:

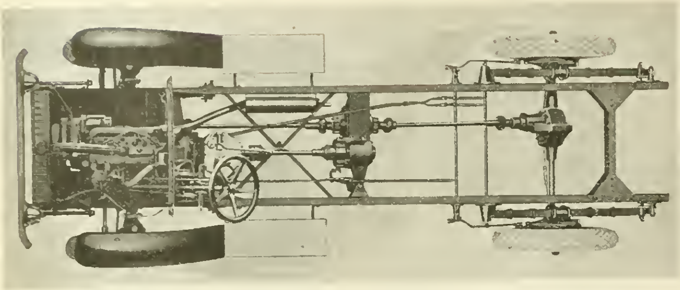
Will you kindly advise me if there are any companies that make a power take-off for a Model T 53 Warner transmission with sliding gear or sliding shaft.—WILFRED E. BROWN, Mystic, Conn.

As far as THE COMMERCIAL VEHICLE knows, there is no concern which manufactures gearset or propeller shaft power take-offs as a special business.

Such devices are usually produced by the hoist or body makers. ' Since you do not give the name of the hoist or body for which the power take-off is required, we give you herewith the list of the principal power hoist makers:

Heil Co., Milwaukee, Wis.
Horizontal Hydraulic Hoist Co., Milwaukee, Wis.
Hydraulic Hoist Mfg. Co., St. Paul, Minn.
Hydro-Hoist Co., Milwaukee, Wis.
Meisel Press Mfg. Co., Boston, Mass.
Wood Hydraulic Hoist & Body Co., Detroit, Mich.

The maker of the hoist you have in use or propose to use undoubtedly can furnish you with the required power take-off.



View of Oshkosh chassis showing main and subtransmission located amidships

New Oshkosh 2-Tonner Has 4-Wheel Drive and Herschell-Spillman Engine

OSHKOSH SPECIFICATIONS

Capacity, tons	2
Price	$3,500
Wheelbase, in.	130
Tires, front	36 x 6
Tires, rear	36 x 6
Bore, in.	3¼
Stroke, in.	5
N. A. C. C. hp	16.92
Speed, r.p.m.	....
Speed, m.p.h.	....
Gear ratio in high gear	8.2 to 1
Final drive	4-wheel

A NEWCOMER in the field is the Oshkosh 4-wheel drive 2-tonner, built by the Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis. With the sole exception of the 4-speed Brown-Lipe gearset used for the main transmission the drive construction is of the company's design and make.

Power is taken from the engine through a Brown-Lipe dry multiple disc clutch to the main transmission. From thence it is carried through a short propeller shaft with two universals into a central sub-transmission located midway between the front and rear axles. This sub-transmission contains a small sprocket from which power is transmitted by a silent chain over a large sprocket containing an automatic self-locking differential.

From this point the power is transmitted through propeller shafts to both front and rear axles. These are of full-floating type and bevel gear construction. The drive leaves the differentials in both axles in a similar manner, but in the case of the front axle there are universal joints of ball and socket types to provide for steering. The universals are dirt and dust-proof.

Cooling is thermo-syphon, the radiator is of cellular type and the Zenith carbureter is fuel-fed by a vacuum system from a gasoline tank located under the driver's seat.

North-East ignition, starting and lighting forms part of the regular equipment. The outfit is of 2-unit type and is completed by the inclusion of a Willard storage battery. The system is a 6-volt one.

The hand brake, of external type, operates on the rear wheels, and the foot brake, also external, on the drive shaft. The frame is pressed steel and is of semi-flexible construction.

Steering is located at the left side and the gear is furnished with radial and end thrust bearings for adjustment to compensate for wear.

Evidence of the desire to insure accessibility and ease of adjustment is afforded by the facts that the propeller shafts are interchangeable, differentials can be taken out without removing the load or jacking up the truck, and any unit of the driving mechanism can be removed without interfering with others. All bearings are standard S. A. E. sizes and are interchangeable in the various units.

Maibohm Introduces Business Car of ½-Ton Capacity with 6-Cylinder Engine

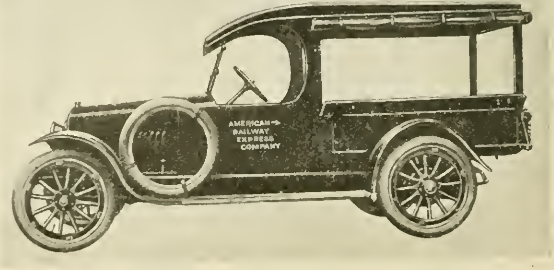
A LIGHT delivery vehicle of ½-ton capacity is now being marketed by the Maibohm Motors Co., Racine, Wis. This firm has hitherto been identified with the production of passenger cars. The new business car is powered by a 6-cylinder Falls engine with valves in the head. The engine, with the Borg and Beck clutch and the Mechanics Machine Co. selective gearset, forms a unit. Thermo-syphon cooling is used, the radiator is of Perfex make and fuel is fed to the Stromberg carbureter from a 14-gal. tank located at the rear by means of the Stewart vacuum system.

Atwater-Kent ignition with manual advance is installed and regular equipment includes a Wagner 6-volt starting and lighting system. The starting motor operates through a Bendix drive and the generator is driven through helical gears. A Willard storage battery is carried in a steel cradle under the floorboards.

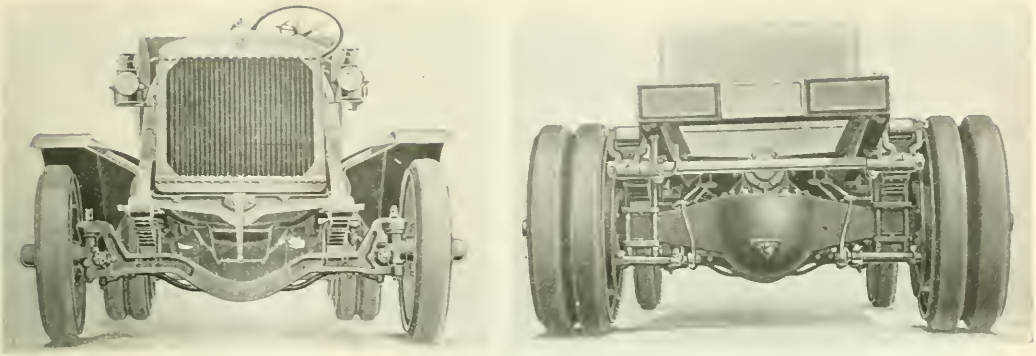
MAIBOHM SPECIFICATIONS

Capacity, tons	½
Price	$1,290
Wheelbase, in.	116
Tires, front	32 x 3½P
Tires, rear	32 x 3½P
Bore, in.	3⅛
Stroke, in.	4¼
N. A. C. C. hp	23.50
Speed, r.p.m.	....
Speed, m.p.h.	....
Gear ratio in high gear	4.5 to 1
Final drive	Bevel

Oshkosh 4-wheel drive truck with stake body and cab



Maibohm ½-ton business car with standard body. Curtains are provided for use in bad weather



Front and rear views of new Acme 5-tonner, showing sturdy axle and spring construction. The radiator is supported on a cushion base

Acme Worm-Driven 5-Tonner Features Oversize Units and Simplicity

ACME SPECIFICATIONS

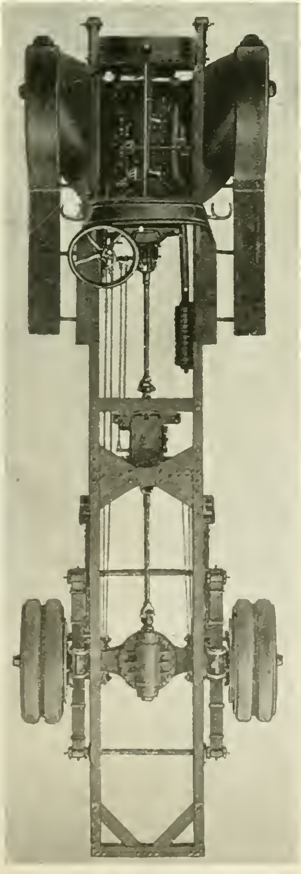
Capacity, tons	5
Price	....
Wheelbase, in.	180
Tires, front	36 x 6
Tires, rear	40 x 6d
Bore, in.	4¾
Stroke, in.	6
N. A. C. C. hp.	36.15
Speed, r.p.m.	1000
Speed, m.p.h.	10
Gear ratio in high gear	11.6 to 1
Final drive	Worm

WITH the addition of a 5-ton model, the Acme line of trucks, built by the Acme Motor Truck Co., Cadillac, Mich., is completed, the entire range now including trucks of 1, 2, 3½ and 5 tons, all of which are fitted with Continental engines. The 4-ton model has been discontinued, as its place has been taken by the new 5-tonner.

The new model is essentially a heavy-duty job which has been designed with a full realization of the requirements imposed by extremes of service. Oversize units have been selected with the view of securing properly balanced power and capacity. This method of balanced assembly is not a new feature, it is evident in all the Acme models. An example which illustrates the ample factor of safety provided in the 5-tonner is that of the frame. This is 9 in. in depth, made of pressed steel, heat treated.

The engine, a Continental B-2, has cylinders cast in pairs, and is of L-head type with valves on the right side. A centrifugal pump circulates the cooling water and the fin-tube radiator has a cast iron case. The Rayfield carbureter is vacuum-fed from a gasoline tank placed under the driver's seat. The engine is controlled by a built-in loose-ball governor, also of Continental make. An Eisemann magneto with impulse starter furnishes the ignition.

A Borg & Beck 14-in. dry-plate clutch is used, and the selective gearset, located amidships, is of Cotta make, having the gears always in mesh. Both front and rear axles are of Timken make, the former being of conventional I-beam section and the latter of full-floating type.



Accessibility and simplicity are features of the 5-ton Acme chassis

A propeller shaft, made of heat-treated steel, 1½ in. in diameter and equipped with two universal joints, connects the engine with the transmission. From thence power is transmitted through a 1¾ in. shaft, also having two universals, to the rear axle.

Propulsion is taken through radius rods and torque through the springs. The latter are self-lubricating, have bronze bushings and are 4 in. wide by 56 in. long. Front springs are 3 in. wide and 44 in. long. Radius rods are of rolled steel and are semi-flexible, eliminating the use of universals. The frame is also of semi-flexible construction, with gusseted and riveted cross-members. It is made in the Acme factory.

Smith pressed steel wheels with oval hollow spokes are regular equipment. The steering wheel is located on the left side and the steering gear is irreversible nut and screw type of Ross make. Finish is in factory gray with lead priming coat and equipment includes seat, lamps, horn, jack, tools and tool box.

All the trucks in the Acme line are equipped with vacuum fuel feed systems and the three models carried over from last year have individual clutch type gearsets in unit power plants on the two smaller models and amidships on the 3½-tonner. All are of worm-drive type.

Hotchkiss drive is used on both the 1- and 2-tonners, while radius rods are provided to take the propulsion on the 3½-ton truck. The latter form of construction is also employed on the 5-tonner.

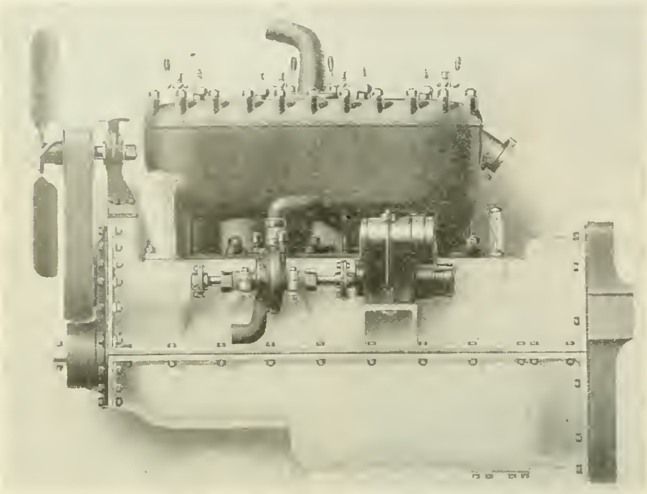
The company specializes in the construction of standard stake bodies to suit the various truck models. These are substantially built of dependable material and are designed to withstand service under extreme conditions.

These bodies are built up of strong maple sub-sills, oak cross-members and oak platforms. All platforms are riveted to a heavy angle-iron frame in such a way as to prevent loosening and to render the body almost indestructible.

Output has been increased very considerably during the past year, the factory floor area having been increased by 27,650 sq. ft. to give a total of 95,000 sq. ft. devoted to the manufacture of motor trucks.

New Wisconsin Engines Designed for Heavy Duty Truck Service

Canton Combined Crane and Engine Stand—K. & J. Adjustable Underframe—
Westinghouse Polishing and Grinding Motors



Type TAU and UAU Wisconsin engine, designed for truck and tractor service

New Wisconsin Engines

A NEW line of 4-cylinder engines, designated the Liberty models, has been developed and is being produced by the Wisconsin Motor Mfg. Co., Milwaukee. These have been designed especially for use in truck and tractor service.

The larger models, known as types RAU and RBU, have bores and strokes of 4¾ x 6 and 5 x 6 in. respectively. They are of L-head type with cylinders cast in pairs and detachable heads, and are designed to operate on the lower grades of fuel now on the market. Crankshafts are of chrome nickel steel 2¼ in. in diameter on the crank pins, and 2¼, 2 5/16 and 2⅜ in. diameter on the front, center and rear main bearings respectively.

Crankcases are made of aluminum and have massive webs supporting the bearings. A large combined breather and oil filler is fitted to the forward end of the engine on the same side as the oil gage, and the flywheel is enclosed in a bell-housing cast integral with the crankcase.

Three points all steel suspension is one of the features. A cast steel or malleable supporting arm is bolted to the bell housing and a large diameter trunnion bearing on the iron front cover forms the forward support. In the remote event of breakage, through accident, replacement is inexpensive.

Camshafts have large diameter bearings, allowing the cams to pass through, and a flange is forged integral for the mounting of the camshaft gear. These shafts are held in position by spring plungers at the forward end.

Valve tappets are of roller type and of extra large diameter. These are hardened, as are the rollers and roller pins, in order to insure long life. Guides are of cast iron and are held in position by crabs and studs. This entire mechanism is enclosed by oil-tight cover plates. Openings are provided into the crankcase to permit of the tappets being lubricated by arising oil vapors. Timing gears have wide faces, helically cut, and the smaller gears are heat-treated drop forgings, while the camshaft gear is cast iron.

All main and connecting rod bearings, as well as camshaft, pump driveshaft and idler gear hearings are of babbitt-lined bronze and main and rod bearings are fitted with laminated shims. Oiling is by a pressure system, a header being cast into the crankcase with leads to the main bearings. Crankshafts are drilled and the oil is forced to the connecting rod bearings and also through tubes on the rods to the wrist pins. The oil pump is surrounded by a screen, which can be easily removed for cleaning.

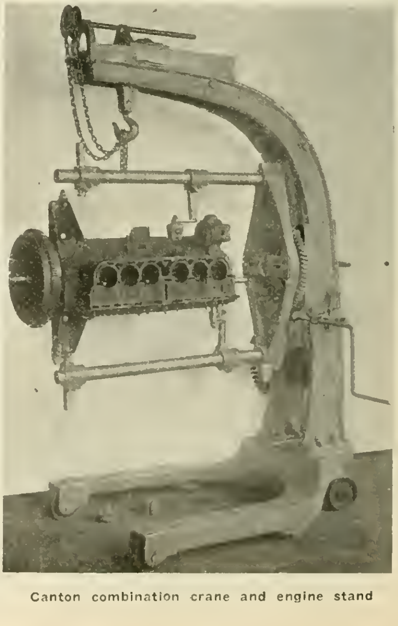
Inlet and exhaust manifolds are cast of iron in one piece and are so designed that the heat of the exhaust assists in the complete vaporization of the fuel.

A substantial fan drive for 2-in. belt is designed to drive the larger type fans used in truck and tractor service. Provision is made for mounting electrical equipment, and these units, together with the carbureter and magneto, are so arranged as to leave all mechanism unusually accessible. Drive for the various forms of governor is also provided.

Engines of 4 x 6 and 4¼ x 6 and 4½ x 6 in. bore and stroke, known as types TAU, UAU and VAU, are also being built. These follow the same general specifications as the others with the exception of the cylinders, which are block cast, and the tappets, which are of mushroom type.

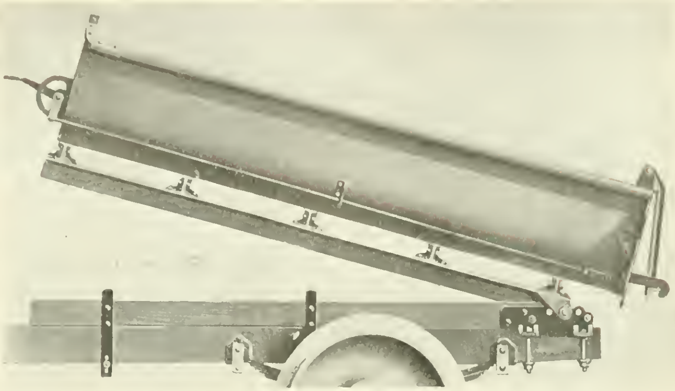
Canton Combination Floor Crane and Engine Stand

AN interesting development of its standard portable floor crane and hoist by the Canton Foundry & Machine Co., Canton, O., involves the embodying with it of a special type of engine stand, as shown in the illustration herewith. The complete outfit is in itself a crane, hoist, truck and complete work-bench for the handling of truck and passenger car engines. An obvious advantage of the equipment is that with it an engine can be lifted out of its position in the chassis, gripped on the stand and taken to



Canton combination crane and engine stand any convenient part of the repairshop. As the stand is revolvable any part of the engine is rendered accessible.

The hoist is of 2-ton capacity, has a clearance or lift of 6 ft. 4 in., and is equipped with Hyatt roller bearings. Apart from the engine stand or bench it constitutes the regular portable crane.



K. & J. standardized body. These rest one within the other for shipping and storage

K. & J. Unit Adjustable Underframe

THE Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, builder of the K. & J. line of standardized truck bodies, specializes in a quadruple adjustment underframe which is applicable to any chassis, regardless of variation in frame dimensions. This has been developed, it is stated, without the addition of weight over that of the ordinary body underframe.

The first adjustment relates to the frame cross-member. By the use of a slot in which a sliding clamp device travels the necessary adjustment to suit any width of chassis may be made. By the use of a series of holes in the hinge casting, adjustment may be made forward and back to place the body in its correct relation to the hoist without interfering with the rear shackle bolt.

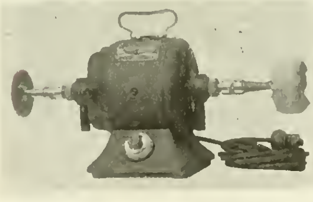
A clamping device incorporating slotted guides at the side sills of the chassis permits of connection to this member regardless of its width. These are the principal adjustments, although further modifications may be obtained by means of a turnbuckle which operates on the hinge rod or tie member.

The underframe is shipped complete with self-contained hinge and extra wide wood cushion sill. The latter is 5 in. wide by 2⅝ in. thick and its increased dimensions are designed to absorb vibration. Although the cushion is extra wide, this width has been attained without affecting wheel clearance.

Body cross-members are 4 in. I-beams having bearing surfaces which extend well out to each side, giving the underframe a wider hold on the body and tending to minimize side-sway. The super-sill to which these members are attached by means of the adjustable device already referred to is a 4-in. Z-bar with its lower flange extending inward to form a bearing surface for extensions of the cross-member connecting device.

The underframe can be mounted without factory facilities, a monkey-wrench being all that is necessary to perform the work. K. & J. standardized bodies with which this frame is furnished nest readily for shipment or storage.

They are made in various types, designed for individual uses and a feature is the countersinking of inside rivets.



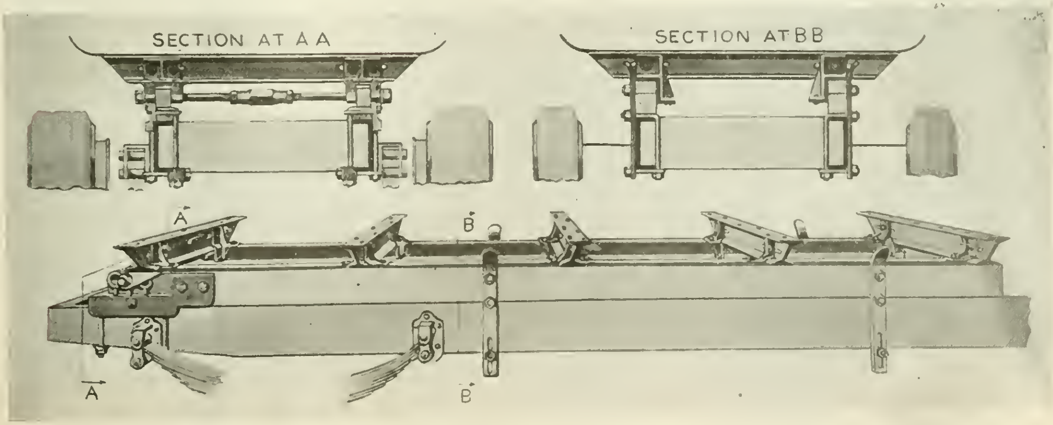
Polishing and grinding motor developed by the Westinghouse company

Westinghouse Polishing and Grinding Motors

THE Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a line of electric motors for use in grinding and polishing operations. These are in use in factories and repairshops for operating on small parts, etc. Features of the motor are the facts that it is completely enclosed, has extra-long dustproof bearings, which practically eliminate end play, and is a single-speed job.

Rubber cushions or bumpers permit the motor to be placed on any surface without marring—it may be fastened down by bolts running through holes in the base if required, although portability is one of its features and a nickeled handle is furnished for carrying. The snap switch is conveniently located and the motor comes complete with a 10-ft. cord and separable plug for connecting to the ordinary lamp socket.

These motors are furnished for either direct or alternating current and are so designed that the grinding and buffing wheels are placed at the correct distance from the base.



K. & J. Unit adjustable underframe, which is applicable to any chassis, irrespective of variation in frame dimensions

Men and Makers

GRAMM-BERNSTEIN MOTOR TRUCK CO. has until recently sold its trucks in the Eastern territory through the Gramm-Bernstein Sales Corp., with offices in New York Philadelphia and Akron. Hereafter it will direct its sales and service for this territory from the factory.

Collier Motor Truck Co.'s new officers are: President, R. A. Palmer; vice-president, S. H. Penfield; secretary and treasurer, J. F. Corl. M. E. Crow has resigned.

Reliance Motor Truck Co., Appleton, Wis., has made the following changes in its officers: John M. Balliet, formerly vice-president, has succeeded Ira L. Miller as president, who retired; M. Weyenberg has been appointed vice-president. The company was organized about a year ago out of the former Racine Motor Truck Co., Racine, Wis., which moved to Appleton. A new plant costing nearly $100,000 was built and equipped for manufacturing motor trucks and a new type of internal spur gear drive rear axle for trucks developed by Piggins Brothers, Racine. This has been perfected and will be produced in quantities together with the Reliance truck, which has now been placed in production.

Comet Automobile Co., Decatur, Ill., will construct a new power and heating plant during the coming summer at a cost of $35,000.

Northway Motors Corp., Natick, Mass., opened its new factory here on Feb. 22 and will be in production shortly. R. E. Northway, formerly of the Northway Motors of Detroit is designer and production manager. The other officers of the company are: James F. Cavanagh, president, and James S. Finneran, secretary and treasurer.

John N. Willys Export Co. has been incorporated in Delaware with a capital of $100,000 by John N. Willys of the Willys-Overland Motor Co., Toledo, Ohio. A. C. Morris, former vice-president of the Chalmers Motor Car Co., is in charge of the new organization and will direct all export work. Mr. Morris sailed last week for Europe, where he will conduct a thorough investigation of conditions.

Service Truck Sales Co., Omaha, Neb., has taken the sale of Service trucks for that territory. E. Bihler has handled these trucks in that territory heretofore. The principals in the new corporation are A. R. Kerr, H. S. Whitehead and A. R. Stone.

Bortner & Hutchinson have secured the distributing agency for the state of Washington on Dart trucks. Salesrooms and service station are maintained at 2212 Fourth Avenue, Seattle.

Automotives Co., Cleveland, Ohio, has taken over the distribution of Selden trucks in Cleveland, Akron, Canton and surrounding counties.

Woodbridge Co., Inc., Boston, Mass., was formed to handle the Denby line of trucks. This truck has formerly been handled by the Henley-Kimball Co. The Woodbridge Co. has leased salesrooms on Massachusetts Avenue.

Gem City Auto Sales Co., Dayton, Ohio, has been organized and will handle Maxwell trucks in that territory. The company is incorporated for $50,000.

Corbitt Motor Truck Co., Henderson, N. C., has assigned the agency for Corbitt trucks in the Metropolitan section to the Corbitt Motor Sales Co., New York City.

Aspinwall Garage has taken on the Oneida truck for Boston and vicinity. Mr. Shea, manager, plans to move the salesrooms for the truck down in the business district near Washington Street.

Atterbury Truck Co. has appointed the following dealers: Dubuy & Wilmer, Baker, Ore.; C. A. McCrae, La Grande, Ore.; Thomas Mason, Canon City, Ore.; Marshfield Auto Co., Marshfield, Ore.; and John Wunderled, Banks, Ore.

Gary Coast Agency, Inc., distributer of Gary trucks, has been organized by J. A. Schneider, H. A. Morrison, A. H. Frees, W. G. Cronkright and E. L. Cramblitt. Salesrooms have been established at 71 Broaderled, Banks, Ore.

Morris-McLoney Co., Springfield, Ill., will distribute Velie and Diamond-T trucks in seven counties of the state.

Turnbull Motor Truck & Wagon Co., Defiance, Ohio, has closed contracts with the following dealers and distributors for

A line-up of sixteen Maxwell 1-ton worm-driven trucks recently delivered to the Department of Water Supply in New York City, where they will be employed for distributing the pipes and other paraphernalia used in the maintenance of the city's water lines. Each of the trucks is equipped with a closed driver's cab and with a low-sided flareboard type of express body the disposition of the Defiance 1½-ton and 2-ton motor trucks: Standard Motor Car Co., Omaha, Neb.; Jackson Motor Co. of Missouri, Kansas City, Mo.; Mound City Buggy & Auto Co., St. Louis; Gale Truck & Supply Co., Sioux City, Iowa; R. D. Rockstead, Milwaukee, Wis.; H. W. Elson, Peoria, Ill.; Frank A. Gillis Motor Sales Co., Ltd., Halifax, N. S.; Ohio Valley Implement & Transfer Co., Cincinnati; Biscoe & Barnes, Mine Run, Va.; Jefferson Cooperage Co., Ranson, W. Va.; D. T. Reaves & Son, South Boston, Va.; Davis & Wood, Charlottesville, Va.; C. D. Nottingham, Sea View, Va.; Ambia Lumber Co., Ambia, Ind.

Fleet Motor Co., New York City, will distribute Tower trucks, made by the Tower Motor Truck Co., Greenville, Mich., for the New York territory.

Hamilton-Whittaker Co. of Indiana will handle Parker trucks in that territory.

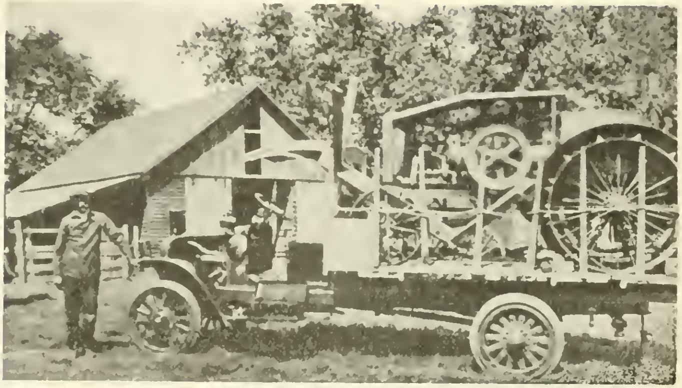
Henry Mossbach Automobile Co., Seattle, Wash., has been organized by Henry Mossbach to handle the Northwest distribution of Rainier U. S. motor trucks, covering Washington, Oregon, Montana and Idaho. The new company has taken a building at Boylston Avenue and Pike Street.

Kelly-Springfield Tire Co. has opened a branch house in Toledo, Ohio. Charles E. Ball, formerly of the Cleveland branch, is general manager and H. H. Pierce, also of Cleveland, office manager.

Herschell-Spillman Co., North Tonawanda, N. Y., has been reincorporated under laws of Massachusetts with a capitalization of $1,750,000 and has taken over all the assets and property of the old company. Plans for extending the plants and increasing production are under consideration. B. W. Birdsall is president and general manager of the new company and associated with him are: Vice-president and chief engineer, E. O. Spillman; treasurer, Thomas C. Perkins; assistant treasurer and secretary, M. J. Tovell.

Candler Radiator Co. has elected the following officers: President, John C. Lodge; vice-president, George V. Candler; secretary and manager, John A. Hinger.

Hartford Auto Parts Co. and the Kinsler-Bennett Co., both manufacturers of universal joints and drives, have been merged into the Hartford Automobile Parts Co. with a capital of $1,500,000. To provide additional manufacturing facilities it has purchased the plant formerly occupied by Billings & Spencer Co., and has taken possession. No change in management is contemplated other than a consolidation of the personnel of those identified with the former companies, and the association of Hollister, White & Co., bankers of Boston, who have a financial interest in the new company. James M. Carney, formerly of the Hartford Auto Parts Co., becomes chairman of the board of the new company, and the following are the officers: President, J. McA. Johnson; vice-president, F. R. Switzer; treasurer, H. A. Bigelow; assistant treasurer, T. C. Hudson. The directors include the above and H. A. Allen of the City Bank & Trust Co., and Shires Morris, president of Hart & Hegeman Co.



Among the many uses to which the farmer is putting the motor truck is that of hauling farm tractors from one farm to another. The above illustration shows the method employed by C. M. William, Bloomington, Ill. The truck used is a Republic fitted with an ordinary stake-sided body. The farm tractor is either hauled up onto the body platform by means of a rope and tackle or under its own power. It is similarly unloaded in the farm-yard where it is delivered by the use of heavy skids hooked on to the rear end of the body floor. Farm tractor dealers also employ the motor truck to deliver the tractors from their plants to the farmers. The use of the truck for this work saves considerable time in that the farm tractor can be delivered direct to the farmer with but one handling. It is not necessary to have three handlings, as is the case when it is first hauled to the railroad, carried by rail to the nearest freight station and finally hauled to the ultimate purchaser

Great Western Truck Body Co., recently organized for the manufacture of truck bodies and other accessories at Omaha, Neb., has leased the four largest buildings of the Iler distillery, closed by the advent of prohibition, and it is planned to have a force of seventy-five men at work in the plant by the first of March. Officers of the new company are: W. G. Shipley, president; Charles Dundy, secretary; C. O'Brien, manager.

C. R. Wilson Body Co.'s five-story brick assembly plant in Detroit burned to the ground Feb. 14. The company's production will not be hampered by the fire, as the work will be taken care of in other plants of the company in Detroit and Bay City.

Torbenson Axle Co., Cleveland, Ohio, contemplates a $75,000 plant extension and has contracted for the immediate construction of a two-story brick, steel and mill constructed building 100 by 140 ft. as an addition to its present plant.

Lauraine Magneto Co., Menominee, Mich., will shortly move to Long Island City, N. Y.

John B. Giovanoli, formerly with the Willys-Overland Co., has become tool superintendent of the Fuller & Sons Co., Kalamazoo, Mich.

Martin J. Coughlin, formerly of the Arrow Specialty Co., is now representing the Arrow Grip Mfg. Co. as Eastern factory representative.

Lieut. Fred M. Young, who has recently returned from overseas duty in the air service, has become associated with the Perfex Radiator Co., Racine, Wis., as sales engineer.

Ackerman Wheel Co., Cleveland, Ohio, has changed its name to the Atlas Wheel Co.

Bartlett Hayward Co., Baltimore, Md., has bought the entire capital stock of the Hammered Piston Ring Co. of America, whose plant is located in Newark, N. J. The purchaser is a concern which manufactured munitions on a large scale and has almost unlimited capacity for the manufacture of piston rings. It contemplates keeping the Newark plant in operation and handling increases in business at one of the Baltimore plants. Active management will remain in the hands of C. F. Hockley, vice-president and general manager, with headquarters at Newark.

Miami Trailer Co., Troy, Ohio, has increased its capital from $25,000 to $100,000.

U. S. Pressed Steel Co. has greatly enlarged its plant at Ypsilanti, Mich. It has installed the conveyor system and is now making steel products for tractor concerns.

Edwin L. Lewis has been appointed manager of the freight transportation department of the Packard Motor Car Co. of Philadelphia, succeeding Ralph F. Roth, who recently resigned to become special representative of the Packard factory in the company's national freight transportation business in this territory.

F. J. Fisher has been released from the service and has resumed his duties as secretary and treasurer of the Standard Motor Truck Co., Detroit.

E. W. Kruste, formerly with the Four Drive Truck Co., has been appointed district representative of the Standard Motor Truck Co., Detroit. His territory includes Wisconsin and Minnesota.

Carl L. Du Puy will sever his connection with the Selden Truck Sales Co., Rochester, N. Y., on March 1 to become actively and financially interested in the Lufkin Lumber Co., Lufkin, Tex., as president and general manager. Mr. Du Puy will be succeeded in the Texas and Oklahoma territory by M. B. Keith, who has been president of the Texas Truck Co., handling the Selden line for the past few years in Dallas, Tex.

Captain W. J. Munro has been released from the army and has joined the advertising force of the General Motors Truck Co., Pontiac, Mich.

C. E. Wirsching has been appointed assistant to E. F. Dayers, general manager of the export department of the Garford Motor Truck Co., Lima, Ohio.

L. B. Casagrande, formerly division sales manager for the Available Truck Co., Chicago, has been appointed general manager and will also have charge of the sales for that company.

Albert L. Jones, for 20 years with the White Co., is in charge of the assembling branch of the Fulton Motor Truck Co. at San Antonio, Tex.

E. C. Learock has been appointed Pacific Coast representative of the Fulton Motor Truck Co., Farmingdale, N. Y.

C. M. Strieby, former advertising manager and sales promotion manager of the Smith Motor Truck Corp., Chicago, has been appointed advertising manager of the Fulton Motor Truck Co.

Birkett L. Williams has been appointed sales manager of the truck department of the Grant Motor Car Corp., Cleveland.

Glenn Hiller, formerly with the Seemann Peters office furniture company, has been made advertising and general sales manager of the Nelson Motor Truck Co., maker of the Jumbo truck. C. H. Tibbitts has been appointed first assistant sales manager.

J. M. Case, former sales and advertising manager of the United Motors Co., Grand Rapids, Mich., has become advertising manager of the Garfield Motor Truck Co., Lima, Ohio.

A. R. Redburn has been appointed sales manager of the truck department of the Waldon W. Shaw Livery Co., Chicago.

Joseph A. Anglada has resigned his position as general manager of the Commercial Car Unit Co., Philadelphia, Pa., but retains the position of consulting engineer with the company. Mr. Anglada will open offices in Philadelphia, New York and Chicago.

Milner T. Lallatte, who has been acting as assistant to division sales manager C. M. Snow, in the Southern territory for the Selden Truck Sales Co., Rochester, N. Y., will succeed Mr. Snow in the Southern territory as division sales manager, with headquarters at Atlanta, Ga.

Clifford M. Snow, who has been Southern division sales manager for the Selden Truck Sales Co., with headquarters at Atlanta, Ga., has been appointed one of Vice-President H. T. Boulden's special field supervisors. On March 1 Mr. Snow will leave for the Pacific coast in the interest of the Selden organization and will establish headquarters in San Francisco, Cal.

Jesse W. Haines, trading under the name of the Oneida Truck Sales Co. of Philadelphia, will act as distributer for Oneida trucks in eastern Pennsylvania and southern New Jersey. Sales and service facilities have been obtained at 158-162 North Twenty-second Street. Charles W. Worsall has been appointed director of sales for local and dealer business.

William McGrath has taken on the Giant truck for the Boston territory. Temporary salesrooms are on Massachusetts Avenue. but he has taken the entire building on Worcester Street, just vacated by a big department store as a storage place.

C. S. Ransom, who took over the Fulton a few weeks ago, has now added the Sanford.

R. G. Ames has joined the Black & Decker Mfg. Co., Baltimore, Md., as branch manager in charge of the Chicago office. For the past 10 years he has been with Edward A. Cassidy Co., New York.

Ralph J. Handy, Detroit, has been made district distributer for the International Motor Truck Co. Salesrooms and service station are at 554-560 Grand River Avenue.

Carl Changstrom, 2020 Farnum Street, Omaha, Neb., has been appointed western sales manager by the Turnbull Motor Truck & Wagon Co., Defiance, Ohio.

McKinney Co., Chicago, has succeeded Charles C. McKinney Service of Chicago. The officers of the McKinney Co. are: C. C. McKinney, president; O. D. McKinney, vice-president; L. J. Sholty, secretary. The company has taken additional space and new quarters at 58 East Washington Street.

Daniel N. Mason, founder of the Mason Tire & Rubber Co., Kent, Ohio, died at his home in Cleveland, Ohio, of pneumonia.

J. R. Dedell, until recently connected with the Corday & Gross Advertising Co., Cleveland, Ohio, has been appointed advertising manager of the Firestone Tire & Rubber Co., Akron, Ohio.

Lieut.-Col. A. B. Jones, vice-president of the B. F. Goodrich Rubber Co., Akron, Ohio, who has just returned home, left here in August to take charge of the motor transport work of the Red Cross in France, when it formed its own department to handle its supplies.

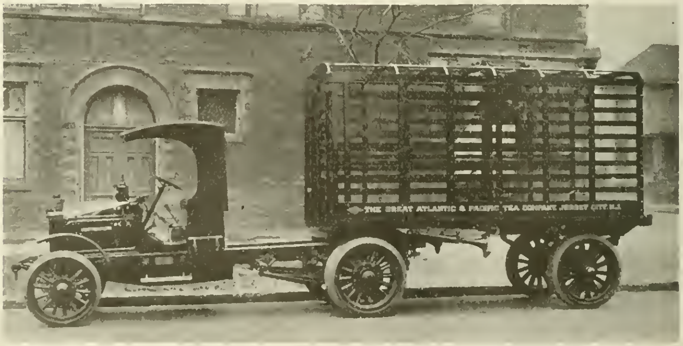
George Wurtz, for several years general Wisconsin traveling representative of the mechanical goods department of the Diamond division of the B. F. Goodrich Co., Akron, Ohio, has been promoted to the post of Eastern manager of the same department, with headquarters in Pittsburgh, Pa.

G. M. Rymarczick, until recently supervising senior inspector of the magneto section of the Bureau of Aircraft Production, is now connected with the Simms Magneto Co., East Orange, N. J., in the capacity of production engineer.

Louis D'Eyraud, Los Angeles, Cal., has taken over the manufacture and distribution of the Clear View Windshield Cleaner. The business has been reorganized with present headquarters at 542-546 West Sixteenth Street.

W. B. Fewell has been appointed sales manager of the Stan-Par axle division of the Standard Parts Co., Cleveland, Ohio.

J. H. Sims, former district manager of the Chevrolet Motor Co., has formed a selling company known as the Superior Motor Sales Co., which will distribute the trucks made by the Superior Motor Truck Co.



While Pierce-Arrow trucks are not recommended as a general thing for use with any kind of trailers, the above illustration shows a 5-tonner hauling a two-wheeled Freuhauf semi-trailer of 8 tons' capacity. Two of the trailers are used with each truck, one being loaded at the warehouse while the other is out making deliveries. The outfit is owned by the Great Atlantic & Pacific Tea Co., with main offices in Jersey City, N. J. While similar outfits have been employed in the New York territory for several years, that shown above is the first to be installed in Detroit for hauling groceries between the company's warehouse and its retail stores

The COMMERCIAL VEHICLE
Read by Business Men

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SERVICE

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"NORMA" Ball Bearings—small, and hidden away in ignition apparatus and lighting generators—are the standards with the builders of high-grade electrical apparatus because their superlative speed qualities and high factor of safety in speed service are known to give maximum security against bearing trouble—which means maximum security against ignition and lighting trouble.

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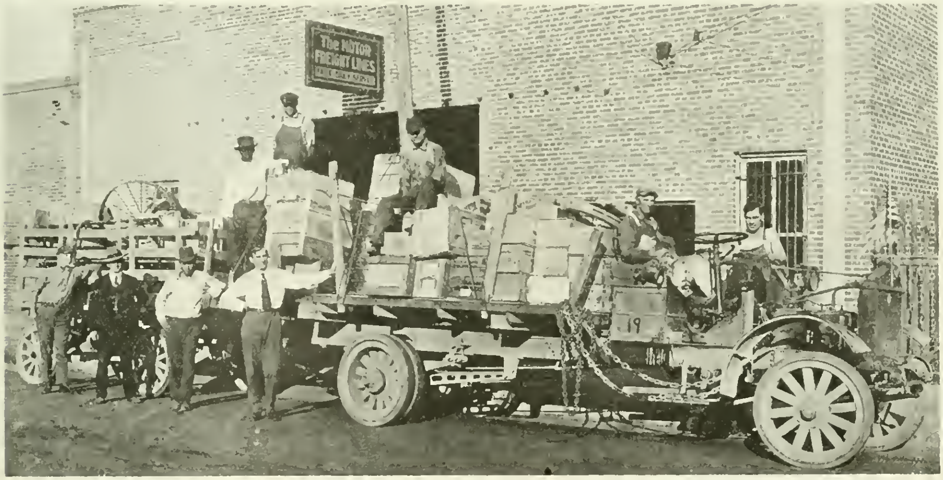
The
COMMERCIAL VEHICLE
Read by Business Men

Vol. XX. March 15, 1919. No. 4



One of the Seldens with its trailer lined up before the company's combined warehouse and garage in Fort Worth. The great diversity of the loads handled is clearly indicated, the truck being loaded with soap and groceries and the trailer with farm implements

Hauling Goods Overland Between Dallas and Fort Worth Proves Successful

Fleet of Thirteen Trucks and Several Trailers Meets Needs of Two Thriving Cities of Great Southwest

By Joseph Husson

ONE of the largest and most successful of the overland motor truck haulage concerns in the great Southwestern territory is the Motor Freight Lines of Dallas, Tex., which operates a fleet of trucks on regular schedule between Dallas and Fort Worth, a distance of 35 miles, and between Dallas and Terrell and Wills Point, respectively 38 and 56 miles almost due east of Dallas. The Motor Freight Lines operates a fleet of thirteen trucks in the overland work in addition to eight converted Ford passenger cars for pick-up work and three trailers employed on the Dallas-Fort Worth run whenever the loads are sufficiently large to warrant their use.

The company was organized in a very business-like way and established a combined freight depot or warehouse and garage in Fort Worth with depots in Dallas and collection stations in Terrell and Wills Point. The line was inaugurated on April 10, 1918, and began operation with three 2-ton Selden trucks.

Thirteen Trucks in Fleet

At the present time the fleet has been increased to thirteen trucks in all, including two more 2-ton Seldens; three 3½-ton Seldens; three more 3½-ton Seldens and two 5-ton Seldens. This fleet is exclusive of one 1-ton trailer which was found far too small for the work in hand; two Troy 3-ton trailers and one Hesse 3-ton trailer. In addition, eight converted Ford chassis made into trucks by the attachment of Smith and Graham Brothers' converters are used for pick-up work in Dallas and Fort Worth and on occasion rented out on a contract basis to outside concerns.

A daily schedule is maintained between Fort Worth and Dallas with one truck running each way every day. The truck leaving Fort Worth at 5 a. m. arrives in Dallas between 7.30 and 8 a. m., and after delivering its load runs on to Wills Point, 56 miles further east, where the deliveries are made direct to the con-

A close-up of the warehouse loading platform, showing one of the trailers being loaded and the dispatcher's office on the platform at the right

View of the platform from one end, showing how the roof columns are kept out of the driveway and the method used in illuminating the interior of the building

signee, there being no general warehouse with an unloading dock in Wills Point.

Trucks Loaded at Night

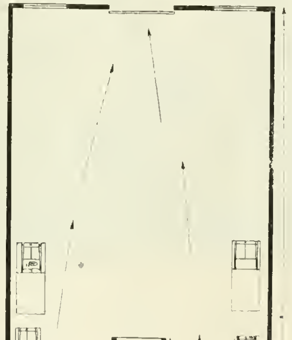
Both of the main line trucks starting out at 5 a. m. in the morning and running to and from Dallas and Fort Worth are loaded at night, the goods having been picked up on the previous afternoon. In some cases where the goods moving between the two cities is of large volume, trailers are employed or two trips made a day.

Loads are carried both ways on the main line between Dallas and Fort Worth. The goods moving from Dallas to Fort Worth consist principally of rolls of print paper, wrapping paper and embossed paper, solid and pneumatic tires and groceries. On the return run, loads from Fort Worth consist principally of lubricating oils, printed paper, hardware, iron and wrought iron products and packing house goods, including fresh meat. From Dallas and Fort Worth the goods carried to Wills Point consist principally of groceries, while the return loads are made up of peaches, strawberries and sweet yams in season and other food products.

Rates Lower Than by Rail

The rates between Dallas and Fort Worth by the trucks of the Motor Freight Lines are 30 cents per 100 lb., which is 5 cents less than by steam railway or interurban express by which means the rate is 35 cents per 100 lb. Special rates of 50 cents per 100 lb. are made for furniture handled between the two points and 40 cents for goods which would be classified under first-class freight rates.

The rates from Dallas to Wills Point are based on 40 cents per 100 lb. for ordinary goods. This rate is also less than by first-class railway freight or interurban electric. The railroad rates between these same points are 46 cents per 100 lb. and the interurban express, 45 cents.



Plan view of the combined warehouse and garage, showing how trucks can enter on one street and go out on the rear street

The growth of the company and its advertising methods to secure its initial business are of interest to other concerns about to enter similar work in other parts of the country. The initial run was somewhat spectacular in nature and was made with two of the 2-ton Selden trucks, which ran from Dallas to Tyler, a distance of 108 miles.

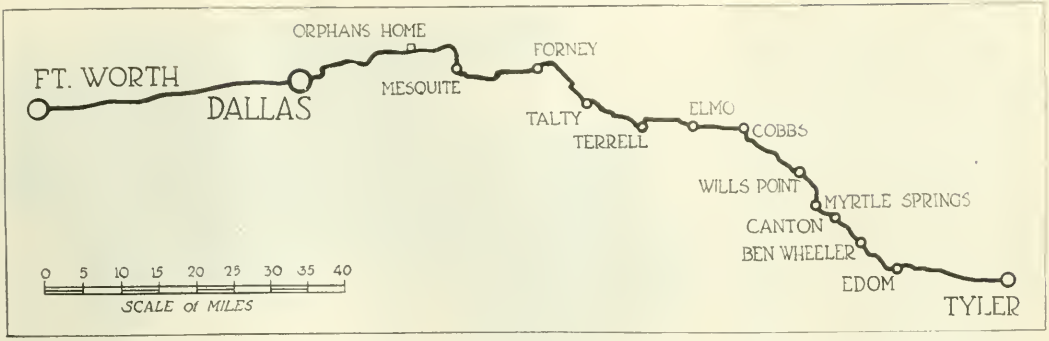
The Initial Run

The two trucks left Dallas at 6 o'clock in the morning of April 10. One was loaded to 2 tons capacity and the other, close to 3 tons. The route lay through Mesquite, where the first delivery, consisting of newspapers from Dallas, was made earlier than it had ever been done by the rail service. The route then lay through Forney, Terrell, Elmo, Cobb, Wills Point and Myrtle Springs.

At noon, Canton, the county seat of Van Zandt County, was reached, where the Canton Board of Trade had prepared a dinner and invited all of the merchant and professional men of the town to inspect the trucks in order to bring home to them the daily service which the truck line offered in bringing their purchases out from the large distributing center of Dallas and taking back various farm produce.

The route then led through Ben Wheeler, where another gathering of citizens was held. Late that afternoon the trucks crossed the Neches River and climbed through the hills to the east and entered Tyler, where the remainder of the goods were delivered to the respective consignees.

The various points touched at between Wills Point and Tyler lie in a rich agricultural country which is not served by any railroad. The roads, however, were poor and many of the bridges later proved unable to withstand the continued traffic of even 2-ton trucks, so that the service to Tyler was temporarily



The routes traversed by the trucks of the Motor Freight Lines, Inc., Dallas, Tex. One route is between Fort Worth and Dallas, 35 miles apart. Trucks leave daily from each end of that route. The other route is from Dallas to Wills Point, a distance of 56 miles. The route to Tyler, 108 miles from Dallas, has been discontinued because of poor roads and weak bridges

discontinued until such time as the roads and bridges could be put into shape. Accordingly, the two lines operating at this writing are from Dallas to Fort Worth and to Wills Point.

Daily Trips Made

At least one trip is made a day to Wills Point and at least one each way between Fort Worth and Dallas, even if the tonnage on hand does not equal the carrying capacity of the trucks.

It is the intention to employ only the 5-ton trucks on the Dallas-Fort Worth road, which was put into fine shape during the summer of 1918 on account of the large amount of government materials passing from Dallas to Fort Worth for the flying camps and cantonments situated within a radius of from 10 to 12 miles of Fort Worth.

Whenever possible, trailers are used on the Dallas-Fort Worth run, and in this work they have proven more economical than running two trucks. There are no serious grades on the route between the two cities, so that the running time with truck and trailer is not much greater than that of the truck alone. The miscellaneous class of goods handled on the trucks and trailers is clearly indicated on page 5 in the illustration of the Selden 5-tonner and its trailer, showing the two vehicles in front of the company's Fort Worth warehouse.

Agent Solicits Trade

On the initial run from Dallas to Tyler, the vice-president of the Motor Freight Lines and several of his assistants accompanied the trucks in a passenger car and sought to obtain business for the new line from all points along the route. Since that time at least one man has been employed solely to get new business and to hold the old by a regularity of truck operation which gives a service upon which the customers can depend.

Although there is some small amount of live stock raised in the territory served, no attempt has been made to handle it on account of the necessity of obtaining health certificates and the lack of proper facilities for cleaning the manure out of the truck bodies and washing them out thoroughly at the stock yards so that other goods, such as groceries and food products, can be carried without contamination.

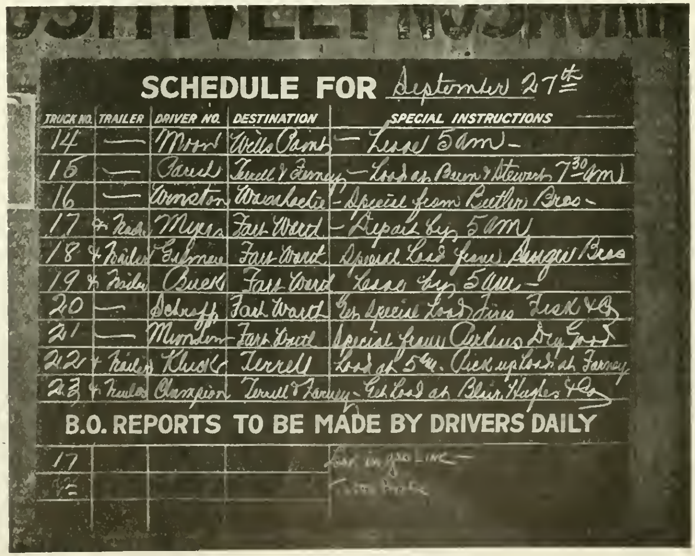
Full insurance is carried on all of the company's trucks and on the goods moved. The safety of the goods in transit is further protected by having each of the truck drivers bonded to an amount of $1,000. To prevent thefts of goods while in transit, drivers must pay for all goods claimed to have been lost. If the driver cannot be forced to pay for goods which he claims were lost, the bond protects the truck owner. The bond costs $5 a man a year for the $1,000 limit.

The truck drivers are paid $4 a day or at the rate of $24 a week for a 10-hour working day. In cases where trucks are out over night, the expenses are paid but no overtime. Helpers are only used on the main line trucks between Dallas and Fort Worth, and are paid at the rate of $2.50 a day.

Combined Garage and Depot

The trucks are maintained in the Fort Worth combined warehouse and garage, the plan of which is shown on page 6. It is admirably laid out for the work in hand. The building is approximately 75 ft. wide and 250 ft. long and runs clear through from one street to the next, with the entrance on one street and the exit on the other. This prevents congestion or loss of time by the vehicles getting into or out of the garage, either empty or with their loads.

All of the loading is done from a large central platform approximately 15 ft. wide and 60 ft. long. This is located in the center of the building and allows for a clear runway of approximately 30 ft. on either side of the platform and the



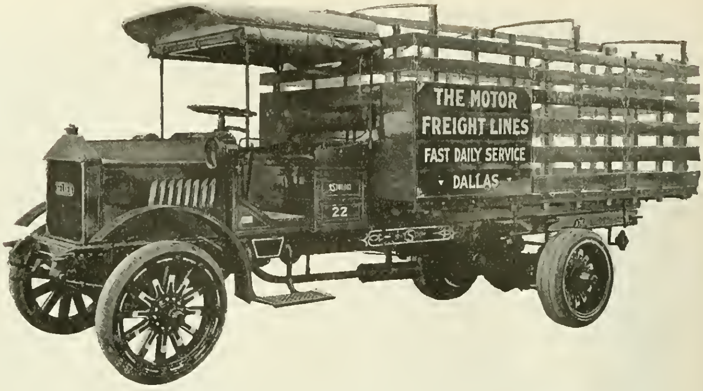
SCHEDULE FOR September 27th

TRUCK NO.	TRAILER	DRIVER NO.	DESTINATION	SPECIAL INSTRUCTIONS
14	—	Moore	Wills Point	— Leave 5 am —
15	—	Carroll	Terrell & Forney	— Load at Baum & Stewart 7^{30} am
16	—	Winston	Waxahachie	— Special from Butler Bros —
17	& Trailer	Myers	Fort Worth	— Depart by 5 am
18	& Trailer	Gilmore	Fort Worth	Special Load from Sanger Bros
19	& Trailer	Buck	Fort Worth	Leave by 5 am —
20	—	Schroff	Fort Worth	Ex Special Load from Fisk & Co
21	—	Munden	Fort Worth	Special from Perkins Dry Goods
22	& Trailer	Kluck	Terrell	Load at 5 am. Pick up load at Forney
23	& Trailer	Champion	Terrell & Forney	Get load at Blair Hughes & Co

B.O. REPORTS TO BE MADE BY DRIVERS DAILY

17				Leak in gas line —
12				[illegible]

The novel blackboard used in the warehouse at Fort Worth to show how the trucks are scheduled for each day, their drivers, destination and special instructions for the drivers. Those which are pulling trailers are also stated



One of the 3½-ton Seldens used in the Fort Worth-Dallas run of 35 miles each way. The stake units of the body are removable so that side loading is made possible

corresponding wall of the building. The trucks are garaged close to the walls of the building. Those being loaded from the platform run up parallel with the platform and have the goods put onto them from the side instead of the rear end of the truck. By this method, there is an aisle between the truck or trailer being loaded at the platform and any of the trucks garaged along the wall on the same side, and this aisle is of sufficient width to permit a truck running clear through the building from the entrance to the exit. One of the trailers being loaded at the platform with soap and pneumatic tires and a general view of the platform itself are shown in the two illustrations at the top of page 6.

Office in Garage

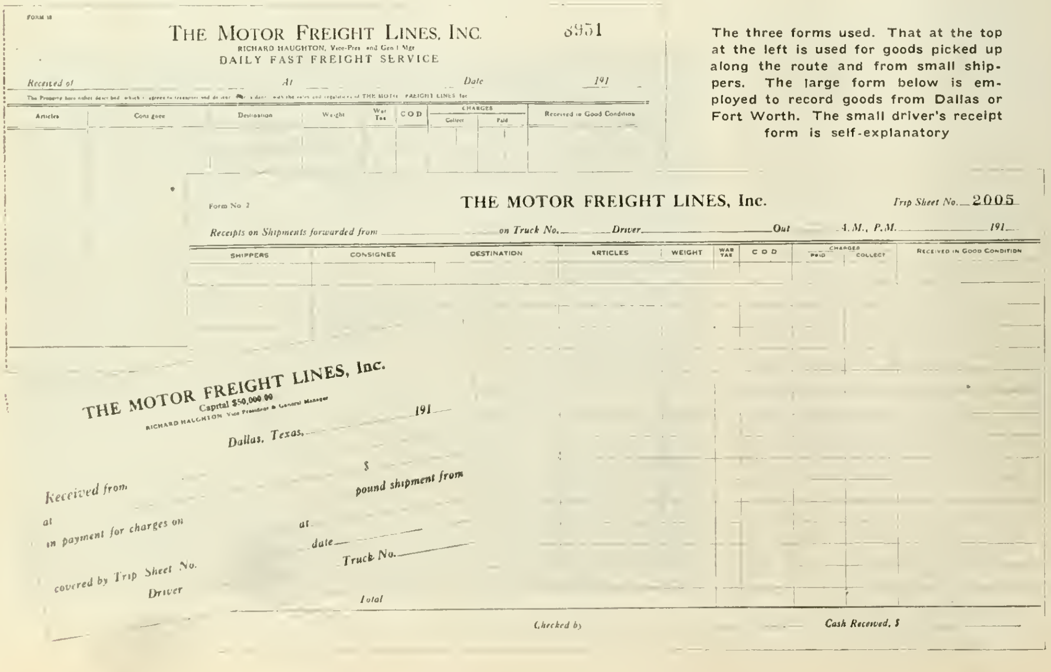
The company's office is located at one end of the building to the right of the entrance door. On the opposite side a small shop, with drill press, emery wheel and similar tools, is fitted out and divided off from the rest of the floor by means of a screened partition. Oils and greases are kept in a separate room directly in back of the office.

Another feature of the combined warehouse and garage is the schedule board illustrated at the bottom of page 7. It is a large blackboard on which the runs to which each of the trucks is assigned are written on one day for the next day's work, so that the driver always knows his work for the following day. As shown, the schedule board is ruled off by lines into five columns, the first giving the truck number; the second, whether or not a trailer is to be used; the third, the driver's name; the fourth, the destination of the truck or truck and trailer, and the fifth column, for special instructions.

Blackboard Advantages

Under the heading of special instructions are written down any unusual information which the driver must be in possession of in order to carry out his work properly. For instance, some goods shipped by one concern may have to be picked up at the place of business or factory of another concern, and if the driver is not aware of this he would naturally lose considerable time by going to the place of the shipper and then having to double back on his route to reach the point from which the goods must be loaded. The schedule blackboard avoids delays of that nature.

The information on the board serves to give a tangible illustration of the work to be done, and also serves as a record which enables the man in charge of the trucks to tell about where each of the vehicles is at any particular time of the day. The lower part of the blackboard is reserved for a space to be used daily by the drivers in noting any operating trouble they have experienced during the day or to indicate minor repairs or adjustments which they consider necessary, such as a leaky gasoline line or a loose brake rod connection.



FORM 18

THE MOTOR FREIGHT LINES, INC. 8951

RICHARD HAUGHTON, Vice-Pres. and Gen'l Mgr.

DAILY FAST FREIGHT SERVICE

Received of ____ *At* ____ *Date* ____ *191*

Articles	Consignee	Destination	Weight	War Tax	COD	Charges		Received in Good Condition
						Collect	Paid	

Form No. 2

THE MOTOR FREIGHT LINES, Inc.

Trip Sheet No. 2005

Receipts on Shipments forwarded from ____ *on Truck No.* ____ *Driver* ____ *Out* ____ *A. M., P. M.* ____ *191*

SHIPPERS	CONSIGNEE	DESTINATION	ARTICLES	WEIGHT	WAR TAX	C O D	CHARGES		RECEIVED IN GOOD CONDITION
							PAID	COLLECT	

Total

Checked by ____ *Cash Received, $* ____

THE MOTOR FREIGHT LINES, Inc.

Capital $50,000.00

RICHARD HAUGHTON Vice President & General Manager

Dallas, Texas, ____ *191*

Received from ____ *$* ____

at ____ *pound shipment from*

in payment for charges on ____ *at* ____

date ____

covered by Trip Sheet No. ____ *Truck No.* ____

Driver ____

The three forms used. That at the top at the left is used for goods picked up along the route and from small shippers. The large form below is employed to record goods from Dallas or Fort Worth. The small driver's receipt form is self-explanatory

The warehouse shop serves only to make minor repairs or adjustments on the trucks, any larger work being done at the service station of the truck maker in Dallas. All of the minor repair work of the fleet of thirteen trucks is accomplished by one boss mechanic and one extra mechanic or helper.

Aside from the actual operation and maintenance of the trucks, the other most important consideration is the method of accounting and the various forms used in keeping a complete record of the goods handled. This has been worked out very satisfactorily by the Motor Freight Lines by the use of three forms which are illustrated at the bottom of page 8. One of the forms is used for goods picked up from Dallas. It is filled out in triplicate, one copy going to the driver, one for the use of the office force and one for filing as a record and for insurance.

Accounting Form Details

As shown, the form is numbered and provided with spaces at the top for the trip covered, the number of the truck used, its driver and the time of the beginning and end of the trip. Below are ten vertical columns with headings for the shipper's name, the consignee's name, the destination of the goods; the articles comprising the shipment and their weight; a space for the war tax; another for C.O.D.'s and two for charges, one paid and one collect, and a space for the signature of the consignee.

The latter column is important to prevent subsequent claims for damages, and on the back of the large sheet is a list of Instructions, of which one is as follows: "Be sure to have the consignee sign the sheet plainly and see that goods are in good condition when delivering." If the consignee signs the sheet as directed that the goods were received in good condition, he cannot subsequently make a claim for damages or breakage. Another one of the instructions states: "Drivers must in no event fail to have this sheet signed by the cashier when checking up after making the trip." This instruction is designed for the benefit of the truck company and for the driver in order to insure that all money collected is turned in at the end of the day's work.

Special attention is called to the column on the war tax, as a great number of the concerns in overland haulage include the war tax of 3 per cent on goods hauled by trucks running as common carriers in competition with other forms of steam, electric or water transportation, in the total charge instead of giving the tax separately. Perhaps the method of giving the tax separately best indicates to the shipper that it is a charge outside of the control of the truckman and an additional item which is not retained by the truck owner but passed along to the proper internal revenue department.

The second of the forms is also numbered and made out in triplicate, and is similar to the first form except as to size. It is used for recording goods shipped by small shippers and for pickups on the route other than at the terminals.

The third form is a shipper's receipt made out in triplicate by the driver and delivered to the shipper at the time his goods are picked up. It has spaces for the date; the name of the shipper; the character and weight of the shipment and for the amount of the charges paid on the goods when received. It also has a space for recording the number of the large trip sheet on which the goods handled by the truck or truck and trailer on any particular day is recorded. This form serves as a protection to the shipper and also as a check on the driver's route trip sheets and on the money turned in at the end of the day's work.

COLUMBUS PROMISED RURAL TRUCK EXPRESS

COLUMBUS, OHIO, March 2—Establishment of sixty mail routes in Ohio and carrying country produce from the door of the farmer to the door of the city consumer and goods from city stores to the farm has been promised Ohio by James I. Blakslee, Fourth Assistant Postmaster General, who spoke at a session of the Good Roads Federation Groups.

One Truck Gave Victory at Chateau-Thierry

THE victory at Chateau-Thierry—that furious engagement which turned the tide of the war forever in favor of the Allies—was made possible through the performance of a single motor truck. How this came about is related by Captain Guy A. Whitcomb of the Motor Transport Corps.

"The marines, who were smashing the last German offensive, were running short of machine gun ammunition," said Captain Whitcomb. "Their commander telephoned back for more. The motor transport commander called for four volunteers from among his ninety trucks—and every driver volunteered.

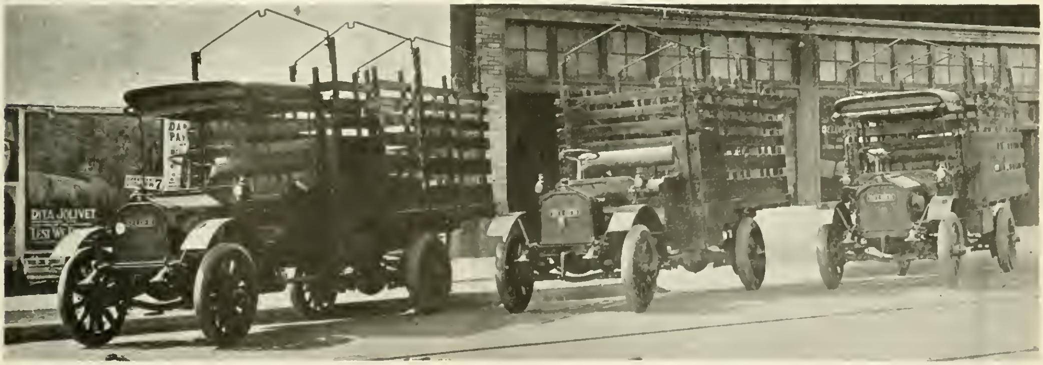
"He chose four, loaded the trucks with 50,000 rounds apiece of machine gun bandoleer ammunition, and they set out—four trucks made in Detroit, turned out of the Packard factory just a few months before. Three of them were caught in the German barrage and their cargoes blown up and their drivers killed. The fourth made his way through with the priceless 50,000 rounds that put the finishing touch on the American victory and saved the day at Chateau-Thierry.

"The driver made his way back to the transport park, and reported in these words: 'Sergeant Anderson reports, sir, the delivery of 50,000 rounds, and requests permission to make another trip.' But his captain noticed the blood pouring from the sergeant's wounds, ordered him to the hospital, and the brave Anderson died 10 hr. later from fourteen wounds."

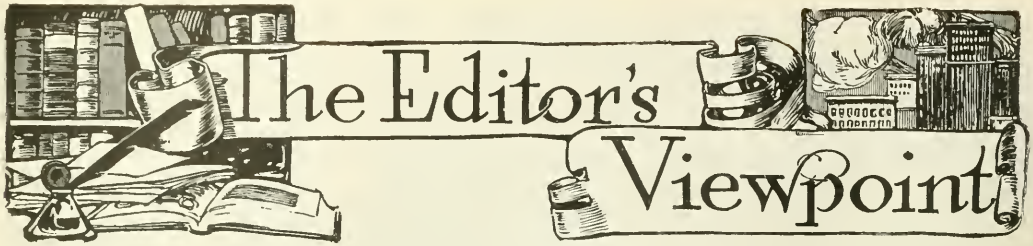
Captain Whitcomb said that 14 per cent of Pershing's entire force is classed in the Motor Transport Corps, and that the number of trucks under the American flag overseas would be hardly believable to most people.

WISCONSIN ROAD REPORTS

MILWAUKEE, WIS., March 2—The Milwaukee Weather Bureau is issuing a daily bulletin on road conditions in Wisconsin. The service is appreciated particularly by business houses of Milwaukee getting deliveries by trucks.



The first three Selden 2-tonners purchased by the Motor Freight Lines for its overland haulage operations. Two of the trucks made their initial Dallas to Tyler run of 108 miles on April 10, 1918. Bulky goods are protected from the weather by stretching a tarpaulin over the inverted V-shaped iron rods placed on top of three opposite sets of body side stakes



The Editor's Viewpoint

Overland Haulage Companies, Beware!

NOW that the war is over, it seems that some of the large railroads are again exhibiting their pre-war tactics of combating successful motor truck lines by every means within their power. Every motor truck owner who has carried any goods overland when the goods could have been shipped by rail knows that in the pre-war days he at once aroused the antagonism of the railways. When the war was upon us and the railroads were burdened with more than they could carry, they appeared to be very much in favor of turning over their unprofitable short-haul shipments to the motor truck.

Now that conditions are once again becoming normal, the railroads seem to have reverted to their old scheme of doing business, namely, to take every bit of business that they can get, no matter whether it is profitable or not. If a successful truck line happens to be carrying some goods which could be moved by rail, even at a loss, an attempt is made to put that truck line out of business.

This is apparently what has happened to the best known of the several successful motor truck lines operating between New York and Philadelphia. In the old days, restrictive legislation or even threats to the shippers that the railroad company would not handle other longer-distance rail shipments or accidentally on purpose losing the goods received in some terminal were the general methods employed.

In the present instance, however, a new method has been used, that of urging the expansion of the truck company, providing the necessary money for that development and incidentally obtaining a majority of the stock and finally voting the company out of existence, and in that way ending the truck competition.

This is seemingly a new method of getting rid of bothersome motor truck lines which are giving shippers a quick, cheap and reliable transportation service. The railroads have worked it successfully in Philadelphia and there is no reason why it should not be expected to show itself in other parts of the country where large truck lines are now operating on a sound financial basis and paying dividends to their stockholders by carrying a large volume of business. It is a method for which other similar truck owners should be on the lookout.

The Chicago Truck Fiasco

THE instance cited above is but one of many where the railroads have resorted to duplicity to gain their ends. Perhaps the first step in this regard was the Chicago fiasco of some months back when the editor of one of our contemporaries spent several months at the head of a large committee to work out a plan whereby all of the less-carload shipments originating and delivered within a radius of 50 miles of that city could be turned over to motor trucks and the railroads allowed to concentrate on their better paying long-haul work. This move was urged by the Highways Transport Committee then in existence in Washington and was welcomed by the railroads.

After the plan was worked out and agreed upon as entirely feasible by all of the business men to whom it was submitted for approval, the Highways Transport Committee shirked the responsibility for putting it into effect by saying that the editor was entirely mistaken in his ideas on the subject and the railroads by saying that they never intended to accept it except in the utmost emergency, and then only as a temporary war-time measure.

Of course, all the time, money and effort expended by the committee which worked out the plan were wasted, for the time being at least; but the experience will be very valuable in the days to come, for those with a vision can foresee the time when transportation over the highways will outstrip that of the present day over the rails!

That day may not come in the next decade, but it is surely on the way, and is just as certain as the setting of the sun in the west. When it does arrive, and it will come in direct proportion with the betterment of the roads, the motor truck will have in reality come into its own.

Then every lane and byway of the nation will have to bear its burden of motor truck traffic. Then, too, the business of highway transportation will be builded on a firm basis, as it already is in some parts of the country to-day. Then the motor truck will be one of the greatest servants of mankind, providing transport to the industries of raw products, of finished goods and of the food we eat, the clothes we wear and everything which we use in our daily lives.

$385,000,000 Already in Sight for 1919 Roads

Federal Aid Funds for 3 Years Alone Total $574,000,000

THERE will be available at least $574,000,000 for co-operative road building in the United States during the next 3 years, according to the terms of the Federal Aid Road Act. President Wilson has signed the Post Office Appropriation Bill carrying an amendment providing $209,000,000 in addition to the Federal Aid money previously appropriated and which will be spent dollar for dollar with state money on the construction of Federal Aid roads up to the end of the fiscal year of 1921 or June 30, 1922.

The total thus made available is the largest ever appropriated for road construction during a 3-year period by any government, and enables the government and state authorities to carry out a road-building program of a magnitude never before equalled.

As large as the total of $574,000,000 is, it is quite possible that almost as much will be spent on road work in the United States in the year 1919 alone. On reports received from the various State Highway Departments, the Bureau of Public Roads has estimated that the 1919 expenditures for highways and bridges will be at least $385.000,000, or $110,000,000 more than the average yearly expenditure in 1916 and 1917.

One of the most important features of the Post Office Appropriation Bill furnishing the $209,000,000 additional for road work is that it broadens the definition of a rural post road, under which class a highway had to qualify to receive the benefits of the Federal Aid act. Under the old act it was required that mail should actually be carried on the roads or that there should be a reasonable prospect that mail would be carried on it within a short time after the improvement was made.

Under the new interpretation, a rural post road is construed to mean any public road a major portion of which is now used or can be used, or forms a connecting link not to exceed 10 miles in length, of any road or roads now or hereafter used for the transportation of United States mail. It excludes every street and road in a place having a population as shown by the latest available Federal census of 2500 or more, except that portion of any such street or road along which the houses average more than 200 ft. apart.

Of the $209,000,000 added to the funds available under the Federal Road Aid Act, the new law makes $9,000,000 available for expenditure by the Secretary of Agriculture for roads within or partly within the national forests. In addition, it also raises the Government limit of contribution from not to exceed $10,000 a mile to not to exceed $20,000 a mile, thus taking into account the higher present cost of both labor and material and the necessity for a more costly and stronger road on account of the greatly increased motor truck traffic throughout the entire nation and the great possibilities for further increases during the next half decade.

The original Federal Aid Road Act passed in July, 1916, appropriated $75,000,000 for the 5-year period ending June 30, 1921, and $10,000,000 for forest road building. Not over $3,000,000 of the fund had been spent up to the present time on account of the war, so that $82,000,000, plus $209,000,000, or a total of $291,000,000 will be the Federal fund available during the next 3 years exclusive of any state or county appropriations.

Approximate Apportionment of Funds Under Federal Aid Road Act and Latest Amendment

States	Amount Available for fiscal years 1919 1917, 1918,	$50,000,000 for fiscal Year 1919	Fiscal year Allotment 1920	Fiscal Year 1920 $75,000,000	Fiscal Year 1921 Allotment	Fiscal Year 1921 $75,000,000	Total
Alabama	$625,903.17	$1,050,264.10	$420,105.64	$1,575,396.15	$525,132.05	$1,575,396.15	$5,772,197.26
Arizona	411,081.14	685,043.57	274,017.43	1,027,565.36	342,521.79	1,027,565.36	3,767,794.65
Arkansas	498,085.77	840,229.53	336,091.81	1,260,344.30	420,114.76	1,260,344.30	4,615,210.47
California	909,358.99	1,524,248.30	609,699.32	2,286,372.45	762,124.15	2,286,372.45	8,378,175.66
Colorado	508,349.34	867,570.90	347,028.36	1,301,356.35	433,785.45	1,301,356.35	4,759,446.75
Connecticut	185,487.77	307,064.65	122,825.86	460,596.98	153,532.32	460,596.98	1,690,104.56
Delaware	48,965.10	81,384.45	32,553.78	122,076.68	40,692.22	122,076.68	447,748.91
Florida	338,652.69	573,797.20	229,518.88	860,695.80	286,898.60	860,695.80	3,150,258.97
Georgia	806,897.89	1,346,044.75	538,417.90	2,019,067.12	673,022.38	2,019,067.12	7,402,517.16
Idaho	363,862.05	610,509.27	244,203.71	915,763.91	305,254.64	915,763.91	3,355,357.49
Illinois	1,321,102.17	2,185,550.65	874,220.26	3,278,325.97	1,092,775.32	3,278,325.97	12,030,300.34
Indiana	813,473.04	1,349,919.40	539,967.76	2,024,879.10	674,959.70	2,024,879.10	7,428,078.10
Iowa	873,180.41	1,443,046.20	577,218.48	2,164,569.30	721,523.10	2,164,569.30	7,944,106.79
Kansas	858,754.08	1,436,313.93	574,525.57	2,154,470.89	718,156.96	2,154,470.89	7,896,692.32
Kentucky	585,400.35	976,865.17	390,746.07	1,465,297.76	488,432.59	1,465,297.76	5,372,039.70
Louisiana	406,179.27	680,729.03	272,291.61	1,021,093.55	340,364.51	1,021,093.55	3,741,751.52
Maine	290,161.92	481,231.35	192,492.62	721,847.33	240,615.78	721,847.33	2,648,196.53
Maryland	263,013.09	434,737.02	173,894.81	652,105.53	217,368.51	652,105.53	2,393,224.49
Massachusetts	442,814.70	736,883.30	294,753.32	1,105,324.95	368,441.65	1,105,324.95	4,053,542.87
Michigan	872,707.53	1,447,213.80	578,885.52	2,170,820.70	723,606.90	2,170,820.70	7,964,055.15
Minnesota	853,047.58	1,420,774.53	568,309.81	2,131,161.80	710,387.26	2,131,161.80	7,814,642.78
Mississippi	535,469.12	899,488.26	359,795.31	1,349,232.39	449,744.14	1,349,232.39	4,942,961.61
Missouri	1,017,765.21	1,695,314.11	678,125.64	2,542,971.14	847,657.05	2,542,971.14	9,324,804.29
Montana	593,382.46	999,467.15	399,786.86	1,499,200.73	499,733.58	1,499,200.73	5,490,771.51
Nebraska	639,757.68	1,066,642.07	426,656.83	1,599,963.10	533,321.04	1,599,963.10	5,866,303.82
Nevada	386,424.72	642,933.45	257,173.38	964,400.18	321,466.72	964,400.18	3,536,798.63
New Hampshire	125,599.97	207,810.38	83,124.15	311,715.57	103,905.19	311,715.57	1,143,870.83
New Jersey	353,995.26	594,050.80	237,620.32	891,076.20	297,025.40	891,076.20	3,265,844.18
New Mexico	474,847.98	798,785.78	319,514.31	1,198,178.67	399,392.89	1,198,178.67	4,388,898.30
New York	1,501,835.01	2,487,956.40	995,182.56	3,731,934.60	1,243,978.20	3,731,934.60	13,692,821.37
North Carolina	685,702.23	1,139,977.47	455,990.99	1,709,966.20	569,988.74	1,709,966.20	6,271,591.83
North Dakota	458,015.09	768,360.27	307,344.11	1,152,540.42	384,180.14	1,152,540.42	4,222,980.46
Ohio	1,118,759.68	1,854,462.47	741,784.99	2,781,693.71	927,231.24	2,781,693.71	10,205,625.80
Oklahoma	691,906.34	1,153,055.50	461,222.20	1,729,583.25	576,527.75	1,729,583.25	6,341,878.29
Oregon	472,394.85	787,459.10	314,983.64	1,181,188.65	393,729.55	1,181,188.65	4,330,944.44
Pennsylvania	1,382,078.29	2,296,075.85	918,430.34	3,444,113.77	1,148,037.92	3,444,113.77	12,632,849.94
Rhode Island	69,969.51	116,530.95	46,612.38	174,796.43	58,265.48	174,796.43	640,971.18
South Carolina	430,437.00	717,297.05	286,918.82	1,075,945.58	358,648.52	1,075,945.58	3,945,192.55
South Dakota	486,013.67	810,720.68	324,288.27	1,216,081.02	405,360.34	1,215,081.02	4,458,545.00
Tennessee	683,123.95	1,132,103.50	452,841.40	1,698,155.25	566,051.75	1,698,155.25	6,230,431.10
Texas	1,752,770.13	2,926,219.37	1,170,487.75	4,389,329.05	1,463,109.69	4,389,329.05	16,091,245.04
Utah	341,613.62	567,592.10	227,036.84	851,388.15	283,796.05	851,388.15	3,122,814.91
Vermont	136,662.33	225,987.70	90,395.08	338,981.55	112,993.85	338,981.55	1,244,002.06
Virginia	597,102.90	992,052.95	396,821.18	1,488,079.43	496,026.48	1,488,079.43	5,458,162.37
Washington	432,183.03	722,367.25	288,946.90	1,083,550.87	361,183.62	1,083,550.87	3,971,782.54
West Virginia	319,525.27	532,009.10	212,803.64	798,013.65	266,004.55	798,013.65	2,926,369.86
Wisconsin	767,790.41	1,272,946.53	509,178.61	1,909,419.79	636,473.26	1,909,419.79	7,005,228.39
Wyoming	367,396.24	612,912.45	245,164.98	919,368.68	306,456.22	919,368.68	3,370,667.25
Total	$29,100,000.00	$48,500,000.00	$19,400,000.00	$72,750,000.00	$24,250,000.00	$72,750,000.00	$266,750,000.00
Administration	900,000.00	1,500,000.00	600,000.00	2,250,000.00	750,000.00	2,250,000.00	8,250,000.00
Grand total	$30,000,000.00	$50,000,000.00	$20,000,000.00	$75,000,000.00	$25,000,000.00	$75,000,000.00	$275,000,000.00

Export Managers Hold Big Conference

Meeting Enthusiastic on Overseas Possibilities

NEW YORK, March 8—Yesterday's convention of export managers, held under the auspices of the National Automobile Chamber of Commerce, proved to be a remarkable gathering, not only because the attendance was unusually large and included delegates representing all the leading car and truck makers of the country, but for the reason that the enthusiasm displayed and the active interest evinced in the future of the United States as an international trader presaged a brilliant future for our overseas business. There was every evidence that the subject of export trade had received close attention from the delegates before they met in convention, and a note of optimism prevailed throughout.

J. Walter Drake, in his introductory address, made two statements which riveted the attention of the gathering. He said "America has heretofore been a sleeping giant in the matter of export trade," and going on to indicate the country's future in foreign business and the spirit in which we should engage in overseas commerce, he added that we must "keep our ideals high and our hands clean."

He also remarked that there was an evident reluctance among factory executives to accept the statements of their export men concerning minor differences which were needed to render regular products suitable for foreign use, and counseled a get-together policy in mutual interests.

Alfred Reeves indicated that although it was too soon to make a definite statement, yet there was every indication Washington would rule that trucks and cars exported either direct from the factories or through recognized agents or shippers would be tax-exempt.

Roy S. McElwee, assistant chief of the Bureau of Foreign and Domestic Commerce, in the course of an address in which he dealt with many aspects of the development of a national export business, insisted on the rendering of prompt and efficient service as being fundamental to the United States, maintaining its position as the leading exporter of the world. He suggested that the establishment of an "embryo home office" in the country in which it was sought to do business was a primary essential and that a practicable solution of the problem for the smaller manufacturer was that of co-operation with others similarly situated. He insisted that the "Orphan Annies" of the trade, the trucks or cars which did not truly represent the best of the country's standards in their respective classes, had no place in the industry's scheme for foreign trade expansion for the reason that a single failure meant that all American products suffered in reputation by inference.

Louis Domeratsky, of the Division of Foreign Tariffs of the Bureau of Foreign and Domestic Commerce, gave much useful information on the subject of European embargoes and high tariffs. From his remarks it may be safely assumed that although the position is not yet quite clear these restrictions are but temporary.

Instructive talks on the operation of the Webb-Pomerene law, which permits of the combination of firms for export trade, the position of trademarks in foreign countries, the present indefinite position of our shipping, foreign selling problems, packing for export, publicity in foreign lands and the question of straight-side tires and right-hand drive were given by experts.

TRUCKS EXPEDITE MAIL

ST. LOUIS, MO., March 2—Motor truck mail service will be established between the St. Louis, Mo., post office and the post office of East St. Louis, Ill.; the National Stockyards in East St. Louis and other points in the vicinity, as soon as the equipment can be obtained. The trucks will be obtained by the Post Office Department from the War Department.

OHIO TO TAX OVERLOADS

COLUMBUS, OHIO, March 7—The Ohio State Legislature is preparing a law levying heavy penalties on motor truck owners who carry excess loads and who travel at an excessive speed over Ohio highways. A draft of a proposed law is now before the highway committee of the state senate.

Ohio has a law limiting the weight of trucks and loads to 12 tons. The highway committee has been informed that this law is not being observed. While considering the maintenance of highways by a patrol system, the legislature will also take up the question of putting teeth in the present law against excess loads and speed.

Coming Events

March 15-22....	Harrisburg, Pa., Motor Truck Show, Overland Bldg.
March 17-18.....	Peoria, Ill., Motor Truck Show.
March 17-22....	Philadelphia, Pa., Motor Truck Show, Commercial Museum.
March 20-22....	Champion, Ill., Motor Truck Show, Gymnasium of the University of Illinois.
March 21.......	New York City, National Highway Traffic Assn., Meeting, Automobile Club of America.
April 1-5.......	Brooklyn, N. Y., Motor Truck Show, Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory
April 3.........	Macon, Ga., Motor Truck Demonstration Day.
April 5-12......	Montreal, Can., Motor Truck Show, Victoria Rink. Wilmington, Del., Motor Truck Show Hotel du Pont.
April 10-12.....	Philadelphia, Pa., Meeting Motor Truck Sales Managers, Bellevue Stratford Hotel.
April 21-26.....	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.
May 10-17......	Bristol, Va.-Tenn., Great Southern Automotive Show.
May 20-24......	Quebec, Can., Good Roads Congress

Export Vehicles and Tires Not Taxed

N. A. C. C. Interprets Certain Phases of Revenue Law

NEW YORK CITY, March 5—Although full interpretations of the various sections of the new revenue act had not been given, the National Automobile Chamber of Commerce has stated that there is every probability that certain phases of the law will be interpreted as given below.

All export of vehicles and tires will be exempt from the tax, no matter whether the export is made direct by the factory or through any number of intermediaries. Shipments to the Philippine Islands, the Virgin Islands and Porto Rico are considered export shipments. The Panama Canal Zone, Alaska and Hawaii are considered parts of the United States.

WATSON BUYS EMPIRE AXLE

DUNKIRK, N. Y., March 10—The plant and other assets of the Empire Axle Co. of this city have been sold to the Watson Wagon Co. of Canastota, N. Y., for $10,000 subject to the liens against the Empire company. The sale was made by John T. Abbott of Buffalo, N. Y., trustee, after the approval of the company's creditors. The old company will be re-organized and the plant operated on a more extensive scale than before, it being the intention of the Watson company to bring out a new line of motor trucks employing the Empire axle.

HUFFMAN TRUCK AT OMAHA SHOW

OMAHA, NEB., March 10—The Fourteenth Annual Automobile Show opened here to-day with indications that it will be the most successful ever held. Nineteen dealers are showing trucks this year with thirty-eight trucks representing twenty-four makes.

The Huffman truck appeared on exhibition for the first time at this show, since Huffman Brothers of Omaha recently purchased the Elkhart plant at Elkhart, Ind., and began manufacturing under their own name.

The list of truck exhibits follows: J. T. Stewart Motor Co., Pierce-Arrow, 1; Bethlehem, 1; Nebraska Buick Auto Co., G. M. C., 2; Douglas Motors Corp., Douglas, 2; Odell-Hamilton Co., Autocar, 1; Mack, 1; Nebraska White Co., White, 2; C. J. Dutton Automotive Co., Kissel, 2; Standard Motor Car Co., Indiana, 1; Panhard, 1; Defiance, 1; Card-Adams Motor Co., Denby, 2; O'Brien-Davis-Coad Co., Dodge Brothers, 2; Hayward-Cameron Motor Co., Chevrolet, 1; Andrew Murphy & Son, Republic, 2; W. L. Huffman Auto Co., Huffman, 2; International Harvester Co., International, 2; Truck and Tractor Corp., Master, 2; Nash Sales Co., Nash, 2; Jones-Opper Co., Reo, 1; Stewart, 1; Nebraska Oldsmobile Co., Oldsmobile, 2; Mid-City Motor Supply Co., Maxwell, 2; Omaha Auto Sales Co., Grant, 2.

Highway Development National Issue

Federal Highway Council's Membership Increases

WASHINGTON, D. C., March 4—More than 220 acceptances have been received by the Highway Industries Assn. for membership to the new Federal Highway Council which the association is forming and which will include those men most prominently identified with the industries interested in roads of the nation. The council will work as a unit for the mobilization of Federal resources and control for highway construction and for the crystallization of public opinion for the three projects approved at the Chicago Highway Congress last December when resolutions called for:

1—Creation of a Federal Highway Commission to control highway construction and development; 2—Federal financial aid to State highway construction; and 3—All governmental control of highways to be under the Federal Highway Commission.

The late appropriation of $200,000 000 for highways provided by the new Post Office bill completes in part the demands of Section 2. These funds will be devoted largely to aiding the states which in recent years voted road funds but because of the increased cost of labor and materials were unable to apply the funds as provided for in the legislation calling for a specified number of miles of construction. With the additional money from the Federal government this difficulty will be overcome.

The creation of a Federal Highway Commission is well started by the recent introduction of a bill by Senator Townsend which will probably come up at the next session of Congress and which was introduced at this time to allow for public consideration and discussion.

Government control of highways entirely under the Federal Highway Commission as demanded at the Chicago meeting has not yet been discussed in Washington. This is a matter thought entirely logical and feasible, according to highway authorities, that may meet some difficulty because of the reluctancy of government departments to give up any work already under their supervision. The roads are now under the Department of Agriculture and it yet remains to be seen if that department will recognize that roads are now so important that they deserve a department that will be separate from all others and that can be devoted to highways work only.

That the nation is recognizing the need and value of good roads is apparent in the national and state interest now displayed, and in the co-operation that is being extended by industrial organizations that have no direct interest in the work but which understand that highways mean a more prosperous and healthy condition generally. For example, more than 600 organizations, including silk manufacturers, paper box makers, and automatic sprinkler producers, have endorsed the resolutions approved at the Chicago highways meeting. And every good roads organization in the country is operating directly with the Highways Industries Assn.

The association, which is headed by S. M. Williams, has been an important factor in securing the recent State and Federal appropriations. It has worked without attempting to conceal the direct relation of its interests with the industries that will profit through good roads. It has openly announced these interests, contrary to the usual custom that many like bodies adopt. But according to Mr. Williams the policy is based on the fact that the industries represented should and do know more about road building than any other interests and though they may have a more or less personal interest, the results that will accrue through road development more than justify the stimulating causes. Industries, it was stated, have a legitimate right to appeal to legislatures despite selfish interests when the results make for the public good.

WILLIAMS URGES ROAD WORK

WASHINGTON, D. C., March 6—S. M. Williams, president of the Highway Industries Assn., spoke on the subject of good roads before a meeting of Governors and Mayors in Washington recently and brought home to those present the necessity of the development of highways as essential to the life of the nation.

Mr. Williams called attention to the fact that the necessity for good roads was brought out when trains of trucks were sent to San Antonio, Texas, for the purpose of following General Pershing into Mexico with supplies at the time of the Mexican expedition. He also brought out the fact that although the price of road materials was high, that the producers of this material were not making an unreasonable profit on their products, but that the prices had risen proportionately during the past 5 years with the rise in the cost of delivery and labor. He pointed out very specifically that the high cost of road building was due in a large measure to the high cost of labor and that the cost of labor was necessarily high because labor is dependent upon its wage for life and the cost of living and prices generally are on a very much higher plane than they were before the war and are not liable to come down very rapidly. He brought home very forcibly to his hearers that by holding back on road work because of the high cost at the present time they were leading in a movement to tie up money throughout the country.

NASH COMPLETES WAR WORK

KENOSHA, WIS., March 10—The Nash Motors Corp. has completed its contract for the Government which called for 1600 Quad trucks, and is otherwise winding up its war work. The company is now devoting 90 per cent of its attention to the manufacture of its regular car production.

N. Y. Favors Highway Transport Day

Ohio, Missouri, Kansas, Iowa and Nebraska May Follow

ALBANY, N. Y., March 5—New York State may have a Highways Transport Day, as was successfully carried out in the State of Colorado on November 15, 1918, according to F. W. Fenn of the Rural Motor Truck Express Bureau of the National Automobile Chamber of Commerce, who is authority for the statement that Governor Smith of New York State has said that he is in entire accord with the rural motor truck express movement and will issue a proclamation granting a Highways Transport Day at the proper time.

The State Highways Transport Committees in some states are passing out of existence and in others will probably become parts of the state government. In New York State it is possible that a paid secretary will be appointed to carry on the work formerly done by the Highways Transport Committee.

Former Governor Capper of Kansas pledged himself to a similar line of action and his successor, Governor Allen, has followed his lead. Governors McKelvie of Nebraska, Cox of Ohio, Sleeper of Michigan and Harding of Iowa also aim to retain their Highways Transport Committees.

It is also possible that a Highways Transport Day proclamation will be issued not only in New York State, but in Ohio, Missouri, Kansas, Nebraska and Iowa.

CANADIAN GOOD ROADS CONGRESS

MONTREAL, CAN., March 10—At the forthcoming Good Roads Congress to be held in Quebec City, Can., May 20 to 24, addresses covering the following subjects will be delivered as part of the program: Federal Aid; Roads as an Aid to Agriculture; Schools for Highway Engineering; Shall We Restrict the Load or Build the Road? and Keeping Highways Open in Winter.

$8,000,000 MORE AVAILABLE FOR ILLINOIS ROAD WORK

CHICAGO, March 2—Approximately $8,000,000 in addition to the $60,000,000 to be raised by the bond issue passed in November is available in the State treasury for road work in Illinois next spring, according to Chief Highway Engineer Older. He states that the Lincoln Highway, the Chicago-to-Danville section of the Dixie Highway, and the Chicago-Wisconsin Highway are the roads designated for first improvement. Of the $8,000,000 now in the treasury and available for immediate construction when the weather permits, $6,000,000 is available for work on these three roads. Just how soon the work will be started will depend upon the ability of the department to secure material and the contractors to do the work.

907 Trucks Exported During January

An Increase of 11 Over 1918 — Valued at $2,375,584

WASHINGTON, D. C., March 5—During the month of January, 907 trucks valued at $2,375,584 were exported. This shows an increase of eleven trucks in number and a decrease in valuation of $261,105 over December, 1918, during which month 896 trucks valued at $2,636,689 were exported.

The figures for January, 1919, show a decrease of 249 trucks over January, 1918, at which time 1156 trucks valued at $3,328,870 were exported. The difference in valuation is $953,286.

ROAD BILL VOTED DOWN

GREENSBORO, N. C., March 5—The Stevens-Scales road bill for the establishment of a state road construction fund for the building of state highways and meeting Federal aid was voted down in the Senate. The Stacey substitute, which will be introduced in the house by Representative McCoin, providing a 50-cent tax on automobiles, and allowing the counties through tax or bond issue to pay one-half of the cost of construction of the state highways, has been indorsed by the North Carolina Good Roads Assn., which is a division of the National Highway Assn.

BOSCH MOVED BY SEVEN TRUCKS

SPRINGFIELD, MASS., March 3—Seven Packard trucks hauled the entire office equipment of the American Bosch Magneto Co. from New York to Springfield in 20 hours. The trucks left New York late Friday afternoon and reached Springfield just before noon on Saturday.

MILLIONS FOR WESTERN ROADS

WASHINGTON, D. C., March 11—Additional details of highway construction received here indicate that the entire nation is awake to highway value.

Colorado has 51 miles of highways under construction at a cost of $300,000; 91 miles ready for contract to cost $360,000; and 30 miles and three bridges contemplated, to cost $350,000. Maintenance on 4000 miles will amount to about $500,000, while local road and bridge expenditure will amount to about $2,200,000.

Idaho has 87 miles, costing $720,000, under contract; forty-five bridges, costing $425,000, ready for contract; and about $1,800,000 worth of additional work is contemplated during the season.

Iowa will expend $15,000,000 on the road system of the state, of which about $11,000,000 will be for road and bridge construction.

Missouri has 666 miles under contract, costing $1,785,100; 888 miles, costing $3,104,000 ready for contract; and about $3,000,000 additional construction is contemplated. Local road and bridge expenditures in the state will amount to about $7,000,000.

Nebraska has 173 miles, costing $431,000, under contract; 145 miles, costing $550,000, ready for contract; and about 610 miles, estimated at $1,310,000, contemplated. Local road and bridge expenditures will amount to about $3,000,000.

Nevada has 4 miles, costing $54,666, under contract; 102 miles, costing $657,412, ready for contract; 123 miles, costing $523,000, contemplated. Local expenditures on maintenance will amount to $600,000.

Oklahoma has 178 miles, including eighty bridges, costing $1,360,000, under contract. Additional construction of 165 miles, costing $2,500,000, contemplated. Local road and bridge work will amount to about $2,200,000.

These amounts will be supplemented by increased Federal aid appropriations, and later, it is hoped, by national construction of main trunk lines under the supervision of a Federal Highway Commission, as provided for in the Townsend bill, which will come up for consideration by the next Congress.

TRAILER ASSOCIATION UNDERGOES REORGANIZATION

CINCINNATI, OHIO, March 10—There was recently held here a reorganization meeting of the Trailer Mfg. Assn. of America. Twelve trailer manufacturers were present. Officers were elected as follows:

President, W. E. Ferris, the Ohio Trailer Co.; first vice-president, W. A. Murfey, King Trailer Co.; second vice-president, R. C. Sykes, Troy-Wagon Work Co.; secretary and treasurer, J. C. Endebrock, Trailmobile Co. Additional members of the executive committee, W. R. Bond, Detroit Trailer Co.; W. F. Jolley, Miami Trailer Co.; C. H. Martin, Martin Rocking Fifth Wheel Co.

The objects of the association are to encourage the introduction and use of trailers; to further the construction of good roads; to aid in the enactment of suitable traffic laws; to obtain and distribute information of benefit to its members and to do everything suitable toward the general advancement of the trailer industry and of trailer dealers.

The matter of co-operating with truck manufacturers was taken up and it was decided to protect the interests of the truck industry in every way. H. M. Wood, sales manager of the Trailmobile Co., led this discussion.

HERCULES PRODUCTION GROWING

CANTON, OHIO, March 7—The Hercules Motor Mfg. Co. has manufactured 2757 motors during the months of January and February of this year, and expects to produce 2100 during the present month. The company is about to bring out two or three sizes of a new type of motor which will be put on the market shortly.

New York-New Jersey Tube Bill Passed

$1,000,000 Appropriation by New York State

NEW YORK, March 12—A $1,000,000 appropriation for immediate work on the New York-New Jersey vehicular tunnel, has been reported favorably by the New York Senate. The cost of the tunnel will be $12,000,000, each state to appropriate $6,000,000 as its share in the construction work.

The tunnel will be constructed at Twelfth Street, New York, and at Canal Street, Jersey City. Among the most important advantages arising from the construction of this vehicular tunnel would be the transportation of freight by vehicles between New York and New Jersey. It has been estimated that it would accommodate on the most conservative calculation an annual traffic each way of 1,300,000 vehicles. With a toll of 30 cents for each vehicle and the receipts for the rental of conduit rights, the tolls within 20 years would be paying a bond issue with an additional net surplus of $1 500,000.

PHILADELPHIA TRUCK SHOW

PHILADELPHIA, PA., March 12—The biggest motor truck show ever attempted in Philadelphia will open on March 17, with forty-nine varieties of trucks on display. The show will also include exhibits of tractors and trailers. Every bit of available space in the big Commercial Museum Hall is taken. The truck show will last until March 22. Truck accessories also will be exhibited.

DETROIT SHOW A SUCCESS

DETROIT, March 10—The truck end of the Detroit show, which just closed, was so successful that it is expected that there will be a separate truck and tractor show staged next year. During the period of the show over 70,000 tickets were sold. There were thirty-three different makes of trucks and three tractors exhibited at the show.

THE NEW 1-TON ACASON

DETROIT, March 6—The new 1-ton Acason truck made its first appearance to the public at the Detroit show in the exhibit of the Acason Motor Truck Co. The truck carries a 3¾ x 5¼ engine. The rear construction is a Timken worm drive, with a two-piece driveshaft. The radiator is of the cast-tank type. It is equipped with a Fuller transmission and multiple disk clutch, Lavine steering gear, Eisemann magneto and 36 x 6 pneumatic cord tires.

NEW COMET 1½-TON TRUCK

DECATUR, ILL., March 6—The Comet Automobile Co. is now producing a 1½-ton truck to sell for $1,750 in place of the 1½-ton model which sold for $1,575.

Illinois Will Build Two New Roads

Routes Run Out of Chicago and Cover 800 to 900 Miles

CHICAGO, March 6—The Illinois good roads movement is progressing favorably and it is expected that between 800 and 900 miles of new roads will be built during 1919. Both of the routes extend out from Chicago. One route leads south to Danville, Ill., through Momence and Watseka and will tap the adjacent Indiana territory. The other route is to the west to Fulton and passes through Geneva, DeKalb, Dixon and Sterling.

The new roads, which will be built by the appropriation of money already in the treasury and from some of the $60,000,000 Illinois bond issue, will be of concrete and will cost between $21,000 and $25,000 a mile. According to S. E. Bradt, State Highway Commissioner of Illinois, both of the new routes will be built to withstand a gross load of vehicle and load of 32,000 lb. Such roads will permit of the use of practically all present trucks and will go a long way toward increasing the highway motor truck transportation to the west and south with the territory adjacent to the roads tapped by lighter trucks serving as feeders.

In all, Illinois has 4,800 miles of new roads laid out for construction and if real motor truck roads are built of the type mentioned above, the $60,000,000 bond issue will not carry out the entire program.

The Chicago Return Loads Bureau, which was operated by the Truck Owners' Assn., under the supervision of F. E. Erstman, has been closed. At the present time, however, between 90,000 and 100,000 tons of freight are being moved yearly over the highways by motor trucks within a radius of from 35 to 50 miles from Chicago.

18 TRUCK MAKES AT HARTFORD

HARTFORD, CONN., March 2—Trucks figured prominently in the Twelfth Annual Automobile Show of the Hartford Automobile Dealers' Assn. at the state armory. The following makes were shown: The new Oldsmobile, Clydesdale, Bethlehem, Diamond-T, Sandow, Ford, Federal, G. M. C., Selden, Pierce-Arrow, Packard, Ward, Commercial, Walker, Stewart, Reo, Republic, Duplex and Troy trailers.

21 TRUCK MAKES AT K. C. SHOW

KANSAS CITY, MO., March 1—Twenty-one different makes of motor trucks were exhibited at the combined motor truck and passenger car show held in Convention Hall here from Feb. 22 to March 1. In addition to the individual truck exhibits there were two passenger car converters shown, one make of trailer and three makes of standard bodies. Forty-three vehicles of the twenty-one different makes were shown in the alleyway surrounding the main hall of the Convention building.

The makes of the trucks shown and the number of each on exhibition were as follows: Acme, 2; All-American, 1; Autohorse, 1; Bethlehem, 1; Corliss, 3; Dearborn, 1; Diamond-T, 2; Dodge Bros., 1; Garford, 1; G. M. C., 3; I. H. C., 4; Indiana, 2; Kelly-Springfield, 4; Kissel, 2; Master, 2; Nash, 3; Old Hickory, 1; Packard, 1; Pierce-Arrow, 2; Republic, 3, and Service, 3.

The truck converters exhibited included the Arneston and the Graham Bros. The line of Hess trailers and Parry, Hercules and Spaulding standardized bodies were shown.

CHAMPAIGN SHOW MARCH 20-22

CHAMPAIGN, ILL., March 12—The annual show of the Champaign, Ill., truck, passenger car and tractor dealers will take place March 20, 21 and 22. The gymnasium of the University of Illinois has been secured for the exhibits. The passenger cars and accessories will be displayed in the main hall, while the trucks and tractors will be placed in the annex.

SOUTHERN SHOW POSTPONED

BRISTOL, VA., March 4—The Great Southern Automobile Show and Exposition was originally scheduled to take place during the week of April 13, but it has been found advisable to postpone the show until the week of May 10, because the exhibit building has not yet been completed and also to make the date satisfactory to the Government. The sum of $25,000 has been raised by the Bristol Chamber of Commerce from the business men of the city for the erection of the new exhibition building.

HIGHWAY TRAFFIC ASSN. MEETING

NEW YORK CITY, March 11—A public meeting of the National Highway Traffic Assn. will be held at the Automobile Club of America, 247 West Fifty-fourth Street, on Friday, March 21, at 8 p. m. The program includes talks on the following:

"Qualifications for Operators of Motor Vehicles. and Revocation of Licenses," by Francis M. Hugo, secretary of the State of New York.

"Regulation of Pedestrian Traffic," by Dr. Shirley W. Wynne, assistant registrar of Records, Department of Health, New York City.

"Sign Posting for Detours, and Through Routes in Municipalities," by Elmer Thompson, secretary of the Automobile Club of America.

A report of the committee on "General Highway Traffic Regulations for Drivers with Directions for Pedestrians," will be presented by William P. Eno, chairman, who is also chairman of the Highways Transport Committee, District of Columbia.

An informal dinner at $1.50 a cover will be served in the grill room of the club at 6.30 p. m. All interested are invited.

Cancelled Contracts to Be Reviewed

Board Formed to Decide on All Automotive Claims

WASHINGTON, D. C., March 6—A Board of Contract Review of the Motors and Vehicles Division of the Office of Director of Purchases has been created and will pass on all termination agreements of formal and informal war contracts for motor trucks, passenger cars, motorcycles, parts and accessories and trailers, before the agreements are submitted to the Claims Board of the Office of the Director of Purchases for final approval.

The Board of Contract Review will consist of five members and the chief of the Motors and Vehicles Division. These will be appointed by the chief of the Motors and Vehicles Division and approved by the Director of Purchases.

N. Y. DELAYS PORT AGREEMENT

NEW YORK CITY, March 11—Again a delay is caused in the passing of a port agreement between the States of New York and New Jersey toward the general development and improvement of the port and harbor of New York. This time the delay is being caused by New York and not New Jersey and is due to the Corporation Counsel in taking the stand that agreements which sub-committees, representing the legislature of each state, the Governors of both states and Attorney Generals of both states, have come to should be taken up by the city authorities for their opinion.

The committee which met could not come to an agreement on two points, namely: 1—That New York State should have four representatives on the board as against three from New Jersey, which New Jersey would not agree to, and the other, 2—That nothing should be done by the port authorities without the express assent of the Mayor, members of the Board of Estimate and Apportionment and of the Board of Aldermen of the City of New York. This would not be fair to Newark, Jersey City and the other fifteen municipalities which they represented, the New Jersey committee held.

MACON DEMONSTRATION DAY

MACON, GA., March 10—April 3 is the date set for the Motor Truck Demonstration Day to be held in Macon, Ga., under the auspices of the Macon Chamber of Commerce. It is planned to have a parade of motor trucks through the business section of the city. The line will then be divided into six trains and will drive out in as many directions to terminal points of about an equal distance from the city. On the outgoing trip the trucks will be loaded with merchandise and on the return trip with farm products and live stock. Stops will be arranged along each route and a demonstration rally will be held at each terminal point.

Three-Story Garage of Fifth Avenue Coach Co. Has No Elevators

All Entrances Flush With Each Floor—No Ramps Used

200 Buses Leave the Building During the Hours of 6 and 8 A. M.

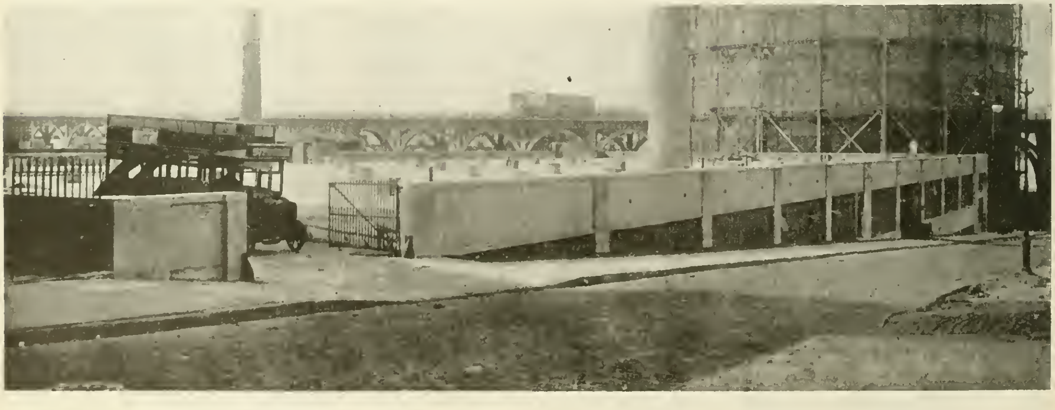
A 33-ft. entrance allows three buses to run abreast with ease

THE high-water mark of efficiency in garage design has been reached by the Fifth Avenue Coach Co. in its new building now in use at 132nd Street, off Riverside Drive, New York City. Ten distinctive features, solving the problems of time, space, energy and money, place the structure in the foremost rank.

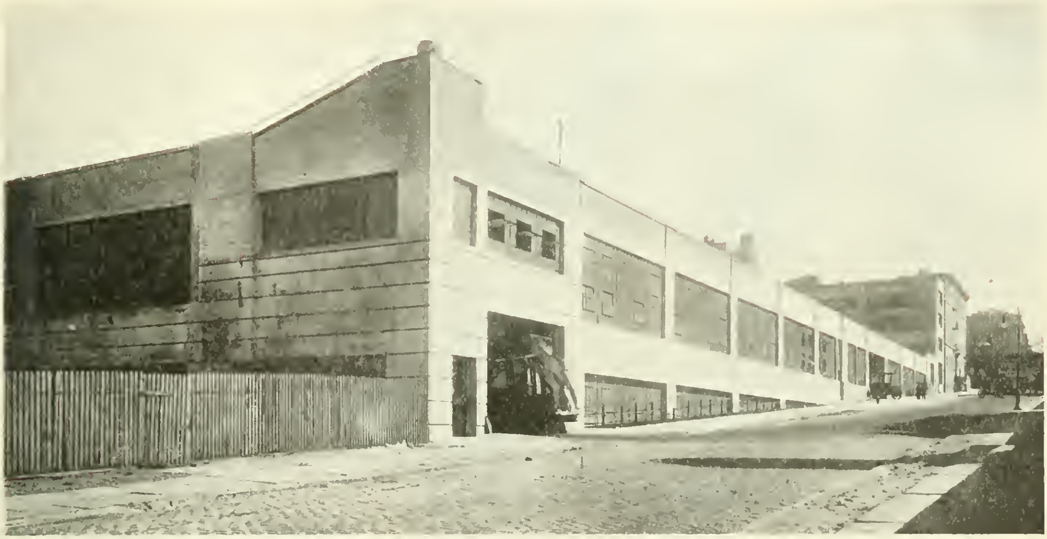
A double grading of 2 per cent from north to south and of 6 per cent from east to west has offered the designers a peculiar advantage in planning a system of entrances made flush with each of three floors. Such entrances obviate the need for elevators. Two hundred buses leave the building between the hours of 6 and 8 each morning, allowing an average of half a minute for each departure. With the use of elevators it would require 6 minutes to lower one bus and return for another.

The time-saving feature is obvious. A bus measures 7 ft. 6 in. by 23 ft. 6 in., requiring an elevator of 15 by 30 ft. Were enough elevators used to discount the time advantage gained by the above-cited system of entrances, a significant amount of space would be encroached upon. The operation of each elevator would require the services of at least one man, not to mention the general upkeep requirements. Adding to these considerations the actual cost of the elevators themselves, the financial advantages of this unique plan of entrances are manifest.

Occupying an area of 82,000 sq. ft., or approximately 2 acres, the garage commands an extensive floor space. The plot is rectangular, 200 by 400 ft. This is used for the main building, with one extra lot at the southeast corner, which is devoted to an administration and welfare building. In designing the main building a number of points had to be considered, such as the storage capacity in number of buses; accessibility to these buses; ease of handling in and out of the building, and flexibility of storage arrangements. Prior to the occupancy of the present quarters the company's buses were not centralized in a convenient terminal but grouped in garages more or less distant from the starting point. Under this former system the waste of time and fuel in unproductive running between housing points and route was considerable. Time is also saved as well as energy and liability to accident by the arrangement of space in this new garage. The buses are easily handled, despite their compact arrangement within the building,

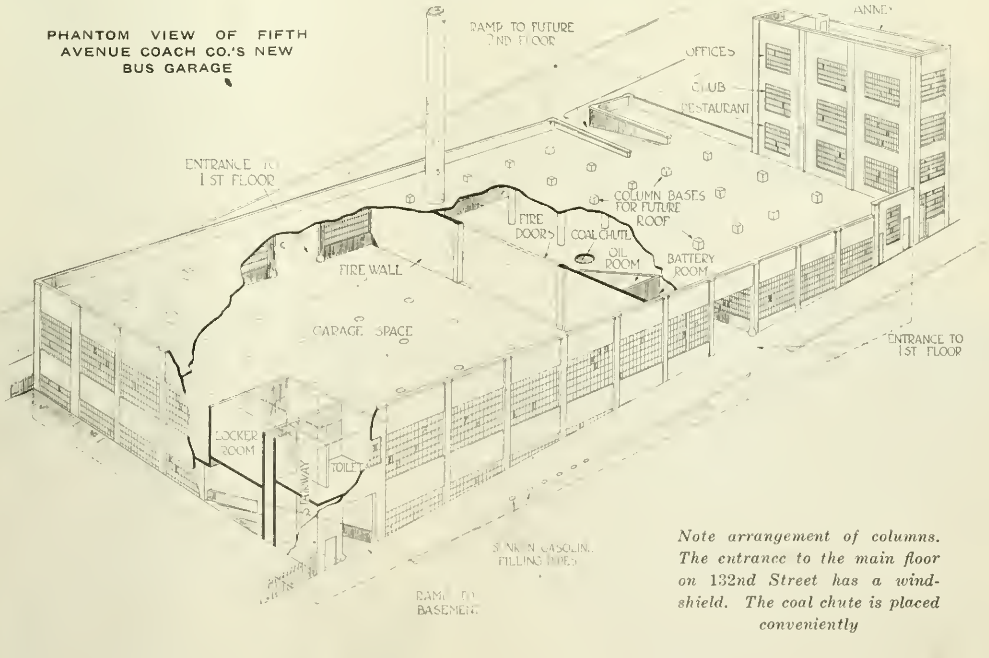


View of new Fifth Avenue Coach Co.'s garage, showing entrances on second and third floors. The third floor now serves as a roof. Note extension of columns from lower floors to take care of any additional need of floorspace



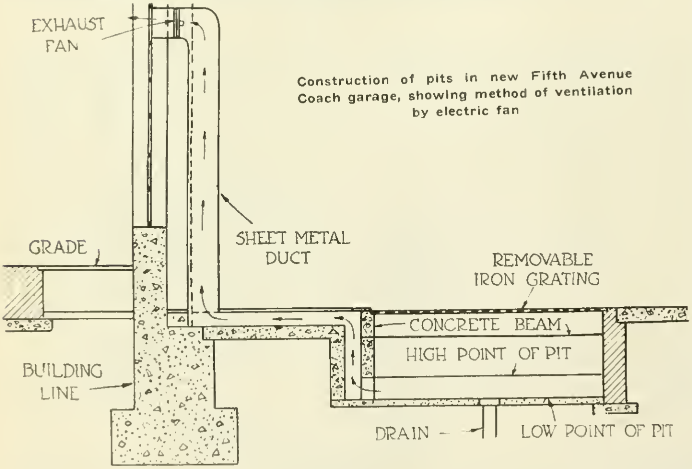
View showing basement and main entrances of Fifth Avenue Coach Co.'s new garage

PHANTOM VIEW OF FIFTH AVENUE COACH CO.'S NEW BUS GARAGE



Note arrangement of columns. The entrance to the main floor on 132nd Street has a windshield. The coal chute is placed conveniently

View of pits in basement of Fifth Avenue Coach Co.'s new garage, showing repair crews and accessibility of working benches to the buses. Note excellent lighting



Construction of pits in new Fifth Avenue Coach garage, showing method of ventilation by electric fan

through the ample width of central aisles and exits which allow three to run abreast freely in and out. The final plans provide for a five-story building which will take care of any expansion of operations.

The supporting columns make up for the considerable space they occupy by housing hot and cold water and gasoline pipes. At each entrance two columns supply gasoline to incoming buses at the rate of 25 gal. a minute. Six impeller electric pumps, automatically operated from the gasoline draw-off points, make possible this record speed of filling. The gasoline supply is in two batteries of six 8000-gal. tanks below the cellar and the first floor. These tanks are filled conveniently through pipes leading from the sidewalk outside. The accumulation of sediment in these has through previous experience been found troublesome, and in order to prevent unnecessary impediment to the flow they have been tipped 2 to 4 deg., thus forcing all foreign matter to the lower end of the tank. The gasoline system is adequately lettered and marked to facilitate reference in case of repair work. Every column has its plan number painted on four sides of it, and every lamp has a number indicating the columns at which its control switch is located. The lubricating oil is contained in one 2000- and three 550-gal. tanks, distributed by eight plunger hand pumps. Space has been conveniently set aside at the entrance on the main floor for the storage of the oil. One 550-gal. tank is used for kerosene. The 2000-gal. tank is used for lubricating oil, the others for gear and light weight oil.

Gasoline indicator boards have been placed conveniently in each of the two floors now in use. These show at all times the amount of gasoline on hand in the six tanks.

Exceptional arrangements have been made for the circulation of water. As stated before, nearly all of the columns have hot and cold water facilities, thus a bus may be washed practically where it is standing. Other improvements under this head include a sprinkler system, overhead washing devices, and a plumbing system remarkable for the fact that every panel of the building is drained, a number of the pipes passing through concrete beams to save headroom.

Unique Sprinkler System

The sprinkler system is unique in that all horizontal pipes are either underground or between the bottom of the slab and the bottom of the beams. This method involved very careful placing of the sleeves and inserts for this work, but saved about 2 ft. of headroom in each story. The sprinkler system is supplied by four connections to the street water mains and by an underground 100,000-gal. reservoir. A 1000-gal. per minute electric fire pump forces the water from this reservoir to the underground sprinkler supply lines. This reservoir is roofed over and forms a part of the first floor. Distributed near each of the entrances are overhead washing devices with hose connections extending to the floor. These are convenient for washing the upper decks and windows, as well as for filling the radiators when the buses come in at night.

Each system of piping is painted in a distinctive color; the sprinkler in red, steam in yellow, and plumbing in green, with any exposed electric work in black. Heat is supplied by a low-pressure Warren-Webster system with Nash vacuum electric return pumps. Steam is provided by two 150 hp. Fitzgibbons boilers connected to a 155-ft. brick stack.

Space has been set aside for the storage of 1600 tons of coal. To save time in the discharge of coal from the trucks it is so arranged that the conveyance may drive right into the garage and discharge its cargo through manholes directly into the bunker in the easterly side of the cellar.

The accompanying illustrations show the excellent lighting facilities. Ample window area obviates the use of but few lights during the day, even in the basement. The ceiling and walls are whitewashed and in the center of each 1100 sq. ft. panel there is a lighting fixture. These are designed for 18-in. enamelled iron shades and 350-watt lamps. There is an extension plug device at every interior column.

Two battery charging rooms, one on each floor, take care of the complete handling of this phase of the company's system. Facilities are such that 150 batteries can be charged at one time. Elevating trucks, large enough to carry seven batteries and just high enough to roll under the battery container of the

Interior view of main floor, showing arrangement of columns and the ample storage space and the wide avenues for incoming and outgoing buses to operate in. Note overhead arrangement for the sprinkler system

bus, have solved the lost motion problem in battery lifting. Two trucks with their load of fourteen batteries are put on the city line direct, with no resistance. At the end of the day the trucks are placed conveniently near the entrances, and as each bus comes in it is a matter of but a minute for the replacing of the old battery with the new. At the same time the gasoline tanks are filled, new oil supplied and the radiators replenished. Thus the bus is instantly ready in the morning to go to its route.

Provision for Employees' Comfort

Nothing has been overlooked by the company for the comfort of its employees. As a result, there is a spirit of good feeling and co-operation that will not be downed. Convenient locker rooms have been installed in the building and ample space has been set aside for wash rooms. A clubroom, with everything for the comfort of the men while off duty, has been provided on the third floor of the annex. On the fourth floor is located the statistical department, the doctor's office and the tailor shop. A modern restaurant, run by a caterer at much lower prices than in outside establishments, is located on the second floor. The first floor houses the transportation office, the employment bureau and the receiver's window.

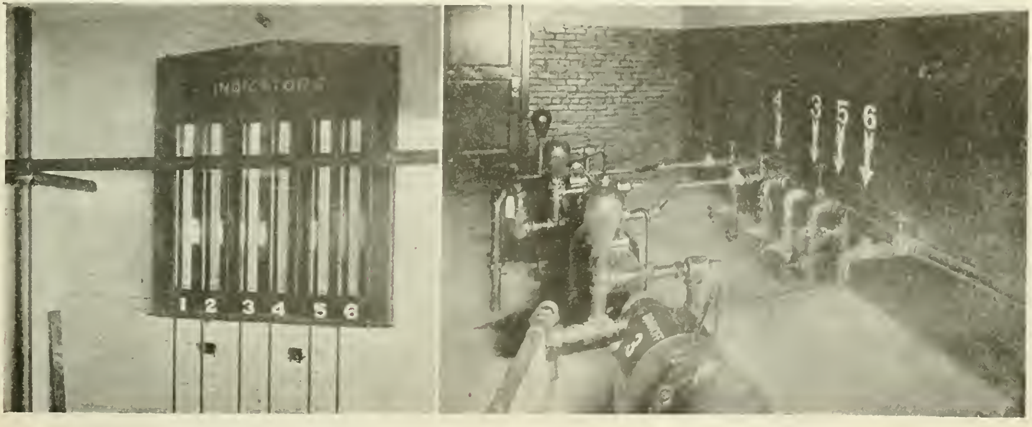
Publish House Paper

Each month there is published a house organ styled *Bus Lines*. In this appear stories and suggestions of interest to the men. Results of contests between the various departments appear, as well as human interest articles. Nothing is withheld from the employees on organization matters, the company's affairs for the most part being an open book. The men show a keen interest in their work and many valuable suggestions for improvements come in from them each day. An instruction school has been located on a balcony above the main floor. Here the men are drilled on the construction of the buses and various other matters that concern thorough knowledge of the working parts of the machine. It is a rule of the company that promotions come only from the ranks. Thus there is always that keen interest of the men to get ahead in their work, resulting in an efficient organization.

All of the foregoing efficiency methods have resulted in an organization of clocklike movement. The success of each department is dependent upon the smooth working of the others. The repair department, for instance, is dependent upon the lighting facilities, tool layout, pit arrangements, distribution of work, stockroom and repair benches. This branch of the organization at the 132nd Street garage has been worked out accordingly. One hundred trucks are taken care of by the section in the basement and 200 can be housed in the section on the main floor. Though nominally under one head, these two sections are independent of each other, each having its own foreman, who is responsible for the efficient handling of his men and buses. Friendly competition each month to better each other's records has proved a great success in getting the best out of the men and in keeping costs down. A record is kept of the fuel consumption of each bus, as well as oil, etc. A great saving on gasoline consumption is made by instituting economy contests, the results of which will be treated in another story in this magazine.

Tools Arranged Systematically

In order to give the repair crew the best of lighting facilities, the workbenches have been installed along the windows on both floors. Pits for working conveniently under the buses have been placed right in back of the benches. The tools are placed in systematic order in racks on the walls and the stockroom is nearby. All parts are kept in steel bins, and in order to save time all



Left—View of gasoline indicator board. Right—Gasoline pumps for the six drawoffs

View of main floor entrance, showing method of handling incoming buses. They are filled with gasoline, oil, and the old batteries are replaced

Assembly room at the 102nd Street garage of the Fifth Avenue Coach Co., showing overhead crane and other equipment

main units have been photographed. These photographs are placed at the ends of each bin, accompanied by the part numbers for each respective unit.

There are eleven inspection pits in the basement and seventeen on the main floor. The pits are open underneath all the way through. A constant circulation of air is set up in the pits by an electric fan which is placed at one end.

Straightening out shafts or any other heat-treating processes is taken care of by a forge shop placed in the basement.

21,000 Miles Covered by Buses

It has been figured that over 21,000 miles are covered each day by all of the buses in operation, or about 100 miles per day per bus. Over 1000 stops are made each day by a bus, resulting in approximately 3000 gear changes. As no spare buses are kept, the importance of an efficient equipment is manifest, as well as the elimination of road repair work which cuts down efficiency. In order to carry out the last feature, the company has perfected its equipment so that it can concentrate repairs at a given point, that of 1400 miles. The old buses are expected to run 1400 miles before any repairs are made on them. The new buses are covering 2000 miles without repairs. This means that grease cups, tires, electric lights, etc., must not be touched before these distances are covered. By this method, should some weak point develop within that time, the engineers would be called upon to investigate so as to bring that specific unit up to requirements. The company figures that its success is due primarily to the design of the vehicles and that the organization is secondary.

Record Kept of Condition of Vehicles

A tally is kept on the running condition of each vehicle by means of a driver's report. When the bus comes in at night, any troubles that occurred during the day are noted by the driver in this report, which covers everything from engine trouble down to a leaking roof or rattles. That night the foreman goes over the reports and sees that the complaints are attended to before morning.

When the time comes for a general in-

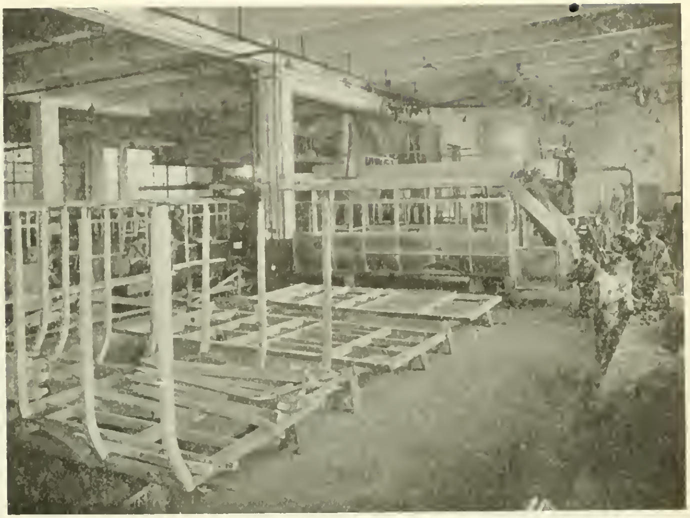
Left—Club room at the new garage. Right—The restaurant is modern in all details spection, that is, when the vehicles have covered the desired mileage, they are put in the hands of repair crews and gone over for tightening up and weak points. After a year's running the buses are given a complete overhauling. The bodies are painted and the engines, etc., are torn down.

The yearly overhauling and painting of the buses is taken care of at the 102nd Street garage. Though nearly seventy buses are stored here on the first floor, the rest of the three-story building is devoted to assembly, body building and repair work.

Fifteen Buses Assembled Monthly

Fifteen new buses are assembled monthly. This department has a well equipped machine shop. One feature is an overhead crane, 220 ft. long, capable of carrying a 3-ton load.

The company builds its own bodies as well as taking care of maintenance in its carpenter shop on the second floor. Sixteen bus bodies can be built at one time in this department. Forty men are employed constantly, and they can turn out an average of three completed bodies a week.



Body building department at the 102nd Street garage, where sixteen bus bodies are built each week. Forty men are employed in this department

Great Britain Develops Return Load Bureaus

NOT content with the perfecting of individual systems identified with the motor truck road transport problems of a single city, the Chambers of Commerce of Liverpool and Manchester have been co-operating in order to obtain maximum results. Both chambers have what are known as motor haulage committees, but control is unified and the scheme is conducted, as a whole, from Manchester.

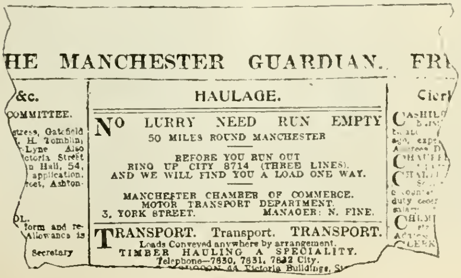
To realize what this actually means it is necessary to consider the geographical position and the environment of these two cities. Both are very important ports, Liverpool being on the coast and Manchester being served by a ship canal. They are located about 40 miles apart, and it is a significant fact that a circle drawn to include both cities would surround that portion of England which is most densely populated and which is identified with a number of the leading industries. In other words, the location is ideal for the development of road transport despite the fact that there are several lines of railroad and canal systems linking up the centers. Roads are typical English highways, kept in excellent repair under normal conditions and, doubtless, maintained on a basis of super-efficiency during war-time.

Reproduced herewith are daily paper announcements which serve to indicate the needs filled by the bureaus. These advertisements appear to be changed almost daily, each one touching on some aspect of transportation which may appeal to truck operators, etc. The system involves the indexing of all inquiries from merchants and carriers under their respective towns, and it is stated that the cards contain details of over 400 trucks operating between Manchester, East Lancashire, Yorkshire and the Midlands. Primarily, the department intended to confine its operations within a radius of 50 miles from Manchester, but on occasion loads have been shipped as far as London.

It is obvious that during the past four years or so the British railroads have been overwhelmed with freight, and for this reason there was ample opportunity afforded manufacturers to try out the road transport. This opportunity was taken advantage of by many, and it is significant that invariably repeat orders have been received by the bureaus. The department has now succeeded to such an extent that three telephone lines are kept busy in the Manchester office.

In the early stages the road transportation scheme seems to have been regarded with some suspicion by truck operators, who came to the erroneous conclusion that the department would be run on a cut-rate basis. It was, however, speedily realized that this was not the case and at present all the truck operators are co-operating in every way.

From July to December the tonnage hauled was 2225, the total tons hauled from January to August, 1918, being 12,350, a five-fold increase. This was accomplished without putting a single extra vehicle on the road, an important fact when the shortage of fuel, tires, labor, etc., is considered. The department guarantees all payments to the truck operator, deducting a commission of 5 per cent on all traffic handled.



HE MANCHESTER GUARDIAN. FR

&c.

COMMITTEE.

HAULAGE.

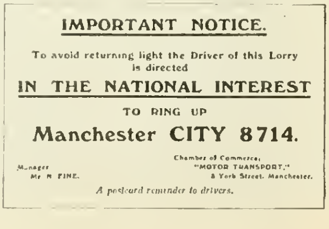
NO LURRY NEED RUN EMPTY
50 MILES ROUND MANCHESTER

BEFORE YOU RUN OUT
RING UP CITY 8714 (THREE LINES).
AND WE WILL FIND YOU A LOAD ONE WAY.

MANCHESTER CHAMBER OF COMMERCE.
MOTOR TRANSPORT DEPARTMENT.
3, YORK STREET. MANAGER: N. FINE.

TRANSPORT. Transport. TRANSPORT.
Loads Conveyed anywhere by arrangement.
TIMBER HAULING A SPECIALITY.
Telephone—7830, 7831, 7832 City.
44 Victoria Buildings, St

Daily paper advertisements of the British Return Loads Bureau in Manchester. The bureau is still in existence and doing remarkably good work even though the war is over. It will prove of great value in the tremendous reconstruction work being carried on in England



IMPORTANT NOTICE.

To avoid returning light the Driver of this Lorry is directed

IN THE NATIONAL INTEREST

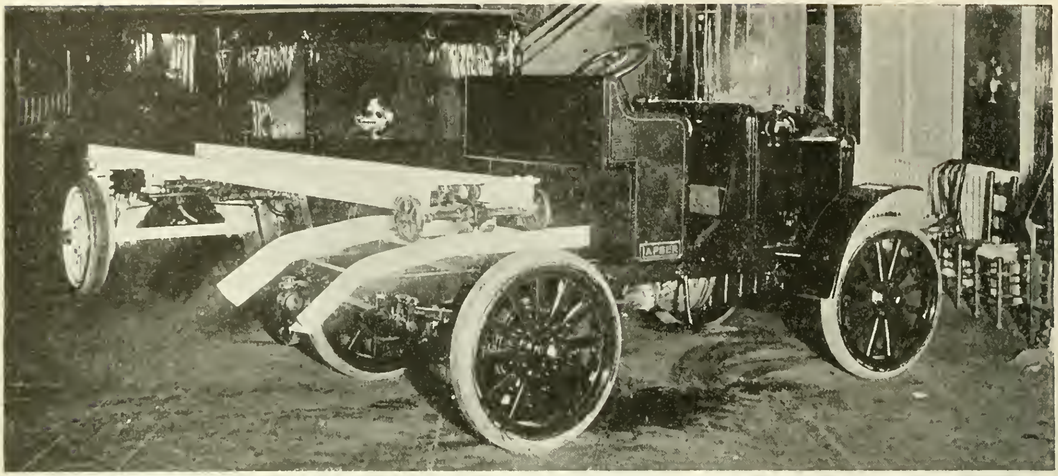
TO RING UP

Manchester CITY 8714.

Manager
Mr N FINE.

Chamber of Commerce,
"MOTOR TRANSPORT,"
3 York Street, Manchester.

A postcard reminder to drivers.



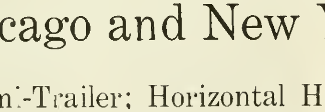
The Lapeer tractor and semi-trailer, showing how the front end of the trailer is carried on two small wheels which run in two tracks on the tractor for connecting the wheel shaft to a hooked king pin mounted on coiled springs to take up the stopping and starting strains

Truck Efficiency Aids and New Design Details Seen at Chicago and New York Shows

Quickly-Connected Semi-Trailer; Horizontal Hoist; Wide Metal Tire Cover for Sandy Country Use and New Lay-Outs of Brake Rods

At the recent New York and Chicago truck shows there were exhibited many new parts and truck devices designed to increase vehicle efficiency. There were also several refinements in the design of the detail parts of the truck chassis. The most important of these which have not previously been described in THE COMMERCIAL VEHICLE are given herewith. Included in these descriptions are the special quickly-disconnected semi-trailer made by the Lapeer-Tractor Truck Co., Lapeer, Mich., shown at both the New York and Chicago shows; a special demountable steel tread to be applied over the solid rubber tire of a motor truck when used in sandy country as shown on a 6-ton Garford at the Chicago show; the Horizontal hoist as manufactured by the Horizontal Hydraulic Hoist Co., Milwaukee, and shown by a working model at both shows; the layout of the unique driving axle of the Walker electric truck; the brake rod layout on the new Columbia 1-tonner, and Guarantee passenger car converter; a new Warner three-point gearset mounting as used on the Denby 3½-tonner; new brake toggle layout on the Torbensen axle used on the new Republic 3½-tonner, and an unique brake equalizer layout on the 5-ton Oneida.

The semi-trailer of the Lapeer Tractor-Truck Co. is characterized by the ease with which it may be connected to or disconnected from the tractor. This is accomplished by mounting the front end of the semi-trailer on a pair of small wheels carried on the end of a crosswise shaft with the wheels outside of the semi-trailer frame. To make the connection between the semi-trailer and its tractor, the wheels run up two inclined runways made of metal with the outer edges provided with angle irons to prevent the wheels from running off. The runways are flared outward at their rear ends so that when the tractor is backed up to connect with the semi-trailer it is not necessary that the longitudinal center line of the tractor coincide with that of the semi-trailer, as is the case where the ordinary king pin must be dropped in the hole in the center boss of the ordinary fifth-wheel and the similar sized rubbing band mounted on the under side of the semi-trailer.



The metal tire shown on a Garford 6-tonner at the Chicago truck show. It is made in two parts and fits over the solid tire

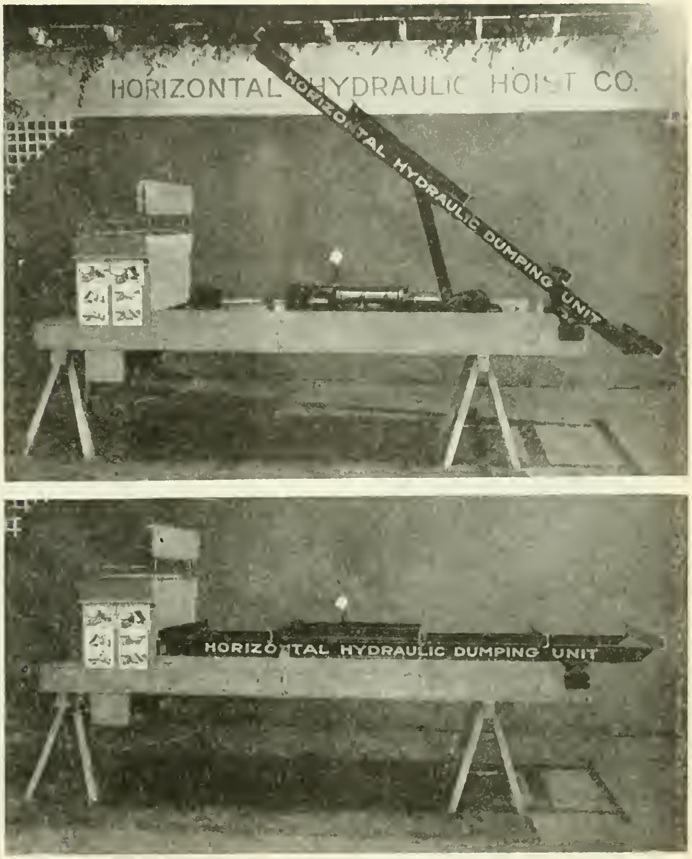
As long as the small semi-trailer wheels touch on the runways mounted on the rear deck of the tractor they are forced to run up to the locking device by being guided by the angle irons on the sides of the runways. It is this elimination of the necessity for accuracy in backing up which permits the trailer to be connected in a minimum of time.

The connection between the trailer and tractor is made by means of a vertical king bolt with a hook at its upper end and with the open end of the hook toward the rear. This hook engages with the crosswise shaft on which the semi-trailer roller wheels are mounted, and is forced down into close contact with the crosswise shaft by means of a longitudinal rod which is forced between the top of the hook and a crosswise roller connected with the trailer frame directly above it. The longitudinal rod is moved forward automatically by being connected to the top of the standing gear of the trailer when it is swung up off the ground. The downward movement of the vertical king pin is made possible by mounting it in a coil spring at the bottom. It is further carried on two sets of horizontal longitudinal shafts, each with two coil springs, so that the starting and stopping strains may be taken up by a backward or forward movement of the king pin.

The rear wheels of the semi-trailer are provided with brakes and these are automatically operated by the movement of the standing gear, which is swung down into contact with the ground when the semi-trailer is left by itself to be loaded. The standing gear consists of a V-shaped framework which is pivoted at its upper end. The brake rod is pivoted to this framework at a point below its attachment to the trailer frame. This construction provides a certain leverage for the movement of the brake rod so that the brakes are automatically set when the standing gear is lowered and similarly taken off when it is raised just before the tractor is put in motion. Beside setting the brakes, the standing gear also serves to lock the hook of the king pin as previously described when the standing gear is raised and to automatically unlock it as soon as it is lowered. The semi-trailer was shown complete with a Lapeer tractor. The trailers are offered in models of 1-, 2-, 3-, 5- and 7½-ton capacity.

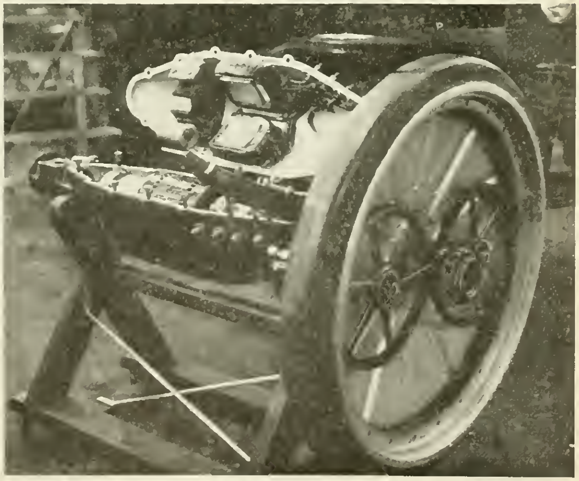
Metal Tire Fits Over Solid

One of the interesting devices seen at the Chicago show was a 12- to 14-in. metal band to be fitted around the circumference of a solid tired truck wheel when the vehicle is to be used in sandy country when it would otherwise sink deep into the ground because of the movement of the particles of the soil when weight is placed upon them. The band is made in two parts, as shown in the small sketch at the bottom of page 22. The two halves of the band are provided with small turned up lugs at each end. These lugs are placed at the extreme outside width of the band so that

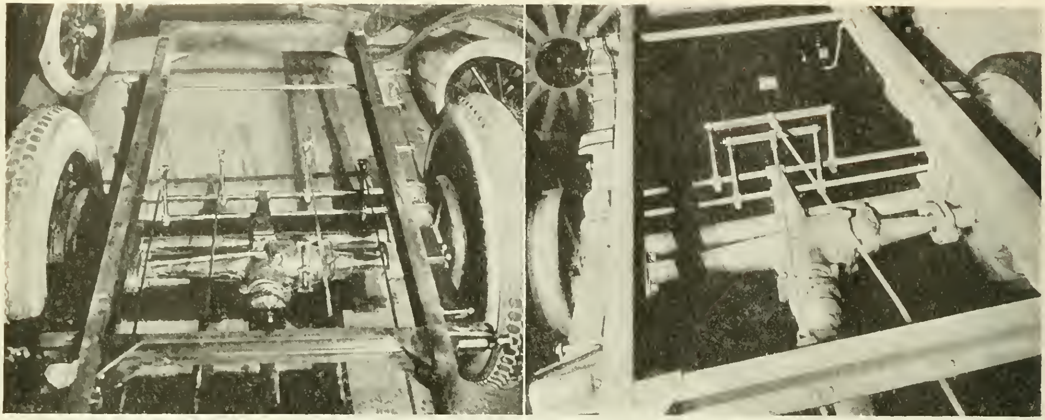

HORIZONTAL HYDRAULIC HOIST CO.
HORIZONTAL HYDRAULIC DUMPING UNIT
HORIZONTAL HYDRAULIC DUMPING UNIT

The working exhibit of the Horizontal hoist seen at both the New York and Chicago truck shows. The entire mechanism is carried on a sub-frame

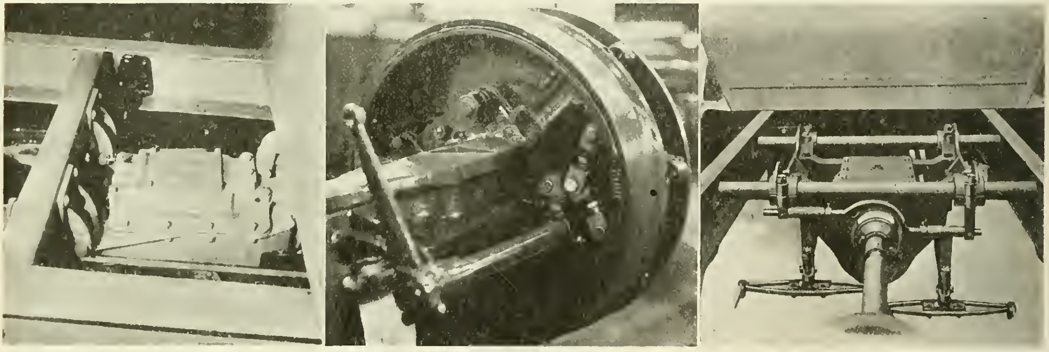
The French hood of the Kelly-Springfield truck, showing the engine accessibility provided by its use



The rear axle of the 1-ton Walker electric, showing the motor armature and field mounting and the form of internal-gear wheel drive



Left, the brake-rod lay-out as employed on the Russel internal-gear-driven rear axle used on the Guarantee passenger car converter. Right, the brake-rod and equalizer lay-out on the new Columbia 1-ton truck with its Russel rear axle



Left, the three-point mounting of the Warner gearset on the Denby 3½-tonner. Center, the new three-toggle brake lay-out on the Torbensen internal-gear axle used on the new Republic 3½-tonner. Right, the gearset and brake-rod equalizer lay-out on the Oneida 5-ton truck

they clear the tire. Bolts and nuts inserted through holes in the lugs tend to tighten the band, hold it in place and take up for any wear on the tire tread. The band can be put on and taken off quickly, and if desired may be provided with grips on the outer circumference.

One of the exhibits which attracted considerable attention at both the shows was a full-sized working model of the horizontal hydraulic hoist made by the Horizontal Hydraulic Hoist Co., Milwaukee, Wis., which about 6 months ago succeeded to the business of the Young Patent Hoist Co. of the same city, which is no longer operating actively. The hoist was operated electrically and the hoist cylinder was provided with a pressure gage for the purpose of showing that by means of the leverage arrangement used the oil pressure required to tilt the body is uniform from the start to the finish of the operation. The hoist outfit comprises a horizontal hydraulic cylinder with the pump and connections mounted on a structural steel frame with cross members for attaching to the chassis; a clutch driving mechanism for taking the power from the propeller shaft or gearset; a control lever set and a set of brackets with shafts and rollers for attaching the hoist to the underside of the body.

As will be seen in the illustrations of the up and down positions of the hoist shown at the top of page 23, the entire hoist is entirely underneath the body, and permits the use of a full length body with no gap between the forward end of the body and the rear of the driver's cab as is necessary when hoists of the vertical type are employed. By the use of the horizontal hoist bodies can be made from 18 to 24 in. longer and thereby have lower sides with more convenient loading than bodies of equal capacity for use with the vertical type of hoist. No portion of the hoist extends below the truck frame and therefore the ground clearance of the truck is not reduced. The tilting arms, by means of which the body is raised, act directly against rollers attached to the underside of the body, thereby making unnecessary the use of wire ropes or cables. By means of the special structural steel frame on which the hoist, pump and connections are mounted as a self-contained unit, the hoisting strains are distributed for a distance of 5 ft. along the truck frame over the rear springs and rear axle so that there is no concentrated weight on the truck frame when raising the body.

The illustration at the bottom of page 23 at the right shows the mounting of the driving motor in the inclosed rear axle of the Walker 1-ton electric truck. The attachment of the field coils and the mounting of the armature are clearly shown, as is also the double spur gear drive to the large internal gear mounted inside of the felloe of the wheel. This gearing is made clear by the removal of the outside disk, which is always fitted on the wheel in order to exclude dust and dirt from the teeth of the pinions and gear.

The illustration in the lower left-hand corner of page 23 shows the tilting engine hood as used on all of the Kelly-Springfield trucks, and indicates the great accessibility of the engine when the hood is tipped to one side. As shown, the radiator is mounted back of the engine instead of in front, as is the cus-

(*Continued on page* 27)

Two Cold-Weather Hints for Motor Truck Owners

Devices for Starting Cold Engines and Preventing Frozen Radiators

WHILE it now appears doubtful if we are to have any really cold weather this winter, the two methods of starting cold motor truck engines and of preventing radiator water from freezing without the mixing of any compound with the water as described and illustrated on this page should be of interest to all motor truck owners who are confronted with these problems.

The problem of starting a cold motor truck engine is one which has to be solved by a large number of motor truck owners, especially those who garage their trucks in unheated buildings or keep them in barns or sheds, as is the case with a great majority of farmers. The method of starting a cold motor truck engine described on this page won the ten shilling prize offered by the *Commercial Motor*, a British motor truck paper published in England.

The cold truck engine is started by means of a conical-shaped tank provided with a nipple at its apex. The tank is made in two parts, a smaller cylindrical tank being inserted inside of the conical one from the apex to about ½ in. above the bottom. The inside tank is filled with gasoline and the conical tank with boiling water, which heats the gasoline and makes it vaporize very readily so that the engine spark will ignite it readily after the engine has been turned over once or twice by hand.

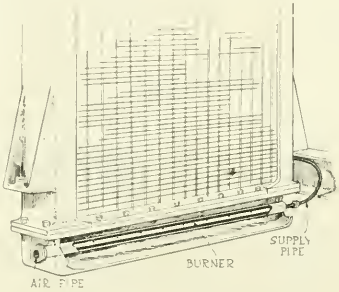
The outer conical tank or hot water container should be made of lead-coated sheet iron and the inner tank for gasoline of thin tinned steel the thinner the better because it will then more readily transmit the heat from the boiling water to the gasoline within.

The base of the conical tank has a large screwed stopper at the bottom, and this is suitably recessed so that it is above the outer circumference or edge of the tank so that it may be set down on a workbench or table without turning over on its side.

The gasoline tank is sweated into the top of the conical tank, the top of the gasoline tank being shaped to fit into the top of the water tank. This sweating operation hermetically seals the gasoline tank from the water container so that neither of the two fluids can mix. The gasoline tank is fitted with a stop cock at its apex and with a union, into the cone of which is screwed a discarded carbureter jet. A handle is fitted to the outside container so that it can be moved readily from place to place.

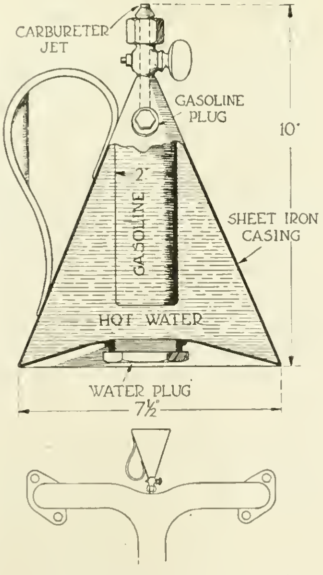
When used a quantity of gasoline is poured into the inner or gasoline tank through a stopper provided near the apex. The outer tank is then filled with boiling water through the base plug, which is then closed. The union at the outlet of the gasoline chamber is coupled to a prepared nipple screwed into the intake manifold, as shown in the sketch, and the cock of the gasoline tank then opened.

The heat of the water makes the gasoline flow out of its tank in a small jet of fine spray, when it is sucked into the engine cylinders as the engine is turned over. The whole apparatus can be left in position on the intake manifold while the starting handle is being turned so that only one man is necessary to start the engine. The can is particularly useful in a garage maintaining a number of trucks, as it can be rapidly transferred from one engine to another as they are started up in order in the morning.



Radiator Heater

This open-ended pipe brazed into the lower radiator tank with a burner tube inside of it prevents the cooling water from freezing when the truck is kept in an unheated garage or left out in the open



Cross-sectional view of the hot gasoline tank for starting cold motor truck engines. The construction and method of mounting on the intake manifold are clearly shown

The entire device is about 10 in. high and 7½ in. in diameter at the base. The inner gasoline tank is of about 2 in. in diameter and has a straight side of about 6 in. with a conical top of an additional 2 in. in length.

The other device is also of British origin and was invented by W. Bonson of Halefield, Altrincham, Eng. It was described in a recent issue of *The Commercial Motor*, and was worked up first for British motor trucks on service in France, where they had to be parked out in the open at night and yet be in such condition that they could be moved quickly in case of emergency. Of course, if the water had been drained from the engine cylinders and radiator to prevent cracking the cylinders or bursting the radiator tubes, it was necessary to refill the radiator and water jackets before the truck could be operated. In some cases, water was not handy, and this delayed the starting of the engine. All sorts of expedients were tried, but probably one of the simplest and most efficacious was that invented by Mr. Bonson.

It consists of a pipe about 1 or 1½ in. in internal diameter which is fitted transversely inside of the bottom radiator tank with the ends of the pipe brazed or soldered into the tank at each end. One end of the tube or pipe is threaded and fitted with a washer, through the center of which is screwed a second pipe of smaller diameter which extends clear through the pipe from the washer and almost to the other end, which is open to the air. This inner pipe has six or more holes drilled in it to act as outlets for fuel fed into the other end of the pipe from the fuel tank or from the acetylene generator of the lighting system.

When a vehicle has to be left out all night in cold weather or when it is idle during loading or unloading operation or held up for temporary repairs, the fuel or acetylene gas is turned into the small pipe and lighted by a match inserted in the open end of the inside pipe. The heat generated by the burning of the fuel inside of the pipe is thus imparted to the water in the bottom tank and results in a constant circulation in the reverse direction to that for which the cooling system is designed. It also insures that the temperature of the water throughout the cooling system will be above the freezing point.

In trials of the device on a 3-ton Thornycroft truck which was left out in the open every night throughout a severe winter the system proved effective and reliable.

Third Annual Conference of Department Store Deliverymen Proves Great Success

Chicago Meeting Endorses One Delivery a Day; Approves Central Wrapping Department and Discusses Motor Truck Operating Costs

THE third annual delivery conference of the International Retail Delivery Assn. which closed its 4-day session at the Hotel Morrison, Chicago, on Feb. 27, will go down in the records as the most successful of its kind and the most beneficial to those in attendance. While in a great majority of cases, those men who attended the two previous conferences came to obtain information rather than to give it, the conference just closed showed the first real indication on the part of the members present to give their own experience as a means of obtaining the experience of others. This was particularly the case in regard to cost figures, especially those covering the operation of department store motor trucks.

Results of Delivery Conference

1—One-delivery-a-day plan endorsed.

2—Central wrapping department voted more economical than clerk wrapping at the counters.

3—First real discussion of cost-accounting methods and truck cost forms.

4—Committee appointed to devise a truck cost system for department store vehicles before the 1920 conference.

5—Discussion of economies in inside delivery department methods which affect outside delivery efficiency.

6—Cleveland selected as the place for the 1920 Delivery Conference, the date to be set during the latter part of February.

Although a motion was made to keep all cost figures given in the meeting secret without mentioning the names of the companies presenting such figures, the motion was killed partly as a result of a protest made by the editor of this magazine who pointed out that the only way to *obtain* was to *give*.

On the third day of the meeting, which was devoted to motor trucks and their cost of operation, one very extensive explanation of truck maintenance and cost figures was given by Mr. Berner, in charge of the trucks and garage of the Rosenbaum Co., Pittsburgh, Pa. He explained that company's drivers' daily record cards and the monthly records for truck operation and maintenance and later outlined the concern's system of bonuses or prizes for drivers and helpers devised as a means of securing greater efficiency and greater care in operation and maintenance by the drivers and garage mechanics.

Aside from this discussion of truck cost accounting and the items which should be included in any form devised for keeping motor truck costs, the two outsanding topics of particular interest to the department store delivery men was the endorsement of the one-delivery-a-day plan and a vote to the effect that a central wrapping department is more economical than clerk wrapping in stores of medium or large size.

While a unanimous vote was made to the effect that one delivery a day is preferable to two or more deliveries, it does not follow that all of the stores whose representatives voted in this manner will be continuing to use one delivery a day when the 1920 conference rolls around. In this connection it was pointed out that department stores must decide whether they want their trucks to be operated efficiently as vehicles or whether they want them to give service as a means of securing greater business, even though the work output of the trucks is far below that which could be secured by full loading, proper routing and the minimum number of trips over any one route.

During the meeting it was brought out by several speakers that the war offered the department stores an opportunity to reduce their delivery service and that the economies thus effected in the reduced cost of vehicle operation and maintenance should be continued hereafter. In some cases an extra charge of 10 or 15 cents per package was made for all special deliveries, in this way making the customer pay for a special service. This action reduced the number of special deliveries handled per day and brought out the fact that the average customer is likely to demand a better service than one delivery a day offers because of the past experience where stores have taught the customer to expect two or three deliveries a day as a means of obtaining business on the basis of service.

The conference was divided up into three 2-day sessions, morning and afternoon, with the fourth day reserved for an inspection of the delivery departments and vehicles of the Chicago department stores.

On the first day, with Walter Rosenbaum of the Rosenbaum Co., of Pittsburgh, Pa., presiding, the meeting was opened by an address of welcome by H. H. Merrick, president of the Chicago Assn. of Commerce, and by a short address by W. H. Mann of Marshall Field & Co. In the afternoon of the same day, S. H. Ditchett, editor of the *Dry Goods Economist*, spoke on "Economic Aspects of the Delivery Problem," and L. E. Studley of Jordan Marsh & Co., Boston, on "One or Two Deliveries a Day, Which?"

On the morning of the second day, internal delivery problems were discussed, including "The Handling of the Package at the Counter," by B. E. Stewart of the National Cash Register Co., Dayton, Ohio, and "The Relation of Service to Good Will," a paper by J. E. Hanley of the J. L. Hudson Co., Detroit, which was read by Hoya H. Block of the Block & Kuhl Co., Peoria, Ill. In the afternoon of the same day "The Package from the Wrapping Desk to the Shipping Department" was discussed by S. G. Whittier and H. Hirschberg of the Lamson Co., Boston, Mass., who showed a large number of photographs and plans of department store delivery conveyors, chutes, central wrapping stations, charge and C. O. D. department equipment, etc. The "Maximum Efficiency in Motor Truck Operation" was discussed by S. S. Merithew of the Packard Motor Car Co., Detroit.

On the third day, "Truck Operating Standards" were discussed by P. S. Fay of the White Co., Cleveland, Ohio, and "Truck Operation and Garage Standards," by Joseph Husson, editor of THE COMMERCIAL VEHICLE. The afternoon was devoted to a frank discussion of truck operating costs and of various phases of truck maintenance, including the uniforming of drivers and helpers; the schooling of drivers and helpers; the possibilities and advantages of insuring trucks by outside companies or by providing a fund from the store's own capital; books of rules for drivers; a discussion of how to charge depreciation, whether by years of service or miles run and cost form standards.

The conference was attended by the representatives of forty-five department stores, six of which are in Canada. Among the cities represented were Boston, Ottawa, Toronto, Minneapolis, Vancouver, B. C., and New Orleans, in addition to many others, including New York, Chicago, Detroit and Cleveland.

The officers elected for the year 1919-1920 were Walter Rosenbaum, Rosenbaum Co., Pittsburgh, Pa., president; H. H. Block, Block & Kuhl, Peoria, Ill., vice-president, and B. M. Arrick of the *Dry Goods Economist*, secretary and treasurer.

In discussing the Rosenbaum Co.'s bonus system for drivers Mr. Berner pointed out that he offered two monthly prizes, one for the lowest cost per mile for truck operation and one for the lowest cost per package delivered. First and second prizes are offered under each heading, the first prize for the lowest cost per mile being $5 and the second prize, $3. The first prize for the lowest cost per package delivered is $3 and the second $2.

At one time he had so much trouble with broken vehicle springs that he took 50 cents out of the driver's wages for each spring broken. This had good results. He also offers another prize of 50 cents a week for the drivers who have their engines cleaned to his satisfaction. He also offers a prize of $5 every 6 months for the greatest number of tire miles of all the tires run and gives a bonus of 50 cents for every 100 miles above the 6000-mile limit. All of the company's cost records which give the final figures of cost per mile and cost per package delivered are kept by one girl who is paid $10 a week.

Latin-American Motor Truck Prospects

Market Better Than Ever, But Presents Many Difficulties

HARD work lies ahead of the American truck manufacturer who wishes to push sales in South America. The market is better than it has ever been before, and there will continue to be an increase in commercial vehicles in the southern republics; yet the distribution of trucks in this territory presents peculiar difficulties.

Much confusion, according to the consular reports, may be avoided by the observance of certain precautions. Prices should be quoted f.o.b. New York, which the dealer can understand, rather than f.o.b. factory, which involves internal conditions in the United States. Catalogs and advertising matter for Brazil should be in Portuguese as well as Spanish, since a large area of this republic contains only Portuguese-speaking peoples. Catalogs and advertising matter sent through the mails are duty free in Brazil and most of the other Latin-American states.

Truck Prices Important

The price of trucks is the greatest obstacle to their more rapid spread. The truck has to compete with the hardy mule. Though the mule is, of course, infinitely less efficient, yet his first cost is small and his up-keep much less in tropical countries than in northern climates. The customs duties in Brazil together with port taxes work out to about 15 per cent ad valorem, which, added to the shipping costs, brings the cost of the truck far higher than in the United States. Consequently the dealer must find his market where the superiority of the truck to animal power is so great, where its special abilities are so marked, as to be practically indispensable.

The Brazilian market, according to commerce reports, seems to require vehicles of 4 to 5 tons capacity. Chain drive is popular; Zenith carbureters and Bosch magnetos are largely used, says Consul Lee. Body makers will not find a profitable market in Brazil, as the local facilities are excellent.

Ecuador will be an increasingly good market for trucks and there is a road-building movement in that State which has already shown practical results in the improvement of the streets of Guayaquil. The same may be said more emphatically of the Dominican Republic, where the American trucks have met with no foreign competition thus far. Under American management there is being carried on a satisfactory road-building program. The streets of Santo Domingo, a city of 35,000 people, are all in good condition, level, and fairly well maintained. There is now a fine macadam road leading from Santo Domingo City and paralleling the seashore to San Cristobal, a distance of 30 kilometers. There are other new macadam highways under construction, one of them extending for about 15 miles, which will connect this city with Santiago. Another road in process of construction will connect the city with the important port of San Pedro de Macoris, a distance of about 40 miles.

There are 10 trucks in this State. The country is provided with adequate garages and a storage battery station, so the obstacles to boosting sales here are small compared with the difficulties in some countries.

1- and 1½-Ton Chain Drives Preferred

Motor trucks are beginning to be employed on the island of Martinique, but the local conditions, limited population and limited wealth, will probably preclude a large increase. About six or seven are now in use. The facilities for transportation by water are so good, and landing places so convenient to the factories, that the animals kept in the plantations for other work provide ample means to get the products to the shipping point. Most of the factories are near the harbors, and some of them extend the plantation railway from the mill to the seashore.

The type now preferred in Martinique are 1½ or 2 ton trucks, chain drive, according to the report of Consul Wallace. Four-wheel drive trucks would be useful here but the price is prohibitive. Summer heat prevails in Martinique all the year round. The air is very damp and the climate is hard on all kinds of machinery, but there is little dust. Body building facilities are poor.

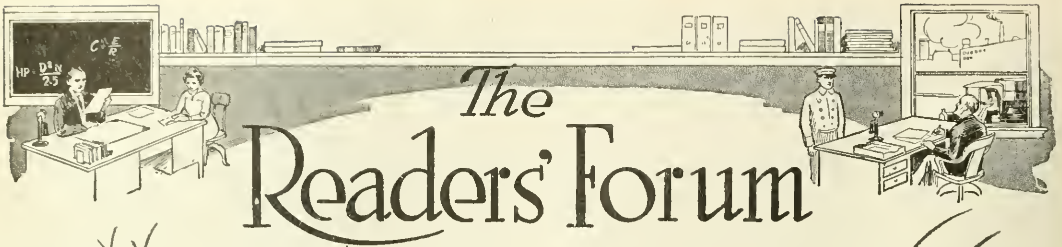
Truck Efficiency Aids Seen at Shows

(*Continued from page 24*)

tomary American practice in the great majority of our trucks.

The new 1-ton Columbia truck made by the Columbia Motor Truck & Trailer Co., Pontiac, Mich., is fitted with a Russel internal-gear-driven gear axle in which the cross brake rods and equalizers are supported in a central bracket fitted around and to the rear of the dead, load-carrying member. A somewhat similar arrangement without equalizers is also employed on the 1-ton Guarantee passenger car converter, which also makes use of a Russel internal-gear-driven rear axle, as shown at the top of page 24.

The unique mounting of the Warner gearset employed on the Denby 3½-tonner is shown directly above. The mounting is of the three-point type with two supports at the rear and one at the front so that the entire gearset can be relieved of any strains set up when the truck frame is flexed in negotiating uneven roads. The new three-part toggle arrangement on the Torbensen internal-gear-driven axle used on the new 3½-ton Republic is also shown directly above. The four-point transmission suspension and brake equalizers of the 5-ton Oneida are also shown above. It is to be noted that the equalizers are supported from the same shafts on which the gearset is hung.



The Readers' Forum

BIG 1919 ROAD APPROPRIATIONS

Present Year Gives Promise of Being Greatest in Highway History

To the Editor, COMMERCIAL VEHICLE:

Will you please give me whatever data you have concerning the total amount of money to be spent on road construction in the United States during 1919? If possible, will you also give the amounts by states?—J. B., New York City.

Both of your questions were answered very fully on pages 24 and 25 of THE COMMERCIAL VEHICLE for Feb. 15, 1919, but in view of the great interest now manifest in road-building work the answers are repeated herewith as follows:

About $300,000,000 will be put into road building this year, according to estimates by experts of the Department of Agriculture, submitted to the Division of Public Works and Construction Development of the Department of Labor. It is understood that about half this amount will go to labor.

The $300,000,000 of construction estimated will not be sufficient to make up deferred war construction, it is believed, for normally the amount spent on roads in the United States is not far below $300,000,000. During the war road building almost came to a stop in many states.

Estimates prepared for the following states are considered accurate within 1 or 2 per cent, according to officials of the Department of Agriculture: Maine, $1,500,000; Rhode Island, $90,000; Connecticut, $4,000,000; New York, $12,000,000; New Hampshire, $175,000; Kentucky, $1,500,000; Alabama, $1,000,000; West Virginia, $16,000,000; Illinois, $9,000,000; Iowa, $15,574,000; Louisiana, $4,674,000; Texas, $20,000,000; Nebraska, $1,657,089.07; North Dakota, $3,000,000; Wyoming, $653,000; Colorado, $3,900,000; California, $20,000,000; Arizona, $900,000; Nevada, $1,148,849.80; Idaho, $1,000,000. New Jersey, Maryland and Montana are expected to make considerable expenditures on roads this year.

U. S. TRUCKS SOLD IN ENGLAND

Twenty-seven of American Makes Now on Market in Great Britain

To the Editor, COMMERCIAL VEHICLE:

Will you kindly answer the following questions regarding the sale of American trucks in Great Britain:

1. How many makes of American trucks are now sold regularly in the British Isles?

2. What are the American names of the trucks sold in Great Britain and what are their British equivalents?

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service

3. How many makes of British gasoline-driven vehicles are manufactured?

4. Where can the specifications of British gasoline, steam and electric freight vehicles be obtained in this country?—K. C. HOWER, New York City.

Answers to your questions in the order given are as follows:

1. There are twenty-seven different makes of American gasoline trucks offered on the British market at this time, according to the specifications of such vehicles as given in the 1919 Year Book and Diary of *The World's Carriers.* The total number of makes of all kinds of gasoline trucks on the British market is seventy-eight, so that almost exactly one-third of the number of makes are of American manufacture.

2. According to the specifications as published in *The World's Carriers,* the following makes of gasoline and electric trucks are offered on the British market for 1919:

American Name	British Name
Acason	Acason
Atterbury	Atterbury
Bessemer	Bessemer
Burford	Burford
Clydesdale	Clydesdale
Denby	Whiting-Denby
———	Detroit
Federal	Whiting-Federal
Ford	Ford
Giant	C. P. T.
Garford	Garford
Gramm-Bernstein	Garner
G. M. C.	G. M. C.
Hurlburt	Hurlburt
Nash	Nash
Kelly-Springfield	Kelly-Springfield
Knox	Knox
Packard	Packard
Peerless	Peerless
Pierce-Arrow	Pierce-Arrow
Reo	Reo
Republic	Republic
Selden	Selden
Standard	Seabrook
Vim	Vim
White	White
Wichita	Wichita
Electric Trucks	
G. M. C. Electric	Edison
G. V.	G. V.
Ward	Ward

3. According to the specifications in *The World's Carrier* Year Book, there are fifty-one British makes of gasoline trucks.

4. We know of no American publication which prints the British truck specifications. A copy of the 1919 Year Book and Diary of *The World's Carriers* containing these specifications is open to inspection at the office of THE COMMERCIAL VEHICLE.

MOTOR TRUCK ORGANIZATIONS

Bodies Serving the Owners, Dealers and Makers of Motor Vehicles

To the Editor, COMMERCIAL VEHICLE:

Where can I get a list of the recognized organizations which serve the motor truck industry as, for example, the Automobile Chamber of Commerce, the Automobile Club of America, etc., together with data pertaining to their personnel and activities?—T. H. SMITH, Packard Motor Car Co. of New York, New York City.

The list of associations mentioned, together with their personnel and activities, is as follows:

National Automobile Chamber of Commerce, Inc.,

7 East 42nd Street, New York City

Objects: To foster the interests of those engaged in the trade or business of manufacturing automobiles and all other self-propelling vehicles.

To reform abuses relative thereto.

To secure freedom of its members from unjust or unlawful exactions.

To diffuse accurate and reliable information as to the standing of merchants and others dealing with members as to all inventions, patents, processes or devices designed or intended for use in, upon or in connection with such vehicles and the manufacture thereof, as to the state of the art relative thereto, and as to the condition or development of the trade in which the members are engaged, in the United States and foreign countries.

To procure uniformity and certainty in the customs and usages of such trade.

To promote the construction of better highways.

To advocate the enactment of just and equitable laws affecting members.

To settle differences between members.

To promote a more enlarged and friendly intercourse among business men engaged in such trade or dealing with persons engaged therein.

To acquire by grant, gift, purchase, devise or bequest, to hold and dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patent and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit.

Officers

President, Charles Clifton; vice-president, Hugh Chalmers; second vice-presidents, R. D. Chapin, Gasoline Passenger Car Division; Windsor T. White, Commercial Vehicle Division; secretary, C. C. Hanch; treasurer, H. H. Rice; general manager, Alfred Reeves.

Society of Automotive Engineers, Inc.

29 West Thirty-ninth Street, New York City.

Objects: To promote the arts and sciences connected with engineering and mechanical construction of automotive apparatus.

Officers

President, Charles M. Manly, vice-president, B. B. Bachman; second vice-president, E. H. Belden; third vice-president, Elmer A. Sperry; fourth vice-president, T. B. Funk; fifth vice-president, John J. Amory; sixth vice-president, L. S. Keilholtz; treasurer, Charles B. Whittelsey; secretary and general manager, C F. Clarkson.

Automotive Equipment Association
1813-1818 City Hall Square Bldg.,
Chicago, Ill.

Officers

President, P. H. Lyon, California; vice-president, R. R. Englehart, Iowa; chairman of the board of directors, R. B. Stranahan Ohio.

Motor & Accessory Manufacturers
33 West Forty-second Street, New York City.

Objects: To promote in all lawful ways the interests of makers of motors, motor parts and accessories.

To aid in the protection of its members.

To secure the advantages to be obtained by mutual co-operation.

To facilitate the collection of the claims of its members and the diffusion of information concerning trade dealers, credits and other matters of interest to the members of the association.

Officers

President, C. E. Thompson; first vice-president, E. H. Brodwell; second vice-president, Christian Girl; third vice-president, W. O. Rutherford; treasurer, L. M. Wainwright; secretary, T. H. Wetzel; assistant treasurer, James H Foster.

Rubber Assn. of America, Inc.,
52 Vanderbilt Avenue, New York City.

Objects: To promote in all lawful ways the commercial interest of its members and to secure the advantages to be obtained by mutual co-operation.

To acquire and disseminate information concerning trade conditions at home and abroad, credits and other matters of interest.

To stimulate social intercourse among those connected with the rubber industry and commerce.

In general to promote the welfare of the rubber industry.

Officers

President, Homer E. Sawyer; first vice-president, Harry T. Dunn; second vice-president, Frank A. Seiberling; secretary and treasurer, Harry M. Vorhis.

Motor Truck Assn. of America, Inc.
1790 Broadway, New York City.

Objects: To encourage the efficient use of motor trucks and protect users against unjust taxes or unreasonable restrictions of any character.

To serve as a basis for a strong national organization of those interested in the commercial use of motor trucks and within the present membership district.

Officers

President, Charles M. Geiger; executive secretary, T. D. Pratt; first vice-president, John M. Wierk; second vice-president, L. E. Campbell; third vice-president, Albert C. Bergmann; secretary, Joseph Husson; treasurer, William P. Held.

INTER-CITY TRUCKING ARTICLES

Much Information Published on Rates Charged and Cost of Operating

To the Editor, COMMERCIAL VEHICLE:

We expect to form a trucking company to operate between Buffalo and Rochester and are therefore anxious to have you advise us of any articles which you have published on the operation of successful companies operating trucks between cities. We should also like some information as to rates to be charged, cost of operation, etc.—RALPH E. BROWN, A. W. Haile Motor Co., Buffalo, N. Y.

THE COMMERCIAL VEHICLE has published a great number of articles on overland haulage by motor trucks. Many of these have given the rates, cost of operation, profits, routes covered and complete information as to the goods handled and the organizing methods pursued.

How to Organize a Motor Truck Company for Overland Haulage is the title of a comprehensive article which appeared on pages 5, 6 and 7 of THE COMMERCIAL VEHICLE for April 15, 1918. A close study of this article will undoubtedly be of great value to you.

In addition, other articles treating of actual installations of motor trucks in overland haulage in various parts of the country have been published in the following issues of this magazine:

Freight Being Hauled Successfully Between New York and Philadelphia by Trucks, pages 5 to 9, January 15, 1918. This article gives a good deal of information regarding the size of trucks, the rates charged, the route followed and the method of operation.

Akron to Boston, 740 Miles by Truck, pages 5 to 11, February 15, 1918. This article tells of the fleet of pneumatic-tired 3- and 5-ton motor trucks now operated by the Goodyear company, between Akron, Ohio, Boston, Mass., and Goodyear, Conn. It gives the route followed and other information concerning the experience gained by the Goodyear company during its operation of the truck since April, 1917. The second part of this same article appeared in the March 15, 1918, issue of THE COMMERCIAL VEHICLE, and contains more detailed information regarding the truck equipment and type of body furnished.

Akron to Cleveland by Truck, pages 24 and 25, March 1, 1918. This article deals with the development of motor trucking between the two centers mentioned.

Twice a Week Truck Service from Boston to New York, pages 15 and 16, March 15, 1918. This article tells of the service installed by one company operating two trucks each week from each end of the route between Boston and New York. It gives the rates charged and the method of operation.

Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton, pages 5 to 9, April 1, 1918. This article tells how the Ohio Freight Delivery Co., Cleveland, Ohio, serves Sandusky, Akron and Canton. A cost estimate for one of the 3½-ton trucks in operation is given together with the charge scale of the company.

Some Actual Mileage, Average Speed and Oil and Gasoline Consumption Figures on Goodyear Overland Trucks, page 9, April 15, 1918. This article tells of some of the results of trips made by the Goodyear trucks.

Route Cards for Drivers of Trucks in Overland Hauls Save Delays on the Way, page 11, April 15, 1918. This article describes the route cards introduced by the Highways Transport Committee for driving army trucks overland.

Day Rates for Overland Haul Trucks in Buffalo, page 25, April 15, 1918. This article tells a little of what Buffalo did to help relieve railroad congestion by introducing trucks. It also gives some rates per hour for hauling material as given by the J. F. Kulp & Sons Co., Buffalo, N. Y.

Poor Condition of Akron-Cleveland Road Costly, pages 18 and 19, May 1, 1918. This article tells of the bad conditions encountered by trucks on the road between Akron and Cleveland.

New York to Philadelphia Haulage Company also Handles Farmers' Food Products; pages 5, 6 and 7, December 15, 1918. The company of Arrott & Fauce is the haulage company spoken of. It operates a large fleet of trucks between New York and Philadelphia on regular schedule and has its own return-loads operator so that it is very seldom that its trucks run empty.

Conscientious Service Makes Trucks Succeed, pages 30, 31 and 32, January 1, 1919. This tells the story of how a man in Hartford has established a well-paying business in overland hauling.

Reo Company Operates Own Overland Haulage Line to Get Incoming Goods from Detroit, pages 21, 22 and 23, March 1, 1919. The Reo company operated trucks over the road from Lansing to Detroit, 104 miles apart, to get its material promptly while the railroad congestion was at its greatest. On pages 22 and 23 are shown daily costs on THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks sheets.

Four Michigan Truck Lines Use One Warehouse, pages 8 and 9, March 1, 1919. These four companies all operate out of Flint to cities within about a 70-mile radius and utilize the one warehouse in Flint.

MID-WEST TRUCK HAUL CONCERNS

Many Overland Haulage Organizations in All Parts of the Country

To the Editor, COMMERCIAL VEHICLE:

We are anxious to secure a list of overland transportation companies operating in the middle west, particularly around Columbus, Ohio.—J. D. PAPINEUA, Sykes Motor Transport Co., Columbus, Ohio.

Below is a list of some of the best-known truck companies which are operating in the middle west:

Name and Address of Company and Routes

Chicago, Waukegan & Gary Transportation Co., Chicago, Ill.—Chicago, Waukegan and Hammond, Ind.

W. B. Ensign, Alliance, Ohio—Canton to Cleveland.

Goodyear Tire & Rubber Co., Akron, Ohio—Akron, Ohio, and Boston, Mass.

Otto Knutsen Trucking Co., Cleveland, Ohio—Cleveland and Akron.

Motor Freight Service Co., Salt Lake City, Utah— Salt Lake City and Ogden.

Ohio Freight Delivery Co., Cleveland, Ohio—Cleveland, Elyria, Lorain, Norwalk, Sandusky, Ravenna, Akron, Hudson and Barbeton.

George C. Penny, Monroe, Mich.—Monroe and Toledo.

Albert N. Reis, Toledo, Ohio—Cleveland, Toledo, Detroit and Chicago.

Racklind & Farber, Indianapolis, Ind.—Indianapolis and Chicago.

Transportation Service Co., Richmond, Ind.—Richmond and New Paris, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio—Akron and Chicago.

Cross Country Transportation Co., Council Bluffs—Destination unknown.

Service Transportation Co., Muskogee, Okla.—Muskogee, Tulsa, Haskell, Claremont, Richardsville, Henryetta, McAlester, Vinita, Tahlequah and Okmulgee, Okla.

Liberty Highway Co., Detroit, Mich.—Detroit and Toledo.

Detroit Distributing Co., Detroit—Detroit to Coldwater, Mich.

Reo Motor Truck Co., Lansing, Mich.—Detroit to Lansing, Mich.

Republic Transfer Co., Flint, Mich.—Lansing and Flint.

Overland Motor Express Co., Flint, Mich.—Flint, Owosso, Saginaw, Bay City, Midland and Alma.

Intercity Trucking Service Co., Flint, Mich.—Flint and Detroit.

H. A. Ward, Flint, Mich.—Detroit, Ann Arbor, Flint and Port Huron.

Suburban Motor Transfer Co., Kansas City, Mo.—Kansas City to five nearby towns, Martin City, Belton, Longview Farm, Lees Summit (two routes terminate here).

Cleveland, Akron & Canton Transfer Co., Cleveland, Ohio—Cleveland, Akron, Canton, Alliance, Youngstown, Niles, Warren, Ravenna, Kent, Barbeton.

Highways Motor Transport Co., Cleveland, Ohio—Cleveland to Willoughby, Painesville, Fairport, Perry, Madison, Unionville, Geneva, Ashtabula, Conneaut. Cleveland to Lorain, Vermilion, Huron, Sandusky, Milan, Bogart, Norwalk, Wakeman, Wellington, Oberlin, Elyria.

J. F. Dewey, Columbus, Ohio—Columbus to Newark, Ohio; Columbus to Circleville, and Lancaster, Ohio; Columbus to Marysville and Delaware, Ohio.

National Motor Freight & Express Co., East Chicago, Ind.—South Bend to Valparaiso and Gary.

C & D Motor Delivery Co., Cincinnati, Ohio—Dayton and Cincinnati.

Two examples of Napoleon 1-ton design. On the left is a side stake body and on the right is a flare-board express

Napoleon Brings Out Two New Models of Internal-Gear Driven Type

NAPOLEON SPECIFICATIONS

Capacity, tons	1	1½
Price	$1,285	$1,485
Wheelbase, in.	132	132
Tires, front	32 x 3½	35 x 5p
Tires, rear	32 x 4	35 x 5p
Bore, in.	3½	3½
Stroke, in.	5	5
N. A. C. C. hp.	19.60	19.60
Speed, r.p.m.	....	....
Speed, m.p.h.	....	....
Gear ratio in high gear	6 to 1	7 to 1
Final drive	Int. gear	Int. gear

THE Napoleon Motors Co., Traverse City, Mich., is planning an extensive construction program on two internal-gear driven truck models of 1 and 1½-ton capacities and has taken steps to increase its working capital to provide for the increased production schedule by the sale of the remaining $350,000 worth of the unsubscribed common stock, bringing the total stock issue up to $500,000. The original plans of the company were to turn out about 864 1-ton trucks and 136 1½-tonners for 1919. Now it plans a larger production, ranging from eight to ten a day.

Specifications of both models appear to be identical with the solitary exception that pneumatic tires are specified as regular equipment on the 1½-tonner, while the 1-ton job has solids. Starters are supplied at an extra charge of $50.

The Gray engine has block-cast cylinders with overhead valves. The 2-in. crankshaft is carried on three bearings. Each model employs a unit power plant, consisting of the four-cylinder engine; a Fuller multiple dry-disk clutch; a Fuller three-speed selective gearset; a tubular propeller shaft with three universal joints, and a Clark internal gear rear axle. Shafts are of chrome nickel steel and gears are of 3½ per cent nickel steel.

Lubrication is by a combination force and splash system, the oil being pumped to the main bearings. Cooling is thermosyphon, used in conjunction with a Chicago radiator of the finned tube vertical type, having a removable cast-iron case. The Stromberg carburetor is gravity-fed from a 16-gal. tank located under the seat.

Ignition is by Connecticut battery system and Auto-Lite single unit starting and lighting can be installed at an extra cost. Governors of any specified make can be installed, but are not furnished as regular equipment.

From the gearset the drive is taken to the rear axle by means of a three-part propeller shaft. The torque is taken through the driving axle by bolting to the load-carrying axle, the bolting being made at the spring centers.

Located on the propeller shaft amidships, immediately back of the S. K. F. intermediate ball bearing, is the service brake, operated by the foot pedal. Both the service and the hand brakes, the latter on the rear wheels, are external contracting. The diameter of the service brake is 10 in. and the width is 4 in. The diameter of the hand brake is 14 in. and the width is 2½ in.

The front and rear springs on both models are half-elliptic. The frame in each case is of rigid construction of rolled channel steel. It is equipped with a Lavine steering gear located on the left, with levers and brakes also on the left. Gearshift is also at the left. Standard equipment consists of electric head and tail lamps, electric horns, jack and tool kit. It is equipped with front and rear fenders with express body only. The cab is of the convertible all-weather type, while the bodies are that of the standard express, equipped with top and side curtains.

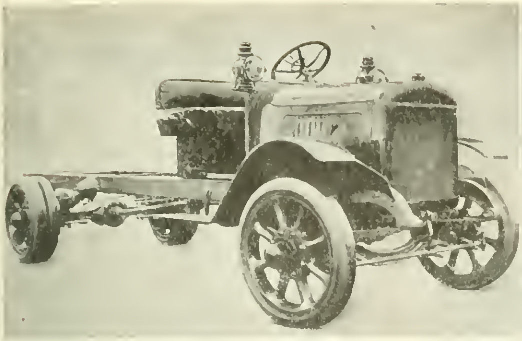
Republic Offers Two Improved Models of 2½ and 3½-Ton Capacity

THE Republic Motor Truck Co., Alma, Mich., has brought out new models of 2½ and 3½-ton capacity to supersede other models of the same rating previously manufactured. The two new models are internal-gear-driven as before, but differ from their predecessors in that each has a Continental engine instead of a Buda; a four-speed instead of a three-speed gearset; a larger radiator and a new type of Pharo oil governor driven by helical gears from the inlet camshaft. Other features of the design which follow 1919 trends include the use of oilless bearings on the brake-shaft brackets and brake pedal and the mounting of the rear axle on the Hotchkiss drive principle. The 3½-tonner is fitted with Smith metal wheels of the spoke type as standard equipment and they may also be fitted with pneumatic

REPUBLIC SPECIFICATIONS

Capacity, tons	2½	3½
Price	$2,395	$3,450
Wheelbase, in.	144	165
Tires, front	36 x 4	36 x 5
Tires, rear	36 x 7	36 x 5d
Bore, in.	4⅛	4½
Stroke, in.	5¼	5½
N. A. C. C. hp.	27.20	32.40
Speed, r.p.m.	....	....
Speed, m.p.h.	....	....
Gear ratio in high gear	8 to 1	10 to 1
Final drive	Int. gear	Int. gear

Three-quarter view of chassis and cab of the new 1½-ton Napoleon truck



Left—New 3½-ton Republic "Dreadnaught" is fitted with metal wheels

Right—Republic's 2½-ton model "Invincible," showing increased frontal area of radiator

tires all around at extra charge. Those used in the rear are 44 by 10 in.

Each model employs a unit powerplant consisting of a Red Seal Continental engine; a multiple dry-disk clutch and a four-speed selective gearset; a two-piece propeller shaft and a Torbensen internal-gear rear axle.

The cylinders are cast in block on the 2½-tonner and in pairs on the 3½-ton model. Cooling is effected through the use of a cellular core radiator with a cast tank with fins. The frontal area of the radiator on the 2½-ton model has been increased to 450 sq. in. and to 600 sq. in. on the 3½-tonner. The core in each case is removable. Ignition is by means of a high-tension magneto in each case, with the spark advance operated by hand. No starter or electric lights are furnished.

From the gearset the drive is taken to the rear axle by means of a two-part propeller shaft, supported at the center by a self-aligning bearing. The torque and propulsion are both taken through the rear springs on each model on the Hotchkiss principle.

On the 2½-tonner the service brake is external contracting and the hand brakes internal expanding on the rear wheels. On the 3½-tonner the design is reverse, the service or foot brakes being of the double-internal type on the rear wheels and the hand brake of the external-contracting type on the propeller shaft. The frame in each case is made of pressed steel. Left steer and center control are employed on both models. Equipment in each case consists of the driver's seat, fenders, short runningboard and a tool box with complete tool kit and jack, as well as side and rear oil lamps, seat cushion and horn.

New 3½-Ton Tower Designed for Use in Inter-City Service

TOWER SPECIFICATIONS

Capacity, tons	3½
Price	$4,100
Wheelbase, in.	165
Tires, front	36 x 5
Tires, rear	36 x 5d
Bore, in.	4½
Stroke, in.	5½
N. A. C. C. hp.	32.40
Speed, r.p.m.	....
Speed, m.p.h.	12
Gear ratio in high gear	6.7 to 1
Final drive	Worm

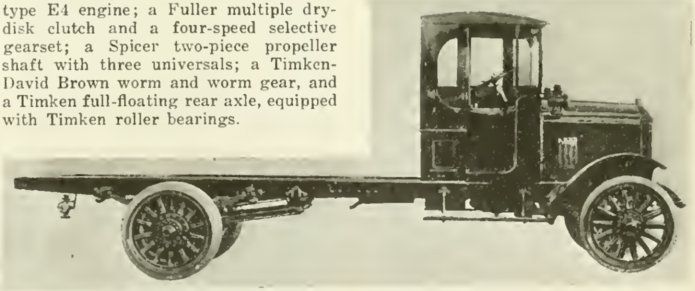
THE Tower Motor Truck Co., Greenville, Mich., has brought out a 3½-ton worm-driven model, designed primarily for service in inter-city freight transportation. The company is also producing a 2-tonner, substantially the same as the 3½-ton job, except for the use of suitably sized units to accommodate its relatively smaller carrying capacity.

The drive is taken from a Continental engine to a Fuller four-speed gearset which is a unit with the engine, through a tubular propeller shaft to a worm gear. Other features include a Pierce transmission-driven centrifugal governor and the lubrication of the plain bearings by oil cup bolts, by which oil is conveyed to the inside of the bearings by wicks. Lubrication is non-circulating splash. The new model is equipped with wood wheels of the artillery type and with solid tires all around.

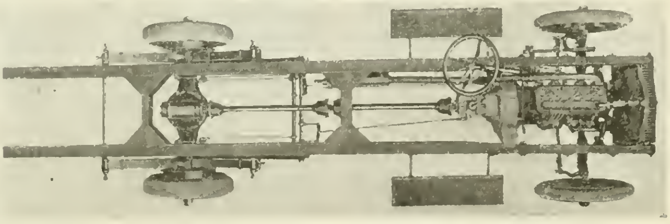
The unit power plant consists of a type E4 engine; a Fuller multiple dry-disk clutch and a four-speed selective gearset; a Spicer two-piece propeller shaft with three universals; a Timken-David Brown worm and worm gear, and a Timken full-floating rear axle, equipped with Timken roller bearings.

The cylinders are cast in pairs and the valves are placed at the left. Cooling is effected through the use of a zig-zag tube radiator with a cast-iron radiator

(*Continued on page* 36)



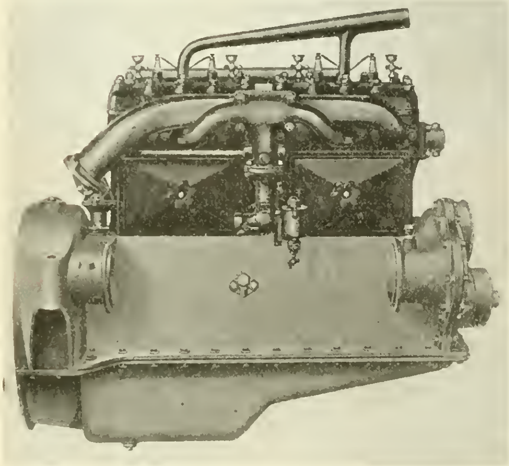
Side view of 3½-ton Tower worm-driven model for inter-city freight service



View of chassis of 3½-ton Tower, showing simplicity of design combined with rugged construction

Hinkley Brings Out Three Truck and Tractor Engines

Fruehauf Four-Wheeled Trailer—New Guide Lamp with Auxiliary Reflector — B & D Electric Valve Grinder



Right side view of Hinkley Model HAA engine, suitable for trucks of 1½ to 2½-ton capacity. Note hot-spot manifold design

Three Hinkley Heavy-Duty Engines

THE Hinkley Motors Corp., Detroit, is now entering commercial production with a line of truck and tractor engines built around the standards of design and workmanship utilized in the manufacture of the Class B Government engine. Having, through its experience with the military truck engine, reached the conclusion that this design represents the best in construction for heavy-duty automotive purposes, the Hinkley corporation will manufacture this same type of engine under the name Hinkley-Class B. In addition, the models HA and HAA are built along the same lines and show the same characteristics with reference to appearance and performance.

This gives a line of three engines, all of similar characteristics, rated at 55 hp. at 1400 r.p.m. for the Hinkley-Class B, 45 hp. at 1500 r.p.m. for the HA, and 35 hp. at 2000 r.p.m. for the HAA. These engines are respectively suitable for 4 to 6-ton, 3 to 4-ton, and 1½ to 2½-ton commercial vehicles, and 4-plow, 2 to 3-plow, and 1 to 2-plow farm tractors.

Class B Engine Block Cast

The Class B military engine has been described frequently and is familiar to truck engineers. The Hinkley-Class B is similar in practically all respects to the Government design, the only changes being in manufacturing detail. The Class B is 4¾ by 6 in., with cylinders block cast.

The Model HA is 4½ by 5½ in. and is otherwise identical, with the same rigid inspection safeguards as its predecessor, the Class B. The Model HAA is 3¾ by 5¼ in. and is also adopted for 4-in. bore cylinders for the purpose of utilizing it in connection with maximum 2½-ton truck sizes, enabling truck manufacturers to standardize on one engine that will take care of trucks ranging from 1½ to 2½ tons.

The general description and specifications of these three engines are similar. The block cylinder castings have two detachable heads and are mounted on a cast-iron crankcase with a removable pressed-steel pan. The cylinders are L-head, all the valves being enclosed. All the engines have three-point suspension, the rear mountings being on the flywheel housing and the front mounting is a large-sized trunnion on the gearcase cover.

Hot-Spot Manifold Design Used

Pump water circulation is used, a centrifugal pump with one connection to the cylinder being employed. The water outlet header has two connections of tubular construction, to secure the proper water distribution to each cylinder group. To assist in vaporizing the fuel the engines have the hot-spot manifold design, assisting in completing vaporization and helping to minimize crankcase dilution. Another feature of the construction is the surplus of metal around the head bolts, preventing possibility of unequal pressure on the head gasket when tightening the bolts.

Full Force-Feed Lubrication

A full force-feed lubricating system is employed with the oil pump submerged in the oil pan, the latter being integral with the crankcase so that the crankcase can be dropped without disturbing the pump. The oiling system is so arranged that the lubricant feeds through a complete copper tubing system, clipped to the inside of the crankcase and carrying the maximum oil pressure to all the needed points. To maintain constant pressure, there is an automatic regulating relief valve. The oil gage is on the side of the crankcase and is of the conventional bayonet blade type.

The piston displacement of the Model HA is 350 cu. in. and on the HAA 232 cu. in. for the 3¾-in. bore and 264 cu. in. for the 4-in. bore. The valve diameters

Side view of new four-wheel Fruehauf trailer using double trucks are 2 in. on the HA and 1¾ in. on the HAA. All the engines have the valves on the right side, with the manifolds on the same side as the valves. The general characteristics of the engine are such that they all show better than 0.6 lb. of gasoline per brake horsepower hour under maximum load conditions. One of the characteristics of the Class B engines was its heavy crankshaft, and this same feature will be followed in the smaller models.

New Fruehauf Trailer

THE new Fruehauf reversible four-wheel trailer is designed to eliminate objections to the use of four-wheel trailers by the adoption of two of the oldest principles used in the construction of various types of heavy haulage vehicles such as freight and street cars.

The first of these is the use of double trucks, or two identical, independent and reversible sets of running gear, for carrying the frame. This is an application to the trailer of the principle of construction used in railway cars and practically all forms of heavy haulage vehicles excepting self-propelled vehicles, to which it is not applicable. The second radical departure from previous designs of trailer construction is the introduction of the circle-steer principle.

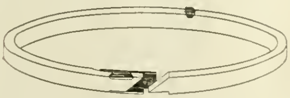
In addition to simplifying the construction and giving a greater sturdiness to the trailer unit, the application of these two old principles to the modern trailer has eliminated the danger of the trailer "snaking" or failing to track faithfully with the truck, and the resultant strains and stresses on the truck and its power plant.

Two other features of this new unit are the cushioning of the load made possible by the use of double trucks, or gears under the frame, and the fact that the foundation for any type of body is built in the frame itself.

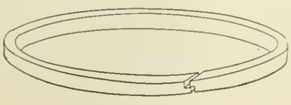
Springs are relieved of strains of hauling the load, the latter being pulled through the dead-square axle of the front truck under the frame. Radius rods absorb all thrust, further relieving the springs of any strain other than that of cushioning the load.

In addition to these features the construction of the double trucks, or gears, permits the springs being placed approximately 11 inches farther apart than is customary on trailers or trucks—giving more resiliency and cushioning power, and enabling the axles to carry in the neighborhood of 1000 lb. greater weight.

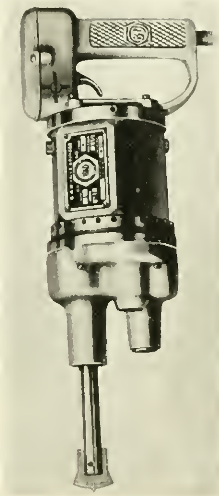
The frame construction provides the foundation for any type of body, allowing the floor to be built flush with the top of the channel frame, and adding to the strength and rigidity of the frame itself.



Permaseal Piston Ring



Schaap Piston Ring



B & D Electric Valve Grinder

Permaseal Piston Ring

THE Grundy Mfg. Corp., New York, is manufacturing a one-piece concentric piston ring, having an integral miter-cut joint, embodying a patented flanged metal insert.

The rings are cast individually from material which insures resiliency and eliminates danger of scoring cylinder walls. The patent sealing joint is made of a special alloy of metals and wears in the same ratio as the ring proper. This joint is pressed on and rigidly attached by a stud, formed from the ring itself during the milling-out process.

The top of the ring is miter cut and the milling-out process, together with the stud, it is claimed, makes it impossible for the insert or joint to slip or become loose in usage.

Sizes from 2 in. to 3⅞ in. cost $1 each, and from 4 in. to 4⅞ in. $1.25 each, and larger sizes up to 5⅞ in. $1.50 each.

Guide Lamp with Auxiliary Reflector

A NEW head lamp adaptable for the use of motor trucks has recently been placed on the market by the Guide Motor Lamp Mfg. Co., Cleveland. The new feature is the auxiliary reflector which is intended to be used for city driving and when passing other vehicles on the road as the light is thrown down in front of the truck, the large bulbs being unlighted. The efficiency of the large reflector is scarcely impaired. It is made in different sizes.

New Guide Lamp

Schaap Piston Rings

THE Schaap Automobile Co., Brooklyn, N. Y., is producing a one-piece concentric ring having a joint designed to not only prevent oil from reaching the combustion chamber, but also to form a hydraulic cushion which tends to prevent piston slap.

In other words, laboratory tests demonstrate that vacuum is registered on the face of the ring and pressure on the back. It is stated that the ring does not depend solely on mechanical pressure to hold it against the cylinder wall, as the oil which is constantly pumped to the back of the ring gives an outward thrust and equalizes cylinder wall pressure.

The rings are heat treated to insure equal density, permanent set, etc. Prices are $1 each up to 4 in., $1.25 up to 4¾ in. and $1.50 for larger sizes up to 5½ in.

Black & Decker Electric Valve Grinder

THE Black & Decker Mfg. Co., Baltimore, Md., has developed a new electric valve grinder. It is an electric motor-driven device with an oscillating spindle which has a long, steady sweep similar to the movement obtained by hand grinding.

The pistol grip and trigger switch allow easy handling and control. The motor is 1/16 hp., and is air cooled. It will operate on either alternating or direct current, and can be obtained for voltages of 110, 220 or 32 volts.

The motor and gearing with reciprocating mechanism are completely enclosed in an aluminum housing, the gearing and oscillating movement being separated from the motor compartment and packed in grease. The grinding spindle runs in a ball thrust bearing. The armature shaft runs on Norma ball bearings, and the gears are mounted on shafts ground to size supported at both ends in long phosphor bronze bushings.

Bits are provided to make the tool adaptable to various types of valves. The price is $45.

Men and Makers

DART TRUCK & TRACTOR CORP., Waterloo, Iowa, elected the following officers at its annual meeting: President, C. C. Wolf; vice-president and general manager, W. H. Johnson, formerly chief engineer; vice-president and sales director, M. D. Herron, and secretary and treasurer, E. L. Stover. H. H. Henry, the retiring president, has accepted the vice-presidency of the Maxim Munitions Corp., the Atlantic seaboard and export distributors of the Dart line.

Commerce Motor Car Co., Detroit, has approved plans for the new addition to its plant. With the new building the company will have 100,000 sq. ft. of floor space. The addition will be of brick and steel, and will have 285 ft. frontage on Mackie Street.

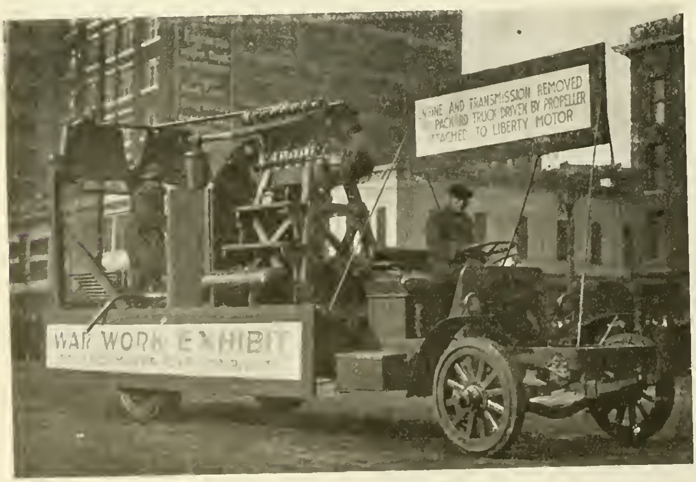
Napoleon Motors Co., Traverse City, Mich., is under the management of the following men: President, W. J. Chase; vice-president, C. E. Culver; treasurer, Frank Trude; secretary, A. L. Bachant; general manager, engineer and purchasing agent, J. W. Oswald; superintendent, John C. Schaufele; sales and advertising manager, George L. Brady.

Studebaker Corp., South Bend, Ind., has completed plans for the erection of a new sales and service station in Detroit. The present quarters are at 513 Woodward Avenue. The location of the new station has not been definitely decided upon, but it will be built in the north end of the city.

Denby Motor Truck Co., Chatham, Ont., has purchased the factory of the Wolverine Brass Co. of that city.

Dart Truck & Tractor Corp. has reorganized its district representatives as follows: A. W. Cook remains with territory reduced so as to give closer cooperation with dealers and distributors. He will have charge of Iowa, Nebraska and South Dakota. M. W. Cline will represent the factory in Kansas, Missouri and Oklahoma. R. C. Zethraeus will have charge of Texas and Louisiana, with headquarters at New Orleans, La. A. H. Kreitler will cover Arkansas and Mississippi, with headquarters at Little Rock, Ark. H. P. Federspiel will look after the factory interests in Indiana, Illinois and Kentucky. Atlantic seaboard and export distribution will be handled entirely by the Maxim Munitions Corp., New York City.

Wichita Falls Motor Co., Wichita Falls, Texas, at its annual stockholders' meeting elected J. A. Kemp, who has been president of the company since its organization, chairman of the board of directors. J. C. Culbertson, who has been secretary, treasurer and general manager, was elected president of the company. He was also re-elected treasurer. A. G. Savelli was re-elected vice-president in charge of export, and G. S. Drenemann, secretary. Two new buildings in course of erection have recently been completed.


NE AND TRANSMISSION REMOVED
PACKARD TRUCK DRIVEN BY PROPELLER
TACHED TO LIBERTY MOTOR
WAR WORK EXHIBIT

This engineless Packard 3-ton truck, weighing 7,000 pounds, was driven around the streets of Detroit recently by an air propeller mounted on one of the Packard-made Liberty engines set up on the truck body

White Co., Cleveland, Ohio, has opened a new service station in Philadelphia in conjunction with its branch already established in that city. The new station is located at Twentieth and Erie avenues, and covers an area of 5 acres, with 86,000 sq. ft. floor space under a saw-tooth roof of refracted glass. The building is one story high. Each department of the station is a unit in itself, that is, each department has its separate manager, and all these managers are under the direction of J. H. Vogler, who was appointed general manager of the entire station. Connected with the service station is a cafeteria, at which food is served at its cost of production. There is a reading room, a music room and space is also allotted for outdoor sports.

Reliance Motor Co. has been appointed distributors of Master trucks in Cincinnati and surrounding territory. Robert D. Doepke is president of the company, and Edward Ulrich, secretary and treasurer.

Columbus-White Motor Truck Co., is the new central Ohio distributor for White motor trucks.

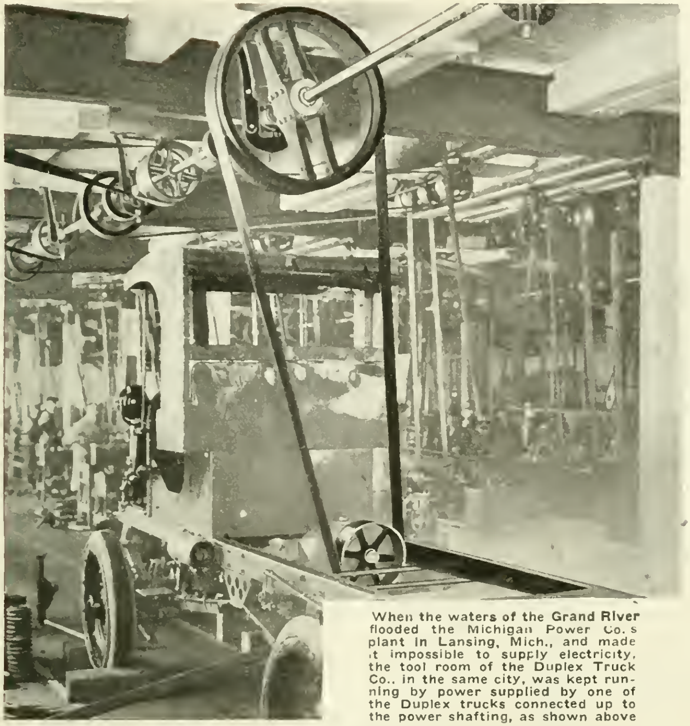
Van Dorn Sales Co. will handle Grant trucks and passenger cars in seventeen central Ohio counties. The company has been organized by T. W. Van Dorn, who will establish salesrooms and headquarters in Columbus, Ohio. Associated with Mr. Van Dorn is Frank W. Kultchar, who will act as sales manager.

Hanson & Tyler Auto Co., Fort Dodge, Iowa, with branches in Sioux City, Iowa; Sioux Falls, S. D.; Webster City and Des Moines, will sell the line of the Dart Truck & Tractor Co. in western Iowa and South Dakota.

Goodyear Tire & Rubber Co., Cleveland, Ohio, now in the Buick Building, will move into new quarters at the corner of East Twenty-first and Chester streets. The new quarters will have a floor space of 43,000 ft. on two floors. The lower floor will be occupied by the local branch organization and the upper floor by the district organization, which is to be moved from Detroit to Cleveland.

Kelly-Springfield Tire Co. has opened a branch house in Toledo, Ohio. Charles E. Ball, formerly of the Cleveland branch, is general manager, and H. H. Pierce, also of Cleveland, is office manager.

General Motors Acceptance Corp., New York City, has been formed by the General Motors Corp. to assist truck and passenger car dealers in financing their sales.



When the waters of the Grand River flooded the Michigan Power Co.'s plant in Lansing, Mich., and made it impossible to supply electricity, the tool room of the Duplex Truck Co., in the same city, was kept running by power supplied by one of the Duplex trucks connected up to the power shafting, as shown above

McGraw Tire & Rubber Co. executive and general offices, have been transferred from East Palestine to Cleveland, Ohio. The new offices are located at 1900 Euclid Avenue. A sales department will be maintained at 1904 Euclid Avenue.

Superb Mfg. Co., Monticello, Ind., will bring out a line of light and heavy trailers within the next 60 days. The company has heretofore manufactured parts and accessories, and is now adding the trailers to its line. In order to have sufficient facilities for the additional line, it is adding 20,000 sq. ft. of floor space to its present plant.

M & S Gear Corp., formerly of Detroit, Mich., is moving its offices to Cleveland, Ohio.

L. V. Flechter & Co., New York City, has opened a branch in Los Angeles, Cal., which is in charge of M. J. Siebert, who for 10 years has been road salesman for the Neptune Motor Co., a subsidiary of the Flechter Co. J. J. Frank has been appointed district manager of sales for the Metropolitan district.

Marvel Carburetor Co., Flint, Mich., is breaking ground for a new two-story factory building which should be completed by early summer, and which will give the company a capacity of 2500 carbureters daily. The new establishment will cost approximately $300,000, and includes a foundry which will permit the company to make its own castings and all other parts with the exception of screw machine products.

Sewell Cushion Wheel Co., Detroit, has grown from a room in the rear of a blacksmith shop with equipment consisting of a single drill press and a few small hand tools in 1907 to a new six-story reinforced concrete building with a total of 50,000 sq. ft. of floor space in 1917. In the spring of 1910 the Sewell company was incorporated with a capitalization of $60,000, and this was increased in April, 1912, when a new corporation was formed with a capital stock of $300,000. The officers of the company are: H. J. Sewell, president and general manager; J. H. Hammes, vice-president and assistant manager; R. S. Moore, secretary; W. T. Sewell, treasurer; F. E. Boylan, sales manager, and J. C. Sallee, advertising manager.

Prudden Wheel Co., Lansing, Mich., was the scene of a fire last week. The blaze was extinguished before it gained headway, but the damage from flames and water will total $10,000. The fire was confined to the finished stockroom, and when the sprinkling system let go it soaked a large quantity of kiln-dried wheel spokes ready for use.

Commercial Body Co., Columbus, Ohio, has leased the plant of the Poste Bros. Buggy Co., which will be remodeled into a plant for the manufacture of truck bodies.

Chicago Truck Body Co., Chicago, Ill., has been incorporated with a capital stock of $15,000, to manufacture bodies for motor vehicles. The incorporators are; F. G. Volz, J. D. Volz and Paul Kettering.

Standard Parts Co., Cleveland, Ohio, moved its central offices in that city to the company's new office building just completed on Walnut Avenue at East Eleventh Street. The central office organization includes the executive and supervisory staff, credits, collections, disbursements, advertising and contracting for the larger material supplies. The sales, engineering, production, cost and purchasing offices will be located at the several plants.

American Bosch Magneto Corp., New York City, has moved its main office to Brightwood Post Office, Springfield, Mass. All communications should be addressed to Massachusetts instead of New York hereafter.

Ahlberg Bearing Co., Chicago, is erecting a new factory building which will be equipped to give 24-hour service on any bearing grinding job.

Holmes Foundry Co., Port Huron, Mich., whose big south-end plant was wiped out by fire recently, is rebuilding its foundry and hopes to resume production within 60 days. To meet its demands, the company has increased production at its north-end plant to 60 tons of steel castings daily.

James J. Sevick has been appointed sales manager of the newly formed Republic Truck Co., Chicago.

Harmon J. Kline, formerly designing engineer with the Olds Motor Works, Lansing, Mich, has been released from the service, where he was a lieutenant in the Ordnance Department, and has joined the engineering staff of the Packard Motor Car Co.

H. B. Parmlee, previously service manager of the Atterbury Motor Car Co., has been promoted to service engineer, and will spend his time going from Atterbury dealer to Atterbury dealer giving on-the-job assistance. Chas. Wiederich succeeds Mr. Parmlee as service manager at the factory.

Louis S. Hallowell has been appointed district sales manager of the Atterbury Motor Car Co. to cover the states of Michigan, Ohio, Indiana, Illinois and Wisconsin. Previously Mr. Hallowell was division sales manager for the Selden Motor Truck Co. He covered the New York State territory for 2 years in that capacity.

Fred W. Ansteth will act as district sales manager, covering North Carolina, South Carolina, Tennessee, Georgia, Alabama, Mississippi and Louisiana for the Atterbury Motor Car Co.

C. H. Spencer, formerly with the Packard Motor Car Co., and a member of the automotive industry for many years, acting in various sales capacities, is now with the Pierce-Arrow Motor Car Co. He is acting as a trade research expert, analyzing trade conditions in various territories.

Joseph C. Faust, director of the production of advertising art for the Packard Motor Car Co, has resigned to become associated with Voelker & Scharfenberg, advertising specialists.

Capt. H. J. Vogler, late of the Army, has been appointed district sales manager of the Service Motor Truck Co. His territory includes Maryland, the District of Columbia and the Carolinas.

S. R. Swiss, recently associated with the Ivan B. Nordhem Co., poster advertising, Pittsburgh, Pa., is in charge of the advertising department of the Republic Motor Truck Co., Inc., Alma, Mich.

Loyal E. Thompson has been appointed assistant manager of the service department of the Republic Motor Truck Co., Inc., at the factory in Alma, Mich. Mr. Thompson was formerly connected with the service department of the Cadillac Motor Car Co.

Blaine McGrath, formerly in charge of the advertising department of the Republic Motor Truck Co., Inc., is going into the sales department and will cover important territory in four Southern states for the same company.

W. S. Jewell, former retail manager of the New York City branch of the Studebaker Corp., is now retail manager of the Detroit distributing branch of the same company.

Clifford M. Snow, formerly sales manager of the southern division for the Selden Truck Sales Co., Rochester, N. Y., is now special field representative with that company. His headquarters will be in San Francisco. Milner T. Lahatte, Mr. Snow's former assistant, will be his successor in the former position.

Robert E. Page, for 4½ years assistant foreign sales manager for Dodge Bros., has joined the Commerce Motor Car Co., Detroit, to act as a district salesmanager in Canada.

LeRoy Kramer, who for the past 6 months has been the federal manager of the United States Railroad Administration for the Southwest District at St. Louis, Mo., succeeds C. O. Miniger, retired, as vice-president in charge of production of the Willys-Overland Co.

C. R. Miller, who has been assistant to C. O. Miniger, formerly vice-president of the Willys-Overland Co., has been appointed works manager for the Toledo plant of the company.

C. O. Miniger, retired on March 1, 1919, as vice-president in charge of production of the Willys-Overland Co., Toledo, Ohio, to devote his entire time to the presidency and general management of the Auto-Lite Co. Mr. Miniger continues a director of the Willys-Overland Co.

Paul J. Killeen, Galesburg, Ill., has taken the agency for G. M. C. trucks in the Knox County territory.

E. C. McMullen, sales manager in Dayton, Ohio, for Stewart trucks, has taken over the entire management of that company's service station in Dayton.

M. R. Sanbourne, formerly in charge of the Fulton Truck Co.'s branch at Philadelphia, has taken charge as general manager of the Kansas City branch, which is now a direct factory branch for a large territory, including Oklahoma, Kansas and Western Missouri.

R. P. Bishop has resigned as assistant sales manager of the Nash Motors Co., Kenosha, Wis., to go into business for himself in Saginaw, Mich. The new firm will be known as the Nash-Saginaw Motor Co., and will distribute Nash trucks and passenger cars in Michigan.

James C. Smith, formerly manager of the Duluth Branch for Nash trucks, has engaged with the International Mack Corp., and has been assigned to the St. Louis branch.

Arthur LeRoy Bell, Peoria, Ill., manager of the truck department of the International Harvester Co., died at his home in that city following a brief illness with influenza.

J. W. Lever is now district manager of the Denby Motor Truck Co., Detroit. His territory is Oklahoma and Texas.

C. H. Furman of the Columbus Armeleder Co., agent for the Armeleder and Myers trucks, will erect an addition to the salesroom and service station of 25,000 sq. ft. of floor space.

B. V. Osborne, formerly sales manager of the Fulton Motor Truck Co., Farmingdale, L. I., has been appointed sales manager for John L. Judd, New England distributor of Columbia trucks, with offices in Boston, Mass.

Frank M. Foster, Detroit, has been made distributor of Hall trucks in that city.

New Tower 3½-Tonner Has Timken Worm Axle

(Continued from page 31)

case. The case is in four pieces, flanged and bolted. The case is detachable for cleaning and repairing. Other features of the cooling system are a ball-bearing four-bladed fan and a centrifugal pump.

A Stromberg gravity-fed carbureter is used. The fuel tank is under the seat. No starter or electric lights are furnished. Ignition is by a high-tension Bosch magneto, hand controlled.

The driving torque is taken through the springs and the propulsion is through the radius rods. All four springs are half-elliptic and are made by the Detroit Steel Products Co. With the exception of the main leaves of the rear springs, which are of silico-manganese steel, all of the leaves are of carbon steel. Each leaf is slightly concave throughout its entire length, forming a natural grease channel. The end of each leaf is formed to act as a grease cup. The brakes are internal expanding on both the foot and service types. The brake drum has a 21-in. diameter and is 4 in. wide.

The frame is of pressed steel channel, 4 in. wide by 7 in. deep. It is tapered at the ends. Left steer and center control and gearshift are employed on the new model. Equipment consists of a driver's cab seat, fenders, oil lamps, tool box, hand horn.

He will also furnish service for that line of trucks.

E. D. Hensley, Dayton, Ohio, has joined the sales force of the W. C. Wampler Co., Dayton, distributors for Grant trucks and cars. He has been made territory manager.

B. J. McMullen, general sales manager of the Chevrolet Motor Car Co., Flint, Mich., has resigned to enter into business for himself in Minneapolis, Minn., in which territory he will distribute Republic trucks. C. C. Meade, who was assistant to Mr. McMullen, succeeds him as general sales manager of the Flint company.

Justin R. Weddell has been appointed advertising manager of the Firestone Tire and Rubber Co., Akron, Ohio. Mr. Weddell for the last 3 years has been sales manager of the Corday & Gross Co., which took over the company that Mr. Weddell organized.

C. S. Puttman has been appointed manager of the Detroit branch of the United States Tire Co. He started with that company in 1911 as a stock record clerk and his advancement has been rapid.

John H. Diehl has been elected vice-president of the Mason Tire & Rubber Co., Kent, Ohio.

C. F. Troupe, who represented the Fisk Rubber Co. in the East and South, has succeeded Frank Lee as sales manager of that company in Wisconsin and upper Michigan. Mr. Lee recently resigned and has gone to California for the winter.

Rex D. Gilbert, Philadelphia, Pa., has been elected secretary and treasurer of the Oldfield Tire Co., Cleveland, the new concern organized by Barney Oldfield, the ex-car racer. Mr. Gilbert was with the Firestone Rubber Co. for the past 6 years.

W. A. Westlake has been appointed Eastern sales manager of the motor-truck tire department of the McGraw Tire & Rubber Co., New York.

William A. Haines, Detroit representative of the Westinghouse automotive equipment department, died of pneumonia on February 11. The affairs of the Detroit district will be temporarily in charge of G. Brewer Griffin, manager of the automobile equipment department, 110 West Forty-second Street, New York City.

R. E. Clingan, for the past 11 years representative of the Hess-Bright Mfg. Co., has been appointed sales manager of the Bock Bearing division of the Standard Parts Co., Cleveland, Ohio.

C. F. Hepburn has been appointed director of sales for the Torbensen Axle Co., Cleveland. For the past year and a half he was a major in the Ordnance Department.

J. F. Mackin has recently joined the Black & Decker Co., Baltimore, Md., to represent the company in the State of Ohio. Mr. Mackin is located in Columbus.

The
COMMERCIAL VEHICLE
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building
231-241 West 39th Street, New York City

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The Commercial Vehicle.
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WYMAN GORDON

A SMOOTH
RUNNING
MOTOR

is essential for the 1919 Truck.

Many things enter into the accomplishment of this, but all efforts will be fruitless unless the crankshaft is of proper design and quality.

Wyman-Gordon Crankshafts are properly designed and their quality insures the minimum of wear on pins and bearings.

Our Engineering and Metallurgical Departments are at your service.

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"The Crankshaft Makers"
Worcester, Mass. Cleveland, Ohio

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It is faster both with a load and without, over long or short hauls.

Chassis $2050

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THE AUTOCAR COMPANY
Ardmore Pa. Established 1897

Autocar

The Commercial Vehicle
Read by Business Men
Vol. XX, April 1, 1919. No. 5

Trucks Help 27-Year-Old Contractor to Establish a Profitable Business

Secret of Success Is in Keeping Vehicles Moving—Started Without a Cent 7 Years Ago and Is Now Worth Over $45,000

Philadelphia's Youngest Motor Trucking Contractor

Charles D. Heavey, 27 Years Old

BEGAN business without a cent 7 years ago. Now, thanks to dump-body motor truck fleet, energy and good employees, has property worth $30,000 and equipment $15,000.

Has his mechanic live over the garage—on the job all the time.

Does building-wrecking and hauling and is the biggest used brick dealer in Philadelphia.

Owes part of his success to acquaintance among contractor-politicians and doing business by personal contact.

When he sees a good building idle, if he finds he can "turn it over" by converting it to another use, he quickly leases it and undertakes the job of conversion—at a good profit, and uses his trucks in the work.

HEAVEY'S MOTTO: "KEEP 'EM MOVING"

CHARLES D. HEAVEY, 514 North Sixty-first Street, Philadelphia, the youngest motor trucking contractor in the city—only 27 years old—started in business virtually without a cent of his own 7 years ago, and to-day is his own boss, has a growing trade, owns motor truck equipment which he values at $15,000, and other property, including realty, worth $30,000.

Asked how he accomplished this, Heavey frankly said:

"By personal contact and by keeping my trucks moving every possible minute. I always have lived in West Philadelphia and know everybody in this locality who has anything to sell or buy in my line."

Heavey's "line" is somewhat varied and extensive. For instance:

His specialty is dealing in second-hand brick—he's the largest dealer in that respect in Philadelphia, and probably in the State.

He buys and sells—always at a substantial profit, because he knows his

On the job with Charles D. Heavey. The 27-year-old hauling contractor may be seen standing by the wall, instructing his men. He paid $1,550 for the second-hand brick he removed from this spot

Part of the Heavey fleet lining up to remove the wreckage of a building to be torn down for a new structure. The Federal 3½-tonner is in the lead, with two Pierce-Arrow 5-tonners following

market — building material of many kinds, such as terra cotta, lumber and stone.

He makes a business of wrecking both commercial buildings and dwellings and uses his fleet of motor trucks in the work.

He converts structures from one type into another. Sometimes he has as many as sixty men working for him at one time.

In his general contract hauling business he moves coal for some of the big companies; ashes, snow and dirt for some of the largest city contractors, including the Vares; sand for builders; does much cement work and laying of concrete foundations both for buildings and machinery; hauls steel for various purposes and transports piping of many kinds.

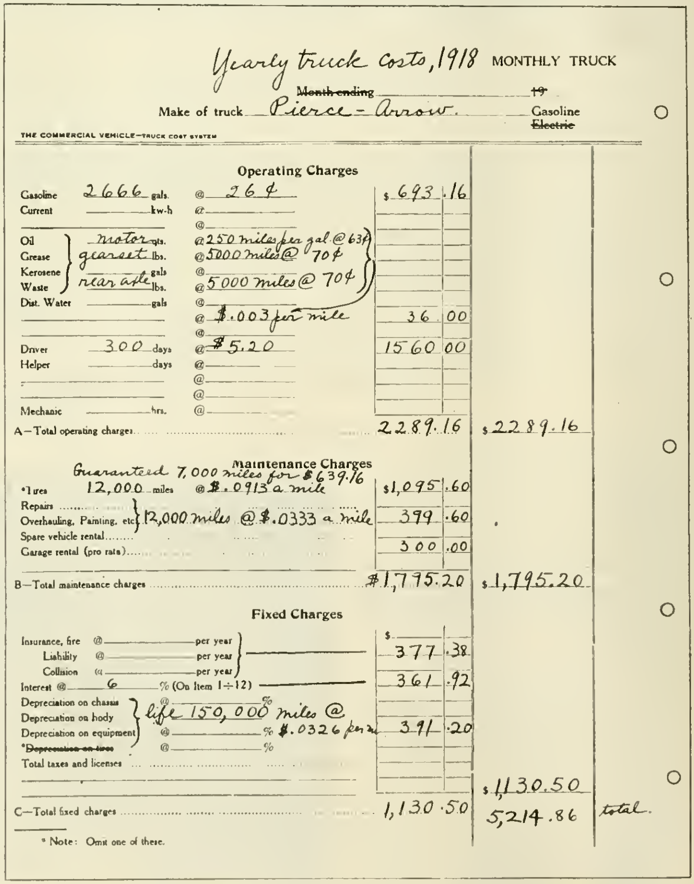
One of Heavey's best shifts is when he finds a customer who needs a certain kind of building, hunts up one that comes as near to filling the requirements as possible, leases it and then converts it into the exact type of structure wanted by his client. The leasing is done only after Heavey is guaranteed that he will be used for the reconstruction job and, of course, the lease insures his obtaining not only the work, but the extra building material if he wants to buy it. This arrangement gives him first chance at his client's building or reconstruction work and first chance to buy and sell the waste material.

Heavey has his own garage in connection with the office and service station, and has his repairs done through his own mechanic, an expert who is "on the job" not only during business hours but at any time of day or night in which he might be used in an emergency. This is through an arrangement whereby the mechanic has his living quarters over the substantial, new, "Heavey-built" brick building housing also office and garage.

This plan of having the man in direct charge of the truck operation live in the upper floor of the garage where the trucks are maintained has proved a very successful one for Heavey, and one which other trucking contractors can follow with equally good results. It enables the man to keep in direct touch with all phases of the truck operation, which is especially important in contracting, where delays in hauling away excavating material, for instance, are liable to tie up the entire job, including a gang of muckers, the excavating derrick, the derrick engineer and perhaps the truck loading gang.

The Heavey fleet consists of two 5-ton Pierce-Arrow trucks, one 5-ton Peerless, one 2-ton and two 3½-ton Federals, and two five-passenger cars—a Pierce-Arrow and a Dodge Bros.

The Pierce-Arrow and Dodge Bros. passenger cars are used mainly for taking Heavey to jobs on which he must estimate and by the mechanic for following up the trucks and giving that service which is necessary to keep them moving. All six trucks have bodies of the power dump type, equipped with Wood hydraulic hoist. They range from 4 to 6 yards capacity.



Yearly truck costs, 1918 ~~MONTHLY TRUCK~~ MONTHLY TRUCK

~~Month ending~~ ______ ~~19~~

Make of truck Pierce-Arrow. Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline 2666 gals.	@ 26¢	$693.16		
Current ______ kw-h	@ ______			
______	@ ______			
Oil motor qts. Grease gearset lbs. Kerosene ______ gals Waste rear axle lbs.	@ 250 miles per gal. @ 63¢ @ 5000 miles @ 70¢ @ ______ @ 5000 miles @ 70¢			
Dist. Water ______ gals	@ ______			
______	@ $.003 per mile	36.00		
______	@ ______			
Driver 300 days	@ $5.20	1560.00		
Helper ______ days	@ ______			
______	@ ______			
______	@ ______			
Mechanic ______ hrs.	@ ______			
A—Total operating charges		2289.16	$2289.16	

Maintenance Charges

*Tires 12,000 miles	Guaranteed 7,000 miles for $639.16 @ $.0913 a mile	$1,095.60		
Repairs Overhauling, Painting, etc.	12,000 miles @ $.0333 a mile	399.60		
Spare vehicle rental				
Garage rental (pro rata)		300.00		
B—Total maintenance charges		$1,795.20	$1,795.20	

Fixed Charges

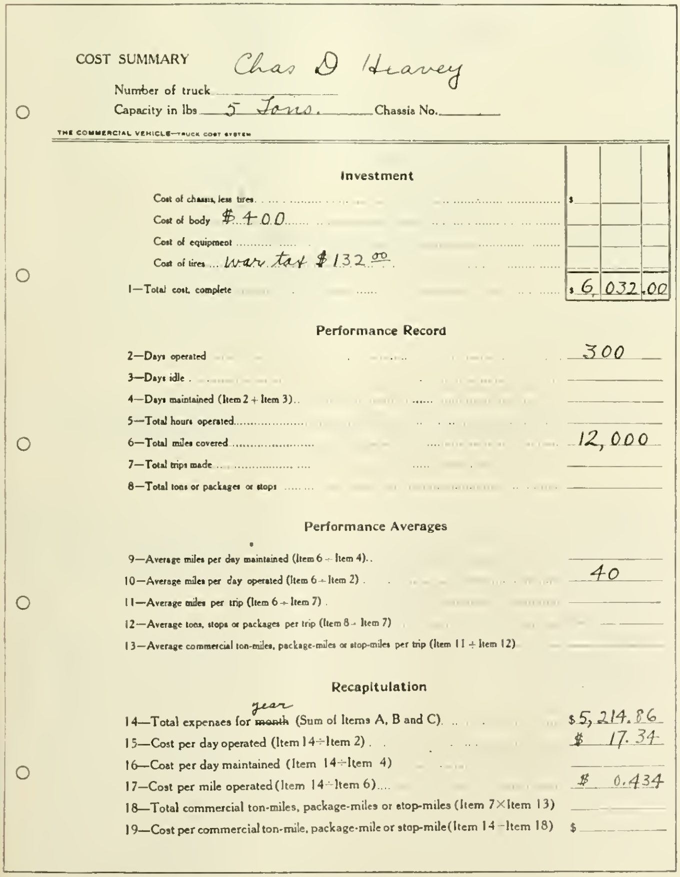
Insurance, fire @ ______ per year Liability @ ______ per year Collision @ ______ per year		377.38		
Interest @ 6 % (On Item 1÷12)		361.92		
Depreciation on chassis @ ______ % Depreciation on body Depreciation on equipment @ ______ % *~~Depreciation on tires~~ @ ______ %	life 150,000 miles @ $.0326 per mi	391.20		
Total taxes and licenses				
______			$1,130.50	
C—Total fixed charges		1,130.50	5,214.86	total.

* Note: Omit one of these.

○ ○ ○ ○ ○

The cost of operating Heavey's 5-ton Pierce-Arrow, as put down on the form of THE COMMERCIAL VEHICLE Cost Keeping System for Motor Trucks

Part of Heavey's fleet which consists of six trucks and two passenger cars. The Pierce-Arrow passenger car is used by Mr. Heavey, and the Dodge Bros. next it by his mechanic. Next are shown a 2-ton Federal and two 5-tonners, one a Peerless and the other a Pierce-Arrow



COST SUMMARY Chas D Heavey
Number of truck
○ Capacity in lbs 5 Tons. Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires $
Cost of body $400
Cost of equipment
○ Cost of tires war tax $132.00
1—Total cost, complete $6,032.00

Performance Record

2—Days operated 300
3—Days idle
4—Days maintained (Item 2 + Item 3)
5—Total hours operated
○ 6—Total miles covered 12,000
7—Total trips made
8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)
10—Average miles per day operated (Item 6 ÷ Item 2) 40
○ 11—Average miles per trip (Item 6 ÷ Item 7)
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 ÷ Item 12)

Recapitulation

14—Total expenses for ~~month~~ year (Sum of Items A, B and C) $5,214.86
15—Cost per day operated (Item 14 ÷ Item 2) $17.34
○ 16—Cost per day maintained (Item 14 ÷ Item 4)
17—Cost per mile operated (Item 14 ÷ Item 6) $0.434
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18) $

The figure of 43 cents per mile operated for a 5-ton truck is interesting, as it shows the cost to which the profit must be added before determining a job price

When the Heavey fleet is not working as a whole—which is seldom, especially in spring, the busiest building and wrecking season—the units not in work may be hired out to other concerns, but the boot usually is on the other foot and Heavey on occasion has had to hire as many as a dozen trucks in a day to supplement his own vehicles. On the great operations at Hog Island he often has had some of his trucks working on structures for the shipbuilders. On the big job of erecting 550 houses for the United States Shipping Board and the Emergency Fleet Corporation at Sixty-eighth Street and Elmwood Avenue, to be used as workmen's dwellings, brick and lumber were ordered through Heavey and the contracting builders, Moss, Taylor & Crawford, were so pleased with the outcome of the job that they held a flag-raising and sent Heavey a special engraved invitation.

Heavey's usual rates are $3.50 an hour for a 5-ton truck, $3 for a 3½-tonner and $2.50 for a 2-ton truck, but the 2-ton vehicles generally are loaded at considerably higher capacity. The mileage varies greatly, of course, as the range of jobs with Heavey is wider than usually is the case with a hauling contractor having so large a fleet.

One of Heavey's most interesting jobs was wrecking the old National Theater in the Tenth Ward, at the southwest corner of Tenth and Callowhill Streets, and converting it into a thoroughly modern garage.

For this work, which took him 2 months with virtually his entire fleet on the job, he took on a temporary partner, just for the occasion—something he had not tried before and has not done since. The plan worked out well and he employed in this instance his procedure of leasing the building immediately he had discovered it and was reasonably sure of a quick turnover on it. The lease was negotiated for $2,500 for the year and Heavey paid down $1,100 cash to the

American Ice Co., which had purchased it when the building had been given up as a theater. The ice concern had held it, hoping to make a storage house out of it, but changed its plans. Heavey had learned that a concern wanted it for a garage and he profited by his knowledge, effected the deal of converting it and was able to turn over the completed building before the unexpired term of his lease, making a tidy sum.

The job was a hard one, as balconies, stage and partitions had to be removed carefully without disturbance to walls or roof. It was necessary to fill in with earth the height of 13 ft. from the ground to stage-level, and altogether it was a stiff undertaking for ordinary house-wreckers. To change it within the 2 months into a modern garage also took some ingenuity, but all was accomplished satisfactorily. When it was all over the partnership was terminated.

Moves 500,000 Brick in Week

Heavey's biggest job, so far, was the moving of 500,000 brick in one week, at the rate of more than 75,000 each day. He had forty men on the job, starting at 1:30 a. m. daily and finishing at 5:30 p. m. This was in tearing down and removing the wreckage of the Beneficial Saving Fund Society Building, 300 ft. long, at Twelfth and Chestnut Streets, since replaced by a huge structure.

Showing the character of the work undertaken by this energetic young man, here are some of the jobs he has accomplished with trucks and men:

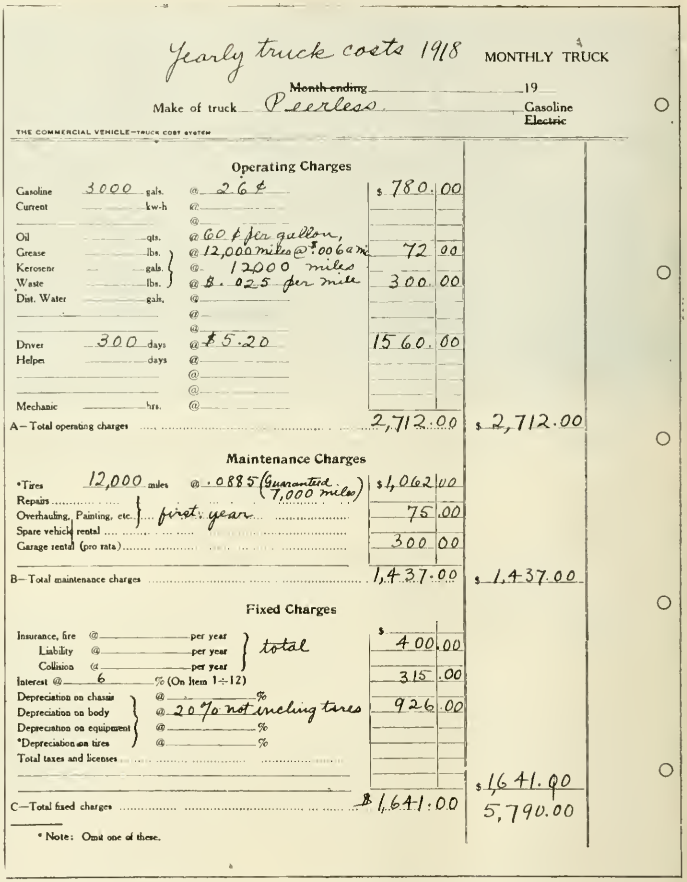
a—Did the digging and hauled all the material for twenty-seven buildings for the Bethlehem Steel Company at Newcastle, Del., for the TNT plant of that concern, one of the first war industry structures in the country. He employed 100 men, used his entire fleet of trucks and seven hired trucks and leased two trolley cars. The company had fifteen cars on the tracks daily and much of the material was hauled over 2 miles from these by the Heavey truck outfit. The material was widely different in character and included steel, sand, stone, cement and brick. The job took 6 months, and while he came out ahead, considerably, he wouldn't be willing to use up another ream of paper to review his costs on the transportation of the various materials involved in the deal. It was about the hardest test his organization ever underwent.

Wrecks Buildings and Parks

b—Wrecked the many buildings of N. Snellenburg & Co. at Twelfth Street and Girard Avenue, extending through to Eleventh Street, and each having a frontage of 75 ft. These structures varied from three to four stories.

c—Wrecked the recreation park, including pergolas, at Eighteenth Street and Fairmount Avenue, using sixty men.

d—Laid concrete foundation for the Finance Building, on Ranstead Street, placing concrete in basement for engines and tanks.



Yearly truck costs 1918 MONTHLY TRUCK

~~Month ending~~ 19

Make of truck Peerless. Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline	3000	gals.	@ 26¢	$780.00	
Current		kw-h	@		
			@		
Oil		qts.	@ 60¢ per gallon,		
Grease		lbs.	@ 12,000 miles @ $.006 a mi	72.00	
Kerosene		gals.	@ 12000 miles		
Waste		lbs.	@ $.025 per mile	300.00	
Dist. Water		gals.	@		
			@		
			@		
Driver	300	days	@ $5.20	1560.00	
Helper		days	@		
			@		
			@		
Mechanic		hrs.	@		
A—Total operating charges				2,712.00	$2,712.00

Maintenance Charges

*Tires	12,000	miles	@ .0885 (Guaranteed 7,000 miles)	$1,062.00	
Repairs			first year		
Overhauling, Painting, etc.				75.00	
Spare vehicle rental					
Garage rental (pro rata)				300.00	
B—Total maintenance charges				1,437.00	$1,437.00

Fixed Charges

Insurance, fire	@ per year	total	$	
Liability	@ per year		400.00	
Collision	@ per year			
Interest @ 6 % (On Item 1÷12)			315.00	
Depreciation on chassis	@ %			
Depreciation on body	@ 20% not incling tires		926.00	
Depreciation on equipment	@ %			
*Depreciation on tires	@ %			
Total taxes and licenses				
				$1,641.00
C—Total fixed charges			$1,641.00	5,790.00

* Note: Omit one of these.

The estimated daily fixed charges and the estimated cost per mile operated of one of Harvey's 5-ton Peerlesses as set down on THE COMMERCIAL VEHICLE Standard Cost Keeping System

e—Tore down big textile mill at Twenty-fifth and Spring Garden Streets.

f—Purchased for $1,550, on terms of $550 cash down and $250 when half of removal was accomplished, with the balance of $750 on total removal, March 1, a huge pile of bricks on the Philadelphia Electric Co.'s lot at Thirtieth and Jefferson Streets. This building material was quickly resold at a profit.

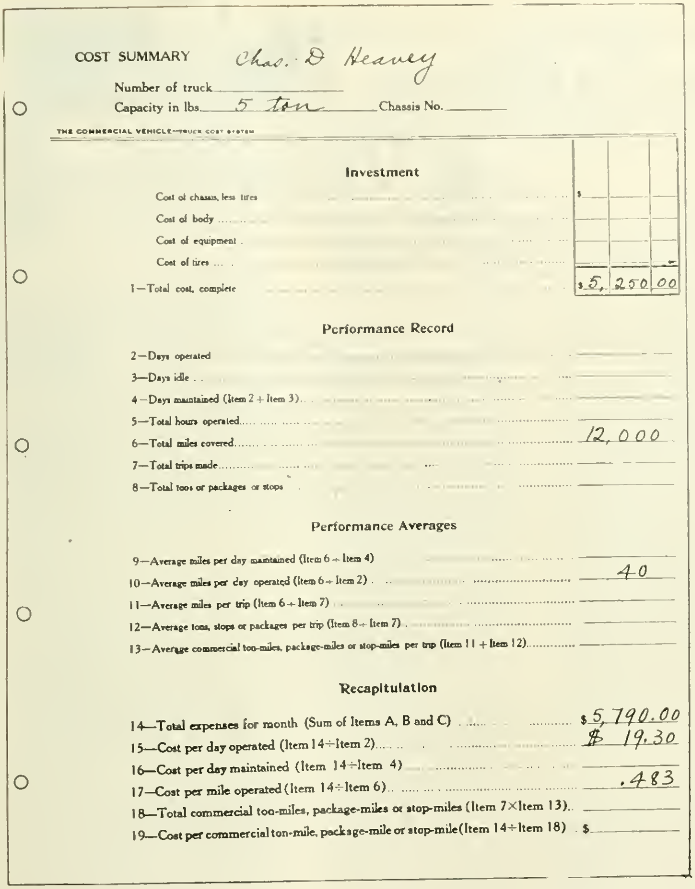
Heavey knows all the big contractor-politicians, and has their confidence because he fulfills his contracts on time. His trucks have played an important part in this work. Among his clients of this type are the McNichol Paving & Construction Co. and the firm of Edwin H. Vare, holder of big city contracts for street cleaning and ash removal.

"Keep 'em moving, keep 'em moving; that's the way we do business," says Heavey. This policy extends to his men, as well as to his trucks. And just so there'll be no loungers in his office—

There is but one chair, and that's at his desk.

The accompanying cost sheets for the 5-ton Pierce-Arrow and Peerless trucks are very illuminating and are especially valuable in that they show that the yearly costs of truck operation and maintenance is almost equal to the original cost of the vehicles, including the body and tires.

It is this ratio between the yearly operating costs and the initial price of the truck which is sometimes not realized and yet is one which has a large bearing on the successful trucking business. The respective figures of 43 cents and 48 cents cost per mile operated of the 5-ton Pierce-Arrow and Peerless trucks are also very illuminating and should be of great value to other truck owners engaged in the same business or about to enter it. In each case, the cost calculations are put down on the form of THE COMMERCIAL VEHICLE Standard Cost Keeping System, so that the figures are comparable with those on other work published in previous issues of this magazine.



COST SUMMARY *Chas. D Heavey*

Number of truck

○ Capacity in lbs. *5 ton* Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires $

Cost of body

Cost of equipment

Cost of tires

○ 1—Total cost, complete $ *5,250.00*

Performance Record

2—Days operated

3—Days idle

4—Days maintained (Item 2 + Item 3)

5—Total hours operated

○ 6—Total miles covered *12,000*

7—Total trips made

8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)

10—Average miles per day operated (Item 6 ÷ Item 2) *40*

○ 11—Average miles per trip (Item 6 ÷ Item 7)

12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)

13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 + Item 12)

Recapitulation

14—Total expenses for month (Sum of Items A, B and C) $ *5,790.00*

15—Cost per day operated (Item 14÷Item 2) *$ 19.30*

16—Cost per day maintained (Item 14÷Item 4)

○ 17—Cost per mile operated (Item 14÷Item 6) *.483*

18—Total commercial ton-miles, package-miles or stop-miles (Item 7×Item 13)

19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14÷Item 18) $

One of THE COMMERCIAL VEHICLE Standard Cost Keeping System forms, showing how it is employed in estimating truck costs with item for cost per day and cost per mile operated

Combining Work of Horses and Trucks Solves Garbage Pick-Up Problem

WHERE is a service which at first blush would seem less adapted to the application of motor trucks than garbage collection? Yet the City of Detroit has applied a fleet of trucks and trailers to its garbage department by which it has reduced the number of men and teams necessary for the work, saved a certain amount of traffic obstruction and made great savings in cost. So successful has the installation proven that it has been copied by a number of other cities.

These things have been made possible by a harmonious combination of horse and motor vehicles under which the horse vehicles concentrate on short hauls and the motor trucks on the long ones, thus confining each to the field for which it is best fitted. This, in turn, has been made possible by eliminating lost time in loading and unloading the trucks.

The trucks are saving the city $16.25 a day at one yard, or 45 cents per ton and $32.96 at another, or $1.11 a ton, in round figures. This is based on what it would cost to do the present work by horse teams alone compared with what it actually costs.

The work consists of the collection of garbage with horse-drawn vehicles, each being fitted with steel boxes holding 2 tons. When these boxes are filled they are hauled a short distance to a transfer point. Here a truck and trailer meet the wagon and the boxes are lifted onto the platforms of the truck and trailer, each load comprising eight boxes, four on the truck and four on the trailer, a total load of 8 boxes of 2 tons each or 16 tons. These boxes permit rapid loading and obviate rehandling the garbage.

When loaded the tractor-trailer hauls its load an average of 7 miles to the loading station. There the boxes are swung off the vehicles by an electric crane and dumped into gondola railway cars, in which the garbage is carried to a dump 29 miles away.

Electric Cranes Save Time

Formerly the individual horse wagons had to make long hauls to the loading stations after they had collected the garbage, and it was found to be both cruel to the animals and expensive. The first motor trucks were installed 5 years ago. Hand hoists were used for the unloading operation until 1 year ago, since then, by using electric cranes, the efficiency of the vehicles has been considerably increased due to cutting down the delays. The entire load of eight boxes can now be unloaded in 5 minutes.

At one of the loading stations the use of the trucks and trailers has permitted eleven horses and wagons to handle twenty-four loads, or 48 tons of garbage where formerly but eleven loads or 22 tons were hauled. At another, the number has been exactly doubled without increasing the number of teams, nine of which are all that are required for 18 loads or 36 tons where formerly only 9 loads or 18 tons were hauled.

The smaller trucks and trailers will average three loads of 6 boxes daily and the larger the same number of trips with eight boxes. They average about 32 miles per day.

The Fleet Make-Up

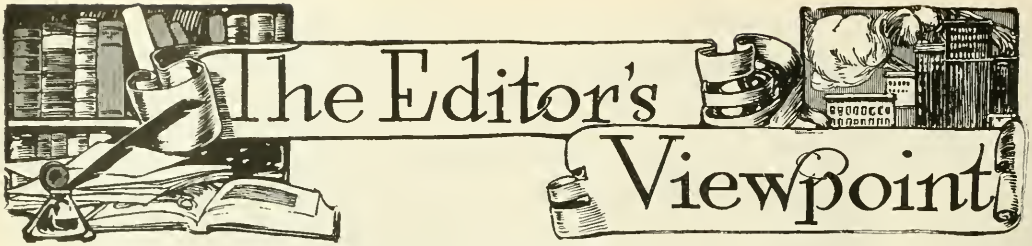
The equipment consists of one Federal 1½-tonner; one Standard 3-tonner; three Packard 5-tonners, and two Peerless 7-tonners. There are four Detroit 7-ton trailers. Only the two Peerless trucks and two of the Packards are used in the garbage transfer, the other Packard being held in reserve. The Standard is used for the downtown collection and the Federal for the same work.

TRUCK HAULS SNOW FROM MOUNTAIN

SAN FRANCISCO, CAL., March 28—During the recent show at this city the Service Motor Truck Co.'s distributer ran a Service truck to the top of Mt. Tamalapais and hauled back a big truck load of snow which was carried through the main street of the city and aroused much interest because of the novelty of a truck load of snow being carried through the streets of the city of perpetual summer.

FOREIGN TRADE CONVENTION

CHICAGO, ILL., March 29—The National Foreign Trade Council will hold its sixth national foreign trade convention at the Congress Hotel on Thursday, Friday and Saturday, April 24, 25 and 26, 1919.



The Editor's Viewpoint

Keeping Trucks Clean

EVERY motor truck owner should see to it that his trucks are kept clean. A clean truck not only has a far greater advertising value to the owner than a dirty vehicle, but in addition results in a lower cost of upkeep and a greater work output through the psychological effect upon the driver.

The advertising value of a clean motor truck to its owner is well known, although it is apparently forgotten by a large number of users, if one is to judge of the thousands of dirty and decrepit-looking trucks seen on the streets of our large cities and on the country roads leading out of them. The advantage of clean trucks as compared with dirty ones is well exemplified in the case of coal companies who paint their trucks white and make them carry material which dirties up things as readily as anything known. If those concerns find that it pays to keep their trucks clean, how much more so should a user whose vehicles carry goods which dirty up the chassis and body to a much lesser degree?

Then there is a very direct relation between a dirty truck and the cost of keeping it in repair. While this direct relation is not always apparent, it nevertheless exists. If a truck body is allowed to get dirty and stay dirty it is fair to assume that, nine chances out of ten, the chassis and the entire power transmission units are dirty too. If this is the case, how can the repairman be expected to find loose bolts and nuts and otherwise examine those small parts requiring attention? It is the small repairs which, if taken in time, obviate the necessity of having to make larger and more serious repairs. If the small chassis and engine parts are not clean, it is impossible for the repairman to examine them carefully, so that there is a direct relation between truck cleanliness and repair costs.

A driver takes much more interest in a clean truck than he does in a dirty one for the same reason that any buyer of goods sizes up and mentally forms his opinion of a salesman by, first of all, noting the appearance of his clothes and whether his collar is immaculately white or finger-marked. The driver of a clean truck takes pride in it.

And once a driver takes pride in his truck he will take more interest in it. Taking more interest in it means that he will give it better attention, and better attention in turn means a truck in better condition. Going still one step further, a truck in good condition means that it will do more work, and more work in any given time gives a lower unit cost of doing that work, the ultimate goal of every truck owner. It is therefore apparent that a clean motor truck is the best motor truck, no matter what size, what make or what work it is engaged in.

The Eventual Return Loads Bureau

THE Return Loads Bureau idea is a good one. It is here to stay. But the bureau must be put on a self-supporting basis. Its income simply as a business proposition must be equal to, if not greater than, the outgo.

The original Return Loads Bureau in this country was formed for the purpose of overcoming a great economic waste in motor trucks covering long distances with loads in one direction and empty in the return direction. The idea caught the popular mind, because it was evidently one means of saving an effort which otherwise would be wasted. It was a step to help win the war which every shipper could take.

The simple fact that the war is over has not reduced the lost effort of trucks running loaded one way and empty the other. The cessation of hostilities, has, however, removed the patriotic appeal for the support of the Return Loads Bureau. It must henceforth be put on a permanent business basis. Only on that basis can it succeed.

Since the motor truckman benefits most from securing additional business through a bureau, it seems only logical that the truckman should support it. This is being done in New York City, as told elsewhere in this issue, and has worked out so satisfactorily that it appears to be the solution of the problem.

It also has great possibilities for the formation of a regular transportation agency which may serve all classes of shippers by handling their goods at a nominal sum and turning the work over to individual truckmen to do under the supervision of the organization. Such a step would be of great benefit to truckmen who possess a small number of trucks.

Actual Truck Rates on Hauls Out of New York

Truck Charges Lower Than Rail Costs When Extra Packing, Excess Weight and Teaming Are Included

W. J. L. BAUHAM, traffic manager of the Otis Elevator Co., New York City, recently compiled the accompanying table, showing the comparative cost of shipping less-carload shipments by rail and by motor trucks for distances up to 199 miles and presented some convincing figures and facts in favor of motor transportation rates as against railway freight rates.

In pointing out the economies of motor truck transportation to points within about 250 miles of New York City Mr. Bauham stated that sometimes manufacturers figure that when a freight rate is 50c. per 100 lb. via freight and the rate to the same point via motor truck is 75c., that this in itself shows an increased transportation cost of 25c. per 100 lb. This is not a fair comparison and is not a true cost.

All Charges Must Be Included

"What I understand to be a transportation cost is all expense involved in making a shipment, starting with the boxing or packing expenses and all other expenses incurred until delivery is made to the receiver in good order.

"It is not an easy matter, however, for the manufacturers to compile all these costs, as freight shipments involve expense through various departments, some of which can be figured out, while the balance are usually carried as a department expense, and if shipments are not made by the cumbersome freight method the cost can be materially reduced if other means are used to make freight shipments to short-haul points.

"I am firmly convinced that motor truck transportation will reduce the shipping costs of the manufacturers considerably and will eliminate a number of transportation evils which are both costly and annoying to shippers and receivers of freight alike.

"The figures given in the accompanying table are worked out on an average basis, and while substantially correct they may not cover all local conditions.

Extra Packing Important

"Included in the freight cost is the first class rate plus 15c. per 100 lb. teaming charges from the shipper's warehouse to freight house, plus 15c. per 100 lb. teaming charges from freight house to receiver's warehouse, plus 24c. per 100 lb. increased cost of boxing to cover shipments made via freight, plus 17 per cent account of increased weight caused by increased cost of boxing.

"The rate via motor truck covers delivery from the shipper's warehouse to receiver's warehouse. I have averaged this rate, and believe it is a fair one to use in comparison with the freight cost movement.

Comparison of Costs Between Less-Carload Freight Movement and Motor Truck Transportation Per Hundred Pounds.

	Via Freight	Via Motor Truck	Miles by Road
From Yonkers to:			
Newark	1.04	.20	26
From New York to:			
Newark	.91	.15	13
Passaic	.91	.18	18
Paterson	.91	.20	22
Elizabeth	.91	.20	18
New Brunswick	.91	.40	36
Trenton	.98	.60	63
Philadelphia	1.02	.80	101
Chester, Pa.	1.05	1.00	116
Wilmington, Del.	1.13	1.20	129
Coatesville, Pa.	1.15	1.05	142
Port Chester, N. Y.	1.02	.63	27
Greenwich, Conn.	1.02	.63	30
Stamford, Conn.	1.03	.65	35
Norwalk, Conn.	1.06	.68	44
Bridgeport, Conn.	1.10	.70	58
New Haven, Conn.	1.13	.73	75
Derby, Conn.	1.13	.73	72
Ansonia, Conn.	1.13	.73	60
Shelton, Conn.	1.13	.73	65
Naugatuck, Conn.	1.15	.74	86
Waterbury, Conn.	1.16	.75	96
Meriden, Conn.	1.16	.75	95
Hartford, Conn.	1.21	.90	113
Springfield, Mass.	1.25	1.00	140
Holyoke, Mass.	1.25	1.10	200
Worcester, Mass.	1.31	1.50	190
Boston, Mass.	1.36	1.50	234
Providence, R. I.	1.32	1.10	199

"In practically every instance it is necessary to prepare material for freight shipment in an entirely different way than if it moved via motor truck direct from the shipper to receiver. It is necessary to go to considerable additional expense by boxing or crating or to protect by other means in order to prevent loss or damage in transit.

Number of Handlings Cause Additional Packing Expense

"This additional packing expense is necessary on account of the number of handlings the less-than-carload shipments receive at the hands of the teamsters and carriers after the material leaves the shipping department.

"This added protection and expense can be greatly reduced if shipments are made via motor truck, and the packages only need protection for loading at the shipper's warehouse in transit without transfer and unloading at receiver's warehouse.

"After the goods have been properly prepared for shipment and the necessary shipping documents are made out, delivery must be made to the local freight house either by truck or other means, which increases the transportation cost to the amount of the teaming and additional labor."

Mr. Bauham has pointed out some fundamental principles in overland motor truck haulage which many shippers overlook. The great majority of shippers have been so accustomed to routing all of their goods by rail that they are loath to change to motor trucks without considerable argument. This is especially the case when there is no demand for quick service. It is quite customary for shippers to compare the truck rates per 100 lb. between any two points with the railroad rate between the same two points and of refusing to give the business to the truck line on the ground that the truck rate is in most cases two or three times the rail rate, of course depending upon the distance the goods are shipped.

Unfair Method of Comparison

This is a decidedly unfair method of comparison, since the rail rates only include the cost of moving the goods from the time they are deposited at the outgoing railroad terminal until they are received at a similar terminal in the destination city. As Mr. Bauham points out, many other charges must be added to the rail freight rate before there can be any fair comparison made with the truck rates direct from the factory of the shipper to that of the consignee. For instance, in some classes of work the increased cost of boxing or crating when shipped by rail is a considerable item and may help to bring the aggregate rail rate above the truck rate when taken into consideration with the cost of teaming the goods from the factory to the railroad depot in the originating city and of similar work from the depot in the destination city to the consignee.

He also brings out that the increased packing or boxing necessary when goods are shipped by rail adds to the weight of the goods so moved, and that in this particular instance the increase in the weight of the shipments is as high as 17 per cent.

Transportation by Truck Much Cheaper

It is very interesting to make a study of the comparative cost of rail and truck transportation as given in the accompanying table. It shows, for instance, that over the good roads along the eastern seaboard it is 15 cents per 100 lb. cheaper to ship the Otis company's goods between New York and Boston by trucks, even though the distance is 234 miles. On the short haul work the truck's superiority is manifest; as for example, the truck rate to Newark is 15 cents per 100 lb. as compared with 91 cents by freight, including packing and teaming charges at both ends. In other words, the truck is about six times cheaper than the rail method from New York to Newark and about four times cheaper than to Elizabeth, N. J.

Iowan Takes Charge of Federal Road Work

Will Also Supervise Activities of Bureau of Public Works

WASHINGTON, D. C., March 26—Thomas H. MacDonald, chief engineer of the Iowa State Highway Commission, has been appointed by the Secretary of Agriculture as engineer in charge of the work under the Federal Aid Road Act, which provides for co-operation between the States and the Federal Government in the construction and improvement of roads. Mr. MacDonald will assume his new duties as soon as he can close up his work in Iowa.

He will supervise and direct all the activities of the Bureau of Public Roads under the Federal Aid Road Act, including the expenditure of the additional appropriation of $209,000,000 provided by the Post Office Appropriation Act for the extension and development of highway construction during the present and the next two fiscal years. For the time being he will devote his energies to the problems arising under the Federal Aid Road Act incident to the resumption and extension of road work. It is planned that in the near future he will formally assume the position of Director of the Bureau of Public Roads, made vacant by the death of Logan Waller Page.

PNEUMATIC TIRES ON N. Y. BUSES

NEW YORK, March 27—The Fifth Avenue Coach Co., operating 265 buses, is making experiments with pneumatic tires on several of its vehicles with a view of using them as standard equipment in place of the solids. The company at present is using 40 by 8-in. Goodyear pneumatics on the rear and 40 by 6-in. on the front, the total load being about 5 tons, including the body and a full passenger capacity of forty-seven.

GOOD TRUCK RUNNING TIME

MILWAUKEE, WIS., March 26—A running time of 4 hr. and 43 min. for 93 miles, the distance between Milwaukee and Chicago, was established by the White truck operated by the Goodyear Pneumatic Tire Co. in a recent trip to Milwaukee. This is considered remarkable time in view of the fact that traffic regulations prevented the truck from going over the Sheridan road system of boulevards, and because of the frightful condition of the roads at Zion City. The truck passed a number of big passenger cars laboring through the mud.

NEW MOTOR FUEL ON MARKET

WASHINGTON, March 20—The Motor Fuels Co., St. Joseph, Mo., which has a process for forming motor fuel for internal combustion engines from fuel oil, developed by S. M. Herber, president of the company, is placing its process on the market.

The fuel, it is claimed, can be made at a cost not to exceed 6.5 cents per gallon from fuel oil valued at 80 cents per barrel at the refinery and which tests from 24.5 to 28 gravity Bé., after all kerosene and gas oil products have been distilled out by the usual methods, or from crude oil of the same character. This motor fuel, it is said, will stand as high a test of efficiency as a motor fuel as the 58 to 59 gravity gasoline now sold and used by the general public.

Herber is willing to conduct demonstrations and tests as may be mutually agreed upon at the model plant at St. Joseph, and is ready to enter into contract with responsible parties to demonstrate the process.

CANADIAN HIGHWAY

OTTAWA, CAN., March 21—During the forthcoming session of the Federal Parliament a bill will be introduced which will provide for the building of a road to be known as the Canadian Highway from Glace Bay, near Sydney, Nova Scotia, to Cape Scott, upon Vancouver Island, and passing as directly as possible to Quebec City, thence to Ottawa, Winnipeg, Vancouver City, Victoria and Manaimo. The appropriation will be $10,000,000 and will be divided among the several provinces in proportion to the estimated mileage in each province of the Canadian Highway, excepting that the total be reduced by an amount sufficient to provide both Prince Edward Island and the Yukon Territory with sums in each instance equal to one-half the amount received by Nova Scotia. The appropriation is to be divided by the Minister, to whom any protests shall be addressed within 30 days of the final passing of the act by the senate should a province be dissatisfied with its appropriation.

TOLEDO TRANSPORTATION ASSN.

TOLEDO, OHIO, March 22—The Toledo Transportation Assn. has been organized in that city in order to handle the work of a return loads bureau. The association was formed by Toledo warehouse and cartage men. Wesley Thurstin, Jr., is temporarily head of the new association.

Coming Events

April 3	Macon, Ga., Motor Truck Demonstration Day.
April 5-12	Brooklyn, N. Y., Motor Truck Show, Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory.
April 5-12	Montreal, Can., Motor Truck Show, Victoria Rink.
	Wilmington, Del., Motor Truck Show Hotel du Pont.
April 10-12	Philadelphia, Pa., Meeting Motor Truck Sales Managers, Bellevue Stratford Hotel.
April 17-19	Lincoln, Ill., Motor Vehicle Show, Court House Square.
April 24-26	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.
May 10-17	Bristol, Va.-Tenn., Great Southern Automotive Show.
May 20-24	Quebec, Can., Good Roads Congress.

Dept. of Agriculture Gets War Trucks

Will Be Distributed to States Building National Roadways

WASHINGTON, D. C., March 18—Under Section 7 of the Post Office Appropriation Bill, recently passed by Congress, the Secretary of War is authorized in his discretion to transfer to the Secretary of Agriculture all available war material, equipment and supplies, including trucks, not needed for the purposes of the War Department, but suitable for use in the improvement of highways. The Secretary of Agriculture is, in turn, authorized to distribute the same among the highway departments of the several States to be used on roads constructed in whole or in part by Federal aid, such distribution to be made upon a value basis of distribution the same as provided by the Federal Aid Act, approved July 11, 1916, provided that the Secretary may reserve not to exceed 10 per cent of such material, equipment and supplies for use in construction of forest roads or other roads constructed under his direct supervision.

LICENSE AUTOMOTIVE MECHANICS

SALEM, ORE., March 21—Automotive mechanics hereafter will be licensed in the State of Oregon. The State Legislature has passed Senate Bill No. 280, which creates a Board of Auto Mechanics Examiners, before whom those who would work as mechanics must appear, be examined, passed and properly licensed—for a fee of $5. The license is good for a year, when it can be renewed. The board may at any time revoke a license for incompetency on the part of the holder and for any other good and sufficient cause.

COLUMBUS P. O. ROUTES GO

COLUMBUS, OHIO, March 27—Owing to the cut in the appropriation of $1,000,000 to $300,000 to the Post Office Department because of the fact that the War Department will turn its superfluous trucks over to the Post Office Department, the route from Columbus to Cincinnati was discontinued on March 4. It is expected that the route from Columbus to Zanesville will be done away with shortly.

MILWAUKEE REGULATES TRAFFIC

MILWAUKEE, WIS., March 24—A bill has been introduced in the Wisconsin legislature under which Milwaukee is empowered to designate certain streets for truck traffic and thus keep paved thoroughfares in a better state of repair. The bill also provides that the weight of the load be limited to 800 lb. per inch of tire width, and that the maximum weight for trucks and trailers be 30,000 lb. It was recommended for passage by the committee to which it was assigned.

Take Steps to Protect Illinois Highways

Bill Proposed by Truck Owners' Assn. Governs Truck Use

CHICAGO, March 17—The Motor Truck Owners' Assn., of this city, has drawn up a bill for the purpose of regulating the use and operation of motor trucks on the highways of the State of Illinois with regard to loads, rate of speed, width of tires and such other provisions which will protect the highways.

Some of the provisions of the bill are as follows:

No more than one motor-drawn vehicle may be trailed by a truck while running on the highways and the speed at which it is operated must be governed by the vehicle having the lowest per mile rating.

Any motor truck not equipped with pneumatics on all four wheels must have the following in plain view on the left-hand side of the chassis: Maker's name, number, model, motor number, weight of vehicle in pounds, allowable load in pounds, gross weight in pounds and maximum speed in miles per hour.

Any vehicles operating on the public highways of the State may not have a gage of more than 75 in., measured from center of tire to center of tire, and not more than 96 in. overall width and must not be higher than 12 ft. 6 in. Any vehicle having a load extending beyond the outside dimensions given above must have displayed at the outside extremity of the load, a red flag by day, which shall be not less than 12 in. square, and a red light by night hung so as to be easily seen by the driver of an approaching vehicle.

No vehicle shall operate over a bridge whose gross weight carrying capacity is less than the weight of the truck. In case this is violated in addition to the penalty prescribed for violating the law, the owner of the truck will be responsible to the county or municipality maintaining such bridge for any damage which may be done to such bridge.

No vehicle operated over the highways of this State shall be equipped with driving wheels whose tires are of metal which may come in contact with the surface of the road or which have a partial contact of the metal with the surface of the road except in cases where non-skid chains or similar devices are used. However, should the chains do damage to the road the person using them is liable to arrest and penalties.

The size of tires used on all motor trucks or motor drawn vehicles shall be determined by the maximum width of rubber and in no case shall the width of bearing surface, when such vehicle is unloaded, be less than two-thirds of such size. In case a vehicle is equipped with tires which are smaller than the required size, no license shall be granted that vehicle to operate.

Not more than one-third of the gross weight of vehicle and allowable load combined shall be carried on one rear wheel. The front wheel or wheels shall carry the balance of the gross weight of the vehicle and allowable load as shown on the plate on the side of the chassis.

The following schedule gives the gross wheel load in pounds and maximum speed in miles per hour for commercial vehicles equipped with tires of the specified given size and diameter:

Size of Tires in Inches	Diameter of Wheel and Carrying Capacity						Speed, Miles per Hour
Single	32 In.	34 In.	36 In.	38 In.	40 In.	42 In.	
2	565	595	625	660	690	720	20
2½	840	890	940	990	1,040	1,090	20
3	1,125	1,190	1,250	1,315	1,375	1,440	20
3½	1,415	1,490	1,565	1,640	1,715	1,790	18
4	1,690	1,780	1,875	1,970	2,065	2,155	16
5	2,250	2,375	2,500	2,625	2,750	2,875	14
6	2,815	2,970	3,125	3,285	3,440	3,595	12
7	3,375	3,565	3,750	3,940	4,125	4,315	10
Dual							
2	1,125	1,188	1,250	1,312	1,375	1,438	18
2½	1,676	1,775	1,875	1,975	2,075	2,175	18
3	2,250	2,375	2,500	2,625	2,750	2,875	16
3½	2,825	2,975	3,125	3,275	3,425	3,575	14
4	3,375	3,560	3,750	3,940	4,125	4,310	13
5	4,500	4,750	5,000	5,250	5,500	5,750	12
6	5,625	5,940	6,250	6,565	6,875	7,190	10
7	6,750	7,125	7,500	7,875	8,250	8,625	10

If the roads are soft during the months of March, April and May because of the thawing of frost, or rain, the maximum carrying capacity of tires on all vehicles shall be limited to one-half the regular allowance. However, notices to this effect must be posted on the highway together with a copy of this section of the act.

The brakes with which the trucks are equipped must be of the friction type and not the kind that will cause a deadlock on the wheels when applied.

A fine of not less than $25 or more than $100 for a first offense in violating any of the provisions of this act may be made and not less than $50 and not more than $200 for a second offense.

The sheriff of each county shall appoint the county superintendent of highways or commissioners of highways of the townships of his county as his deputies who shall enforce this act.

SENATE PASSES TUNNEL BILL

ALBANY, N. Y., March 27—The Adler bill, providing for the construction of a vehicular tunnel from New York to New Jersey and appropriating $1,000,000 for immediate work, has been passed by the Senate with but few negative votes. New York's share of the tunnel cost will be $6,000,000, a like amount coming from New Jersey. Governor Smith will hold a conference in New York City on March 29 with the chairman of his reconstruction commission, and at that time the bill will be given the Governor to either sign or veto as a result of the hearings of that commission on the measure.

GASOLINE PRICE WAR

NEW YORK CITY, March 27—Gasoline prices in Memphis, Tenn., are down to 12 and 13 cents a gal., retail, as a result of a price-cutting war between the Standard Oil Co. and the Gulf Refining Co. The Standard Oil Co. is selling at 13 cents retail and 11 cents to the tank filling stations, while the Gulf Refining Co. is selling at 13 cents retail and 12 cents to the tank filling stations.

The gasoline price war has reached Baltimore also, and it is stated that the hostilities will be opened up all along the Atlantic Coast. The Gulf Refining Co. will open headquarters in Baltimore. Representatives of the company have been in the city for some time, and a location is expected to be found shortly. The Gulf company has a station in Frederick, Md., where it has cut the price 1 cent under the Standard and other companies doing business there. The price at Frederick is 23 cents generally, and 22 cents at the Gulf stations. As yet there has been no cut in Baltimore prices.

P. O. Dept. Gets 1500 More War Trucks

Health Dept. Gets 1000 Trucks To Be Used Nationally

WASHINGTON, D. C., March 18—An allotment of 1500 motor trucks has been arranged for by the War Department for the Post Office Department in addition to the 1200 which were recently transferred, as announced in a previous issue. These trucks are being used for rural truck routes by the Post Office Department. Few have as yet been actually operated, but plans are being perfected, and it is expected that the 2700, and additional trucks, will be used soon.

Arrangements have also been made to supply 1000 motor trucks to the United States Health Department, which will be used in various cities for the transfer of supplies.

NEW UNITED STATES TRUCK

CINCINNATI, OHIO, March 20—The United States Motor Truck Co. has added a 1½-ton truck to its line. With the new addition the line comprises capacities from 1½ to 5 tons. This smallest model is to sell for $1,995 in chassis with seat, solid tires and regular equipment. The name will be Model N.

CANADA CONSIDERS ROAD MAINTENANCE

MONTREAL, CAN., March 26—In December a delegation waited on the Dominion Government representing a number of good roads and motor associations and boards of trade, urging the adoption of the plan announced later by Hon. Dr. Reid as the government's policy for the building of national highways. It is probable that a similar delegation will visit Ottawa shortly to present views on the question of maintenance, a feature of good roads quite as important as construction itself.

NEW TIRE COMPANY

AKRON, OHIO, March 18—R. J. Firestone, vice-president of the Firestone Tire & Rubber Co., is instrumental in the organization of a new rubber company. This company has already acquired the property of the Standard Tire & Rubber Mfg. Co. at Willoughby. Mr. Firestone will be president of the new company. Other officers are: Vice-president, C. A. McCulloch; secretary and treasurer, T. A. Palmer. Pneumatic and cord tires will be manufactured. The plant has a capacity of 250 tires a day.

PEERLESS QUITS MAKING TRUCKS

CLEVELAND, OHIO, March 18—The Peerless Motor Car Co. has discontinued its line of trucks for the present and will devote its entire energies to the manufacture of passenger cars.

Penn. Has Large Road Building Program

$130,000,000 to Be Expended in the Next Four Years

HARRISBURG, PA., March 21—Plans have now been completed and some of the contracts have already been let for the greatest program of road building and maintenance in the history of the State. Within the next 4 years a total of $130,000,000 will be spent for road work and for the balance of this year alone more money will be spent than was spent in the last 8 years. A bond issue of $60,000,000 has been passed by the legislature, $6,000,000 is available from State aid and $12,600,000 from other sources.

The legislature has just passed an amendment to the automotive registration bill increasing the license fees on all classes of vehicles, both passenger and commercial, and it is expected that this will yield several million dollars more in fees than was yielded in the last fiscal year. As all of this goes directly into the highways department for the rebuilding and maintenance of roads there has been little opposition to the raise. The first draft of the bill as presented made the fee for heavy commercial vehicles too stiff, but this has been revised and the bill as amended seems to be satisfactory to everybody.

During the present year it is planned to build 3500 miles of primary road system, the State paying for every foot of this. All primary roads are to be constructed along permanent lines, and they will be built with concrete foundations. Contracts were let yesterday for a considerable amount of this primary system. All new roads are to be built by the contract system and some 234 companies have been bidding for this work. After the roads are completed they are taken over by the State and the State highway department keeps them in order. For this purpose 23 of the tractors which were used last year to help farmers open up new ground have been transferred from the Department of Agriculture to the Department of Highways, and these will be used to drag the existing roads and keep them in shape.

There are approximately 90,000 miles of roads of all sorts in Pennsylvania. The State is bearing the entire cost of extending the primary system or the roads which extend clear into the State or connect important points.

GERMAN TRUCK SITUATION

WASHINGTON, D. C., March 17—In Germany, according to a consular report, twenty motor truck manufacturers organized in 1915 for the purpose of taking over motor vehicles released by the army and disposing of them so as to create the least disturbance to the truck industry. The organization was known as the Feldkraftwagen Aktien-Gesellschaft, or Feldag.

It was generally expected that the truck market would be flooded after the war, but according to an article in the Frankfurter *Zeitung* for Dec. 20, 1918, of which this is a summary, there is not the slightest danger of any immediate flooding of the market, in view of the great scarcity of repair parts. Even in the case of passenger vehicles, the present supply, especially of the lighter models, is far below the demand.

The Feldag is endeavoring to sell the vehicles only after having put them in good running order. But as under the present labor conditions repairs require much more time than under normal conditions, and in view of the scarcity of storage facilities, it was found necessary to sell limited numbers of unrepaired vehicles.

The apprehended drop in prices has also failed to materialize, especially in the case of commercial vehicles. A 3-ton truck which sold for about 16,500 marks ($3,927) before the war, and which may now be obtained for not less than 30,000 marks ($7,200), with tires of iron and wood, is now sold by the Feldag, after a thorough overhauling, for 12,000 ($2,880) to 14,000 ($3,360) marks.

The fact that army contracts for about 10,000 trucks are still outstanding has also a steadying effect on the market.

Under the circumstances it is not surprising that private firms find it difficult to purchase trucks at reasonable prices. It is recalled that a few months ago the association of automobile manufacturers decided to annul all private orders for vehicles received prior to Dec. 31, 1916, on account of the abnormal increase in wages and materials. While orders are now accepted again by the manufacturers, the scarcity of raw materials and the general uncertain conditions make it necessary for them to stipulate a delivery period of several years and to protect themselves thoroughly in regard to prices.

Prior to the war it is estimated Germany had probably about 7000 to 8000 trucks in use. At the outbreak of the war most of them were taken over by the army, and during the war only about 2000 to 3000 vehicles assigned to the home forces were available, partly for public and partly for private use. An increase through return of army trucks is not to be expected, in view of the fact that their number was much smaller than it was generally anticipated, and also because of the armistice provision for the surrender of 5000 trucks to the Entente.

BRADLEY LEAVES M. & A. M. ASSN.

NEW YORK CITY, March 24—L. M. Bradley, who since October, 1916, has been manager of the Motor and Accessory Manufacturers' Assn., has resigned. Early in December he was granted a 3 months' leave of absence because of illness and immediately left New York for Sea Breeze, Fla., where he is at present. M. L. Hemingway, who about a month ago was appointed assistant manager, has been appointed manager. Prior to his connection with the M. & A. M. Hemingway was with the Rubber Assn. of America.

Meet to Discuss Truck Bill in Vermont

Discuss Road Conditions, Types, Sizes and Weights of Trucks

MONTPELIER, VT., March 18—All parts of Vermont and several other States were represented at the public hearing in Representatives' Hall on Bill H. 254, the proposed motor truck law. The hearing was held before the House Committee on Highways and Bridges, with Mr. Taylor of Hardwick presiding. The discussion broadened into a general review of road conditions, types, sizes, capacities and weights of trucks, strength of bridges and, most important of all, proper rates for registration.

At the opening of the hearing it was stated that the committee was not insisting on this bill as it now stands, but that it had been drawn up as a tentative measure with the rates on trucks purposely high so that ideas could be brought out and a fair average reached. Anybody who desired to do so was invited to speak on the measure, information being sought.

It was the general opinion that the rates provided by the bill are altogether too high, but there was much difference of opinion as to how they should be adjusted.

Mr. Witters of St. Johnsbury thought it best to tax passenger cars rather than motor trucks, and maintained that it was unfair to tax a light truck more than a heavy passenger car.

Mr. Fenn of the National Motor Truck Committee read a lengthy article in regard to the general value of the truck, and quoted standard requirements for the motor truck which, he said, had been adopted in many States. He answered many questions, as did Mr. Fenner of the International Motor Co.

In regard to the weight of trucks to be operated on the roads of the State, Commissioner Bates maintained that a 6-ton limit ought to be made, and that it would simply be impossible to build roads in Vermont for several years which would stand up under a load of 15 tons, such as had been suggested.

Many farmers and truck owners protested vigorously against the taxation part of the measure, but all were of the opinion that loads should be regulated until proper bridges could be built. The bill will be redrawn in accordance with the wishes of the people of Vermont.

NEW NEW YORK TRUCK

NEW YORK CITY, March 20—The New York Air Brake Co. of this city, one of the largest builders of railway air-brake equipment in the United States, will enter the motor truck field shortly with a 6-ton truck. It will utilize its plants at Watertown, N. Y., for truck manufacture. The plants were built for the purpose of making munitions for the United States Government and its Allies during the war.

52 Makes of Gasoline Trucks at Phila.

N. Y. Show Is a Little Larger —Chicago's Slightly Smaller

PHILADELPHIA, PA., March 18—The truck show at Philadelphia opened on March 17 with an exhibit of fifty-two makes of gasoline trucks, showing 166 models and one electric with six models. The show was bigger than that at Chicago, where fifty-two makes and 149 vehicles were shown. It was only slightly smaller than the New York show, where fifty-eight makes and 161 vehicles were on exhibit. The trucks exhibited were: Acason, 3; Acme, 3; All-American, 1; Atterbury, 3; Autocar, 5; Bessemer, 4; Bethlehem, 4; Briscoe, 1; Brockway, 3; Chevrolet, 3; Clydesdale, 4; Day-Elder, 5; Dearborn, 1; Denby, 3; Diamond-T, 2; Dodge, 6; Dorris, 4; Duplex, 1; F. W. D., 1; Federal, 4; Ford, 3; Fulton, 3; Gramm-Bernstein, 3; I. H. C., 4; Keystone, 1; Kissel, 2; Koehler, 1; Maccar, 3; Master, 4; Maxwell, 3; Nash, 3; Oldsmobile, 2; Oneida, 2; Overland, 2; Packard, 5; Paige, 2; Pierce-Arrow, 3; Rainier, 7; Reo, 2; Republic, 4; Riker, 2; Rowe, 5; Sandow, 2; Schacht, 2; Selden, 4; Sterling, 4; Stewart, 6; United States, 3; Velie, 3; Vim, 10; Wilcox, 3; Winther, 2. The electric was the C. T. Electric, with six models. Five makes of converters were shown. These were Dearborn, Graham, Redden, Smith-Form-A-Truck and Truxton. Three makes of trailers were shown, as follows: Fruehauf, Redden and Warner.

Most of the trucks shown have been seen at either the New York or Chicago shows, as there has been little new since these shows were held. However, one new truck made its appearance, the Keystone, made in Philadelphia. This is a 2-ton job, largely of standardized parts, and sells for $1,795. The wheelbase is 138 in. Such parts as Fedders radiator, North American 4 x 4½ engine, Borg & Beck clutch, Covert gearset, Russel internal-gear rear axle, Timken front axle, Stromberg carbureter, Simms magneto and Detweiler steering gear are used. The tires are single solid, 32 x 4 in front and 34 x 5 in rear. The truck is really not in production yet, but the first model was rushed through in time to be at the show. It is expected that actual deliveries will begin in 2 or 3 months.

CATTLE HAULAGE TO K. C. YARDS

KANSAS CITY, MO., March 22—The truck traffic into the Kansas City Stock Yards from a district extending 30 miles amounts sometimes to 100 loads a day. But only within the past few months has there been any general tendency among the truck owners to get loads back to their country districts. There are more than fifty trucks owned by transfer men within the city limits who make a regular business of hauling in stock, who go out into the country to get it. One of the men who does it is H. Chipp. For 11 years Mr. Chipp has been hauling with a truck and team, and was only enabled thereby to make one trip a day, on which he would realize $2 to $2.50 for an 8-mile run. He would then get some work around the city, for which he would get about $1. Last year he bought a Ford truck, with which he can carry two to three loads a day at $3 a load for a 4-mile run and $4 up to 8 miles.

WILSON COMPLETES WAR ORDERS

DETROIT, March 18—The J. C. Wilson Co., maker of the Wilson trucks, has just concluded its contract with the government and is now on a peace time basis. The last batch of government trucks was shipped direct to the postmasters at York, Pa., and Columbus, Ohio.

PERRY WITH TRAILER ASSN.

DETROIT, March 20—The Trailer Mfg. Assn. of America, which met in Detroit on March 18, will shortly inaugurate an aggressive publicity campaign to bring the advantages of trailer transportation more prominently before truck users. Twenty manufacturers were represented at the meeting, and all have subscribed to a publicity fund. Harry W. Perry, up to the present time with the National Automobile Chamber of Commerce, has been elected secretary and manager of the association. General offices will be opened in New York City as soon as suitable quarters can be obtained.

FORD TRUCKS AS SCHOOL BUSES

CALGARY, ALBERTA, CAN., March 18—Ten Ford trucks fitted with bus bodies have been purchased at Calgary for use in transporting school children to and from school in the Yarton and Parkdale districts, close to Calgary.

Transport Commission Formed in Mich.

Representatives Chosen From 24 Counties as Chairmen

GRAND RAPIDS, MICH., March 19—A meeting was called in Grand Rapids for the purpose of forming the Northwestern District Highways Transport Commission by the selection of a county chairman for each of the twenty-four counties comprising the northwestern district of Michigan. F. K. George was elected secretary of the executive committee, and the following men were chosen nominees as county chairmen of the counties from which they come:

Name of County	Name of Nominee
Antrim Co.	E. R. Harris, Ellsworth
Benzie Co.	J. F. Hoffstetter, Frankfort
Charlevoix Co.	Harry Nichols, Charlevoix
Cheboygan Co.	Col. H. A. Frambach, Cheboygan
Crawford Co.	T. W. Hanson, Grayling
Emmett Co.	Judge A. L. Deuel, Harbor Springs
Grand Traverse Co.	Frank H. Hamilton, Traverse City
Ionia Co.	M. Chapman, Ionia
Kalkaska Co.	J. H. Greacen, Kalkaska
Kent Co.	F. K. George, Grand Rapids
Lake Co.	G. F. Diffing, Baldwin
Manistee Co.	Richard M. Hoffman, Manistee
Mecosta Co.	George B. Fairman, Big Rapids
Missaukee Co.	Henry Curtis, Jennings
Montcalm Co.	F. E. Ranney, Greenville
Muskegon Co.	Stephen H. Clink, Muskegon
Newaygo Co.	J. B. John, Newaygo
Oceana Co.	Hon. Thomas Read, Shelby
Osceola Co.	V. R. Davy, Evart
Otsego Co.	S. W. Buck, Gaylord
Ottawa Co.	Nathaniel Robbins, Grand Haven
Wexford Co.	Henry W. Knowlton, Cadillac
Mason Co.	Claude M. Curtiss, Ludington
LeeLanau Co.	D. H. Day, Glen Haven

FRUEHAUF PRICES GUARANTEED

DETROIT, March 16—H. C. Fruehauf, general manager of the Fruehauf Trailer Co., Detroit, says that present prices are guaranteed against reduction up to Sept. 1. 1919.

A glimpse of part of the truck exhibition held in Philadelphia

Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections

Official Records Indicate Saving of One and a Half Million Dollars in Road Transportation of Stock to Packing Houses Alone

WHEN the question of the possibilities of an organized system of rural motor express was first considered it was more or less in the light of its capacity to relieve our railroads from the congestion brought about by operating under war-time conditions. In fact, it was a suggested remedy for an abnormal condition, and as such it received the support and endorsement of the Council of National Defense, the Food Administration and other departments which formed part of the country's economic war machine.

It is conceivable that in the minds of many the whole project of a motor transported rural express service was originally merely a method of relieving the tension brought about by the failure of the railroads to respond adequately to the extra strain of handling the excess freight imposed by the necessities of war, and that as soon as peace was in sight the railroads would function as before and the need for mechanically-operated highway transport would cease automatically.

Rural Motor Express Bound to Grow

However, the opportunity afforded has been tried out thoroughly throughout the length and breadth of the United States, with a result so eminently satisfactory to the farmer and the truck operator (assuming that the service was conducted along common sense lines) that not only is there no prospect of a return to the older conditions, but there is every indication of a tremendous increase in the extent of the rural motor express service and equally important developments in the manner in which this service is conducted—greater efficiency, lower operating costs, lower rates and satisfactory profits.

It is not denied that there have been failures here and there but invariably these have been traceable to lack of system, want of method in routing, inefficient cost systems, the use of unsuitable trucks and a general failure to appreciate the requirements of the new form of road transport as a commercial proposition.

Rural Express in Iowa

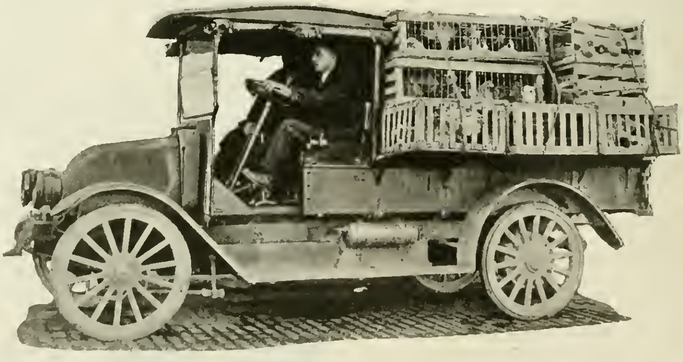
To take a concrete instance of what can be done by systematic methods of operating a rural express service, an example set in the State of Iowa affords an excellent illustration.

It should be realized that the West lends itself admirably to the operation of rural motor express lines. Most of the food products are grown in that portion of our country and the opportunity afforded to the truck operator to play his part in keeping the rural communities and farming sections in closer contact with the cities and markets is very great.

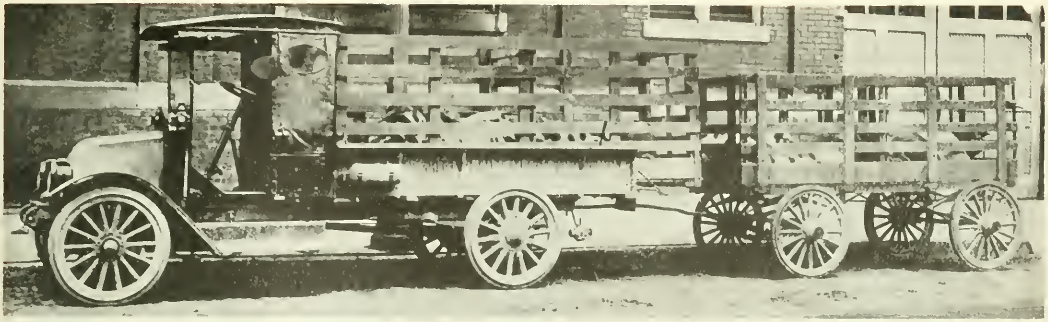
As an example of what has been already done in Iowa by motor trucks in the way of hauling livestock, the secretary of the Highways Transport Committee recently pointed out that trucks had hauled to the packing houses in the State 225,600 head of hogs, 23,408 head of cattle and 61,402 head of sheep. Had it been necessary to haul these by railroad 6250 cars (or approximately 250 trainloads) would have been required. The total road mileage represented in hauling this livestock by truck, including the return trips, is estimated at no less than 2,513,210 miles.

This livestock was hauled by farmers owning their own trucks and by the sixty-one trucking companies operating motor trucks in the State, freight and express being hauled from the cities to small town merchants, farmers, etc., and livestock carried on return trips.

Cattle of the more valuable types are usually carried singly, as shown in this illustration. Livestock for the packing houses is transported in special bodies



Truck transportation offers enormous advantages in comparison with railroad transport in the case of poultry and perishable goods on account of the saving in time and absence of transfers



John Redfeather, a Sioux Indian, operates this truck and trailer. He hauls livestock from the Reservation to Sioux City and merchandise from the city back to the Indian Agency. John doesn't like photographers.

Both the farmers and the truck owners agree that by the utilization of the motor truck the amount saved, the stock shrinkage alone, paid the cost of the hauling, irrespective of the saving in man-power, time and reduced cost.

The secretary's report goes on to say that in addition to the livestock transport requirements there are 187 trucks in the State of Iowa running on regular advertised schedules, hauling merchandise and farm products. These trucks do not haul any livestock. Revenue is collected on 574 tons of freight per day, equivalent to a total yearly tonnage of 172,200 tons, or 8610 carloads (approximately 344 trainloads). Each of these 187 trucks averages 70 miles per day, making a total daily mileage of 13,090 miles.

Combining these items (quoting from the official report) trucks have traveled over the highways 6,440,210 miles, hauling a combined tonnage of 244,200 tons, equal to 14,860 carloads. In these items no consideration has been given to the return loads of trucks hauling livestock from the farm to the market, neither do they include the services rendered by the 6012 additional trucks owned by farmers in the State. These farmers' trucks are used to keep their owners in contact with the nearest town and market, and there are no records of the number of trips, miles covered or amount of tonnage hauled.

Analysis of Department's Conclusions

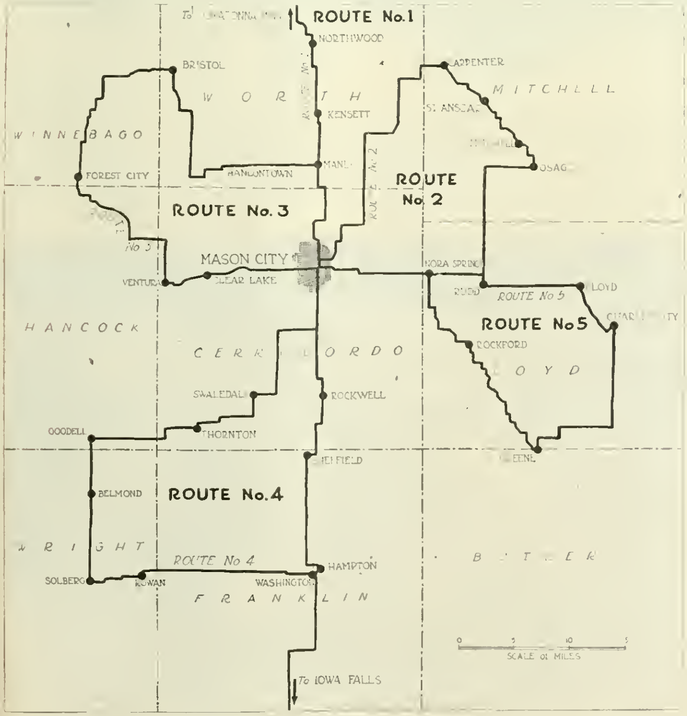
Basing conclusions on the United States Department of Agriculture's detailed estimate that the cost of hauling a ton of freight by truck costs 15 cents per mile as against a cost of 33 cents per mile where teams are used, the following figures are instructive:

In the items under consideration 6,440,210 miles were covered by truck at a cost of $966,031. The cost by team would have been $2,125,269, and the saving effected by the use of trucks was no less than $1,519,237. These figures deal only with the operation of the 489 trucks of which the Highways Transport Committee has a complete record.

Assuming that the 6012 trucks owned by individual farmers have hauled as much tonnage as the 489, and that they have covered as many miles, an ultraconservative basis of estimate, the combined saving as between trucks and horse-drawn vehicles is $2,318,475 in favor of the former. Time is also a valuable asset, and if it be assumed that the truck on the average travels at but three times the speed of the horse-drawn vehicle, the additional saving in favor of mechanical road transport may be realized.

Work Reduced to a Science

The foregoing is a brief review of the position in Iowa from the widest possible point of view, that of the Highways Transport Committee. The report does not deal with the result of any individual effort, but treats the subject as a whole. There are, however, a number of truck operating concerns in the State whose methods are worthy of consideration. Several of these have reduced the problem of successful road transport to an exact science, giving full, prompt and hitherto unobtainable service to the farming communities and at the same time conducting their business on a basis



Map showing the five routes operated by the Mason City Motor Express Co. Under the present schedule each of these is covered twice a week.

Three of the Mason City Co.'s fleet which haul merchandise from the city and farm products on return trips. They maintain service over a route of 92 miles.

These trucks, owned by the Highways Motor Express Co., haul general merchandise from Des Moines to a number of small towns and carry farm products on return trips

which insures an entirely satisfactory profit.

For illustrative purposes, take the Mason City Motor Express Co., which has studied the problems of rural motor express and evolved a system which not only benefits the section in which it operates but does so in a manner which cannot fail to interest the community generally in the possibilities of the motor truck, thereby giving practical demonstration daily of the speed and reliability of mechanical road transport. Incidentally it should be stated that in the past the roads of Iowa have not been remarkable for their excellence and that the development of the rural motor express along permanent lines is expected to do much in helping along the active movement for better roads in the State.

Operates on Schedule

The Mason company operates on the five routes shown on the accompanying map much in the same way as a trolley-car company schedules its daily work. Reference to this map shows that these five routes have Mason City as a common center; each of them is fifty or more miles in length and, combined, they cover all the smaller market centers in a radius of some thirty miles. As a matter of fact, they traverse 38 towns with combined populations of 38,900. There are 394 miles of highway with 1876 farms actually touching them, and there are 5628 farms extending within a mile of the roads traveled. The Mason trucks operate on a basis of definite route, definite time and definite rates. A printed rate sheet tells exactly what the cost will be to carry a shipment from any one point to another, and service is given in accordance with a set time schedule, an arrangement which is all-important to the farmer who is located a little way off the regular route. It is not denied that there have been minor troubles and delays in the operation of the system in severe weather, but the farmers have come to realize that under normal conditions they may expect the Mason City truck on time, that they can rely on prompt delivery of eggs, butter, milk and other perishable products, and that not only do they save time but the cost is actually lower than under the old conditions.

Roads Need Improvement

Although the 1½-ton trucks used in this service by the Mason City Co.'s service operate on a definite schedule, it must not be assumed that it has always been an easy matter to adhere to it irrespective of weather conditions. Iowa roads, when dry, permit of good going for trucks of limited weight and moderate speed, but conditions are far different during stormy weather when the dirt roads become sticky mud without any firm foundation.

In order to prove the possibility of its fleet operating under the most adverse conditions the Mason City Co. kept them working in an attempt to maintain the published schedule during a period of continued heavy rain last fall. It succeeded in doing do, despite the fact that several of them were ditched and had to be hauled out by teams or tractors. Once or twice the trucks were held up overnight, but without exception they got through finally and although the schedule perforce lapsed for a day or two it was speedily resumed.

Of course the answer to the road difficulty is found in Iowa's efforts to provide concrete highways, a project which is under active consideration and for which a bond issue is suggested.

The Dubuque Highway Transport Committee maintains a daily service between Dubuque, Bernard, Phillmore, Cascade, Monticello and Animosa, a 92-mile trip

Johnson's 2-ton Federal unloading cans of garbage from the nearby army camps. The hogs are first hauled from the Fort Worth stockyards and then back again when fattened up

Trucks Haul Hogs from Fort Worth Stockyards to Farm for Fattening and Resale

Same Vehicles Carry Garbage from Nearby Army Camps for Hog Feed

IT'S an ill wind that, no matter how bad, does not blow somebody some good. For instance, the serious drought prevalent in Oklahoma, Texas, New Mexico and Arizona during the summer and fall of 1918 made it necessary for the livestock raisers in those States to ship their cattle and hogs to market as stockers instead of packers. A stocker is an animal which is under weight and which is shipped to market with the idea of being bought by a second party, taken out of the yards and put on nearby farms to fatten up before again being returned to those yards for slaughter. A packer, however, is an animal already fattened and one which is purchased for the packing stockhouses generally surrounding the stockyards and soon afterward transformed into dressed meat for human consumption.

The drought existing in the States of the great Southwest and the subsequent inability to procure feed for the livestock was an ill wind which made those stockmen ship their animals into the Fort Worth market before they were heavy enough to be purchased by the packing houses.

It was this same ill wind which enabled Richard Johnson, a truck owner in Fort Worth, to build up a paying business in buying stockers, transferring them to his farm, where they were fattened for market and later returned to the same stockyard at which they were purchased.

Trucks Also Haul Hog Feed

The use of trucks for such work is not entirely new, since it has been done for several years in other territories surrounding the stockyards in Louisville, Ky.; Cincinnati, Ohio; Indianapolis, Ind.; Kansas City, Mo., and even Omaha, Neb. Mr. Johnson, however, went one step further in this character of work and used motor trucks not only to haul the lean hogs from the stockyards to his farm and the fat hogs from his farm to the stockyards, but also to haul the garbage fed to the hogs from the nearby army cantonment at Camp Bowie and from two flying fields, one, Barton Field at Everman, 10 miles south of Fort Worth, and the other, Carrouthers Field at Benbrook, 12 miles west of Fort Worth. Camp Bowie, a cantonment for drafted men, was located 3 miles southeast of Fort Worth. It was 5 miles from the nearest camp to Johnson's farm and a haul of 10 miles from his farm to the Fort Worth stockyards.

Without the use of motor trucks it would have been impossible for Mr. Johnson to enter the business of hauling the hogs from the stockyards or of taking the contract for the disposal of the garbage of the one cantonment and two flying fields. With horses the haul would have been far too long to give any profit in the work. By trucks it permitted Mr. Johnson to enter a profitable busi-

The 2-ton Federal with a load of empty garbage cans and about ready to start back to the camp from which the loaded cans were picked up. The chains between the side stakes keep the cans in place and yet permit of easy loading and unloading

ness and to keep his trucks going with full loads practically all of the time. If they were not hauling hogs to and from the stockyards, they were employed in bringing the full cans of garbage from one or the other of the camps or in returning the empty garbage cans. Except for the hire of the farm on which the hogs were fattened, Mr. Johnson's business was entirely dependent on transportation. It is but another example of many in which motor trucks have permitted owners to enter new kinds of profitable business.

Forty Stockers in a 2-Ton Load

Before entering the hog business and before taking the contracts for the disposal of the garbage from the three army camps which were made possible entirely by the use of trucks, Johnson owned only two trucks, whereas now he employs five. The present fleet includes two 2-ton Wichitas bought 3 years ago; one Federal second-hand 2-tonner purchased about 18 months ago; a converted Ford passenger car made into a truck by means of a Redden attachment, and a 1½-ton Republic. When the camps were full, one of the Wichitas and one of the Federals were employed to haul the garbage from the camps to the Johnson farm and to take the empty cans back. Each of the truck bodies has a tin-lined platform and is furnished with removable side stakes, which are kept in place when hogs are hauled and removed for moving the cans of garbage: From twenty-eight to thirty cans of garbage are carried to a load on each 2-ton truck. From twenty to twenty-two fat hogs can be carried on each 2-ton truck and about forty stockers.

Had 1700 Hogs at One Time

At one time Johnson had as many as 1700 hogs on his farm at once. At the present writing he has about 1000. The hogs weigh from 70 to 80 lb. apiece when bought at the Fort Worth stockyards. They are kept on Johnson's farm from 60 to 100 days, at the end of which time they weigh about 200 lb. apiece.

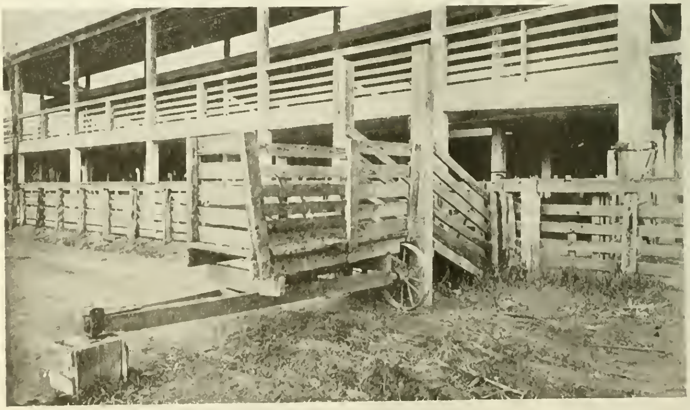
At the stockyards facilities for loading and unloading are provided by means of a new type of swinging platform not previously described in THE COMMERCIAL VEHICLE. The outfit is shown in detail at the bottom of page 20 and the method of use at the bottom of page 21. As shown, the unloading platform consists of two parts a fixed inclined chute at the edge of the stockyard pens and a horizontal revolving platform which is swung around in back of the truck after the latter has been driven up parallel with the side of the pens.

The design is unusual in that the swinging member is not pivoted to one of the posts at the entrance to the inclined runway but instead is pivoted at a point approximately 10 ft. in front of the chute. The revolving horizontal member of the device is mounted on a triangular-shaped framework pivoted at its outer end or apex and fitted with two metal wheels at the base of the triangular framework. The two wheels serve to move the entire framework about its pivot so that when it is swung around in back of the truck the horizontal platform carried on the triangular-shaped framework forms a continuous passageway for the animals from the truck body down the inclined runway into the yard catch pens. The two metal wheels run on the ground and serve to support the greater portion of the weight of the movable member and the hogs when passing over it. The pivot end is several feet beyond the end of the fence built around the horizontal platform and so carries little of the weight with a view to making the entire unit easy to move. Of course, the idea behind the design of this type of platform is to eliminate damage to the unloading chute or to the truck tailgate which might be occasioned if each truck had to back up to the platform in the ordinary manner.

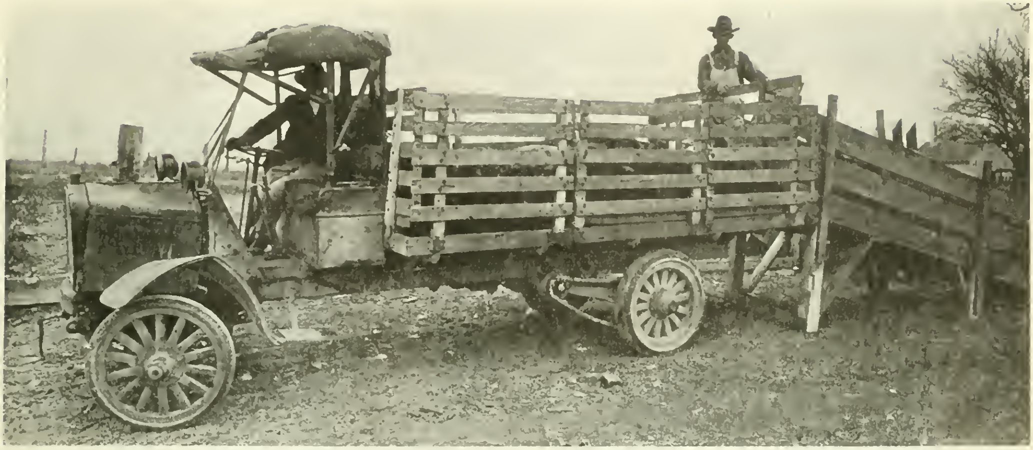
Johnson has provided a simple inclined chute with side-guard fences at his farm. The top or highest point of the runway is exactly level with the floor of the truck body, so that the hogs can be directly loaded into the inclosures on the farm by simply driving them down the chute.

Fort Worth Drive-Out Figures

While Johnson perhaps hauls more hogs in and out of the Fort Worth stockyards than any other man, considerable movement of hogs by means of trucks occurred during 1916, 1917 and 1918. During 1917 a total of 38,658 hogs were driven into the yards as compared with only 23,142 during 1916. This shows an increase of 15,516 for 1917 as compared with 1916, or a gain of approximately 67 per cent. In 1917 a total of 1659 hogs were driven out of the yards as compared with 1283 during 1916, an increase of 376 animals, or a gain of only 30 per cent.



The livestock loading and unloading chute at the Fort Worth stockyards. Note the outside pivot and the wheels to swing the platform clear to allow the truck to run up parallel with the fixed inclined chute



Mr. Johnson has found that it pays to build a permanent though inexpensive inclined chute for loading and unloading because it saves the truck's time

Bad roads in the vicinity of Johnson's farm, which is 10 miles from the stockyards, is one of the greatest problems in truck maintenance. He has found that the bad roads do more damage to the trucks when they are running empty than when fully loaded. All of the trucks are mounted on solid tires.

Son Keeps Trucks in Repair

Johnson's son keeps the trucks in running order, and while the condition of the vehicles, as disclosed by the accompanying illustrations, is not especially favorable, he has found that his son can keep them in better repair than if the work is intrusted to the driver of each truck. The illustrations show engine hoods missing or loose and fenders bent out of shape and the vehicles in a generally dirty condition. While of course it is not possible to say that the running mechanism is in the same state of repair, carelessness in outside appearance is generally a good indication of a similar condition of the running parts. However, the trucks have furnished a very satisfactory service. No doubt if the trucks were in better shape outwardly, the drivers would be inclined to take more care in their operation so that even better service could be expected.

Careless driving is responsible for much of Johnson's troubles in the way of maintenance and the driver problem is one of equal importance with that of bad roads. The drivers are paid $3 a day and work from 7 to 10 hours daily with an average working time of between 7 and 8 hours.

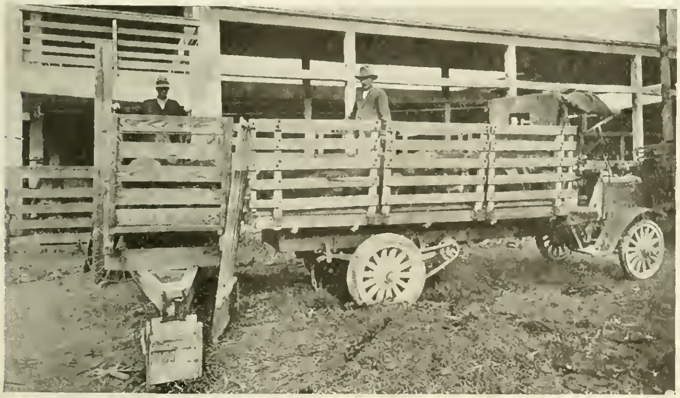
Johnson estimates that each of his 2-ton trucks costs on an average of $10 a day for operating expenses only, not including interest, insurance, depreciation or overhead. The $10 a day charge includes the cost of gasoline, oil, $3 a day for the driver and for repairs. The trucks average from 25 to 35 miles a day, although on some occasions two trips have been made a day from Camp Bowie to the farm, carrying between forty and forty-four cans of garbage for the two trips.

As shown in the illustration at the top of page 20, the cans are stacked in the truck body on one level directly on the body floor. Side stakes with chains between each stake are employed. These serve to keep the cans from jolting off the bodies while running over the rough country roads but may be unhooked to permit easy loading and unloading.

Rail Congestion Forces Use of Motor Truck

Before Johnson began hauling hogs to and from the Fort Worth stockyards exclusively by trucks, he raised some few hogs each year. These were driven over the roads in horse wagons to the Benbrook station 2 miles from his farm. When the war broke out it was practically impossible to get cars spotted at the cattle chutes at the Benbrook station without serious delays. Sometimes a car would be spotted 2 or 3 days after the date on which it was ordered and in other cases it would be more than a week.

As a result the hogs had to be held on the farm for longer periods and in some cases the market price paid at the yard had dropped several cents a pound in the interim. This of course meant a loss to Johnson. For example, if he was shipping twenty hogs, each weighing 200 lb., a price drop of 1 cent a pound would mean a loss of $40 on the shipment. Besides that loss, the shrinkage when shipped by railroad is greater than by motor trucks on account of the severe jolting which the hogs receive during the making up of the livestock train and at each time that the train stops. Even though the cost of hauling hogs by trucks is greater than by rail considering the 100-lb. rate, the saving effected by the quick truck delivery and the decreased amount of shrinkage in the end makes the truck transportation more economical and more certain.



One of the Wichitas unloading hogs over the swinging platform and thence down the inclined chute into the stockyard pens

GETTING BUSINESS *for the* Motor Truckman

T. D. Pratt, right, and W. J. Thompson, left, respectively the executive and salesman of a new type of successful bureau to get work for the motor truckman with a small fleet

New Bureau Self-Supporting—May Develop Into Agency to Work Out the Transportation Problems of All Classes of Shippers

WHAT gives promise of being the eventual solution of the Return Loads Bureau problem has been worked out by the Motor Truck Assn. of America in New York City. It is a business-getting bureau for motor truckmen and one which is self-supporting and therefore can be expected to endure just so long as it continues to function by getting return loads or other work for motor truckmen having idle vehicles. The bureau is called the Motor Truckmen's Division of the association and has been in existence for 5 months.

It gives promise of developing into an entirely new phase of motor truck activities—that of a consulting transportation agency which will handle the transport problem of all classes of shippers of goods in much the same manner as the consulting efficiency engineering concerns go into a factory and point out weaknesses in design, production or sale and of then seeing that the recommendations made to overcome these weaknesses are carried out. This is an entirely new phase in the business of operating motor trucks for hire or on a contract basis. It is of special importance and benefit to the owner of a small number of trucks who is less a business man than a truck operator and who is often confronted with the problem of getting new business, of setting a price on the work and of then carrying out that work in the manner which will insure him a maximum profit.

The work already performed by the bureau has shown conclusively that the average owner of a small fleet of trucks hired out to do haulage on a piece or contract basis is a very poor businessman. It has also shown that he very often allows his business to run in ruts of horse-wagon practice. In many cases he does not show even ordinary initiative in attempting to get the operation of his motor trucks out of the horse-wagon methods of doing business. As a result, his trucks, which are in themselves efficient vehicles, are not employed so as to bring the greatest profits on their investment.

It is this lack of business judgment and initiative in working out new methods of truck operation or of loading or unloading facilities to increase the truck's efficiency which the bureau is now furnishing to members of the association who have idle vehicles.

It is perhaps wise in describing the new bureau to begin at the beginning in order that associations of motor truck owners in other parts of the country may understand the successive steps in the establishment of such a bureau and thereby be able to put a similar plan into effect for their own good.

Why Old Bureaus Died

In this respect it is also wise to go back to the establishment of the first state-wide Return Loads Bureaus in Connecticut in the fall of 1917 and the spring of 1918, as described in great detail, with the actual methods of formation in THE COMMERCIAL VEHICLE for March 1 1918, and in many subsequent issues. It will be remembered that the Return Loads Bureaus were formed first in Connecticut to get the great volume of ammunition manufactured in New England and particularly Connecticut to the overseas shipping docks in New York when the embargoes placed on the railroad lines leading into New York made it impossible to send the shipments by rail. There was no other way to get these shipments through except by the use of the roads and motor trucks, and trucks were therefore employed. It soon became evident that a great economic waste existed in the operation of a large number of trucks carrying loads in one direction only and then returning empty.

The State of Connecticut was quick to realize this situation, and in an attempt to solve the problem formed so-called Return Loads Bureaus at the Chambers of Commerce in fifteen of the most important cities throughout the State.

The idea was of course a good one and spread rapidly in the other States along the eastern seaboard where the railroad congestion was greatest and eventually through the central and even the far west States.

Many of the bureaus thus formed were merely paper organizations which did little if any real work. This was particularly the case in Connecticut, where, as told in THE COMMERCIAL VEHICLE of June 15, 1918, only two or three of the entire fifteen bureaus really functioned properly except in spasmodic periods.

A Bureau That Is Self-Supporting

The bureau of the Motor Truck Association differs from all of the previous types of Return Loads Bureaus as conducted by Chambers of Commerce in that while the latter were not self-supporting, that of the Motor Truck Association stands on its own feet, receiving an income for the work performed. The Chamber of Commerce Return Loads Bureaus were established on the basis of a patriotic appeal to help win the war. Money for their operation was in most cases secured from state or government funds provided for war work and in some small number of cases by contributions from motor truckmen and from shippers, both of which classes receive a direct benefit by obtaining business in the case of the truckmen and of finding truckmen to carry the goods in the case of the shippers.

Now that the war is over this patriotic appeal no longer holds good, so that Chambers of Commerce and other public-spirited organizations cannot be expected to carry on a work which benefits them only indirectly.

As a result, the Chamber of Commerce bureaus began to lag in their work during the latter part of 1918, and at the present time practically all of them have ceased to exist as bureaus capable of accomplishing real work.

While it was evident in New York that there was much truck work to be done and return loads to be secured, it was apparent that the Chamber of Commerce type of Return Loads Bureau was not capable of getting the work or securing the return loads because of the type of men in charge of the work and because the bureau was not self-supporting in that its income was not in excess of the money expended in carrying on its work.

How Bureau Was Started

Then, again, the previous type of bureau in many cases called upon the Motor Truck Association in New York to supply it with data which the truck organization was much more familiar with than the Return Loads Bureau. It was found that the practice of cutting truck rates was becoming prevalent in the city due to the very facts enumerated above of the poor business sense of the average truckman; of his inability to get new work on a fair margin of profit and to then manipulate his trucks so that they could compete profitably with any other means of transportation.

With the end of the Chamber of Commerce type of Return Loads Bureau in sight, Theodore D. Pratt, executive secretary of the Motor Truck Association, which is composed largely of motor truck owners and operators, saw the opportunity to serve the members of his association by taking up the Return Loads Bureau idea where the Chamber of Commerce had left off. It was evident that the bureau must pay for itself and that the motor truckmen securing the business through the bureau should pay for its operation and maintenance, since they were the recipients of the benefits accruing.

Accordingly more than a dozen truck owners doing public hauling were called together to discuss the problem and decide upon ways and means to make the bureau a self-supporting one. One of the truckmen put up $150 in cash to try out the idea, and three others $150 each, giving a total of $600. This money was put into a fund to hire a high-class salesman, who was employed during the next 4 weeks to visit other public truckmen and get them to subscribe to the fund. An additional $450 was collected, there being seven subscribers in all.

This fund was the starting point of the bureau. Here it might be well to state the qualifications found necessary in the type of salesman selected and to point out the dual working force of the bureau, which consists of T. D. Pratt, the executive secretary of the association, and W. J. Thompson, the salesman. Mr. Pratt has had a wide experience in the operation and maintenance of motor trucks which has qualified him to be the operating head of the bureau in addition to his other duties. This experience has enabled him to suggest ways and means whereby the work secured by the salesman can be carried out in the most efficient manner. He is the executive or planner who assists the truckmen in the actual completion of the work turned over to them.

Mr. Thompson is the salesman who gets the business, and in conjunction with Mr. Pratt turns it over to truck owners of the association who have been found reliable. Up to the present time no charge has been made against the bureau for Mr. Pratt's services, although this may have to be done if the work develops, as now seems probable, so that it takes a larger percentage of his time from his secretarial duties.

Other associations not so well fortified by having a man of Mr. Pratt's ability to assist in the work might find it well to employ only one man to run the bureau, selecting him from among the class who know motor truck operating conditions and who, in addition, might be developed into good salesmen. Perhaps a type of man who has previously obtained freight business for the railroads or interurban trolley companies and well qualified as a salesman might with some little study become familiar with the operation of motor trucks and thereby be able to point out how to operate them after he had secured the business for the truck owner. In any event, the man in charge of the work must know how to sell motor truck transportation and then how to advise the owners to whom he turns over the business as to how to make the most money out of it.

After the proper type of man has been secured, the next steps include, in order, the method of getting business; the method of turning it over to truckmen; the method of seeing the work through, and the method of payment.

How Bureau Works

As soon as the establishment of the bureau has been made known among shippers and truckmen, there will undoubtedly be many telephone calls on the part of shippers for trucks to do work and on the part of truckmen asking for work to do. As worked out by the Motor Truck Association, calls of this kind are immediately followed up by Mr. Thompson going out and looking over the ground. For instance, if the shipper requests certain work to be done, Mr. Thompson will go to his place of business, make note of the loading and unloading conditions and similar facilities at the other end of the route. He will decide what size of trucks is best adapted to do the work and will then estimate the cost of doing the work with the facilities existing or perhaps point out how those facilities can be bettered so

(*Continued on page* 27)

Money-Saving Methods in Motor Truck Maintenance

Dirty Waste and Oil Turned Into Cash—Quick Method of Filling Oil Tanks Without Pumps or Waste and of Moving Tools About Garage

Five-Story Garage of Peter Doelger Brewing Co.

This structure is 85 by 100 ft. and built of brick and concrete. There are two 11-ft. doors and an elevator, 11 by 24, runs to the fifth floor. Electricity runs from the company's generators and it also uses its own distilled water for battery charging

HOW would you like to have to maintain eleven foreign trucks for 5 years without a chance of procuring any ready-made spare parts?

This is what the Peter Doelger Brewing Co., New York, has had to do with its Benz-Gaggenau trucks since 1914. The company bought the trucks in 1911, and up to the beginning of the war managed to get parts, but when the war started it was impossible to get any more from Germany.

While, of course, the average American truck owner does not have to maintain foreign-made trucks, the system of maintenance worked out by the Doelger company and the many short-cuts devised to save time and money are of vital interest to any truck owner. They can be applied by the owner of a small number of trucks as well as the large fleet owner because they are based upon fundamental principles which hold good if one or twenty-one trucks are maintained.

One of the first problems was the standardizing of the parts according to American practice in order to get quick deliveries. Another problem was the maintenance of its fleet of trucks at a minimum cost as well as keeping them in good running condition. In addition to the eleven 6-ton Benz-Gaggenau trucks, the fleet consists of one 3-ton Universal; twenty-seven 5-ton G. V. electrics; eight 3½-ton G. V. electrics; one ½-ton G. V. electric with dump body, and a 1903 G. V. 5-tonner. The good maintenance work done on these trucks is borne out by the fact that the whole fleet is now running with the exception of one Benz-Gaggenau truck which was destroyed by fire. Since then the company has added six 6-ton G. V. Mercedes gasoline trucks, a Smith Form-a-Truck and fifteen Fords for salesmen, collectors, etc.

The company maintains its trucks in two separate departments, the gasoline trucks being under the supervision of one foreman and the electrics under another. The gasoline foreman has under him in the day shift five men and in the night shift two men. The electric foreman's day shift includes two men and the night shift, four men. The company has so arranged its shifts that they will overlap, giving a chance for interchange of reports on the work.

Both classes of trucks are maintained in the company's own two-story brick and concrete garage, 85 by 100 ft., which was erected in 1910 for the storage and repair of the electrics, at that time the only power-driven vehicles being used by the company. The next year three more stories were added to care for the gasoline trucks. The building is located on the plant grounds back of the offices and on the right side of the keg department. The first floor is used entirely for the maintenance of the electric trucks and batteries; the second for storing both the electrics and gasoline trucks; the third, for gasoline trucks and passenger cars; the fourth, for outside rental; and the fifth for repairs. The eight supporting columns on the first floor house two charging lines each, besides portable lamp connections and sufficient water facilities. This charging system is carried to the second floor, where but ten trucks can be charged at one time. There are two wide 11-ft. entrances to the garage, one in the front and another at the rear of the right side. The latter entrance is used by the trucks which have unloaded at the keg department just opposite. An elevator, 11 by 24 ft., at the back of the building, runs to the fifth floor.

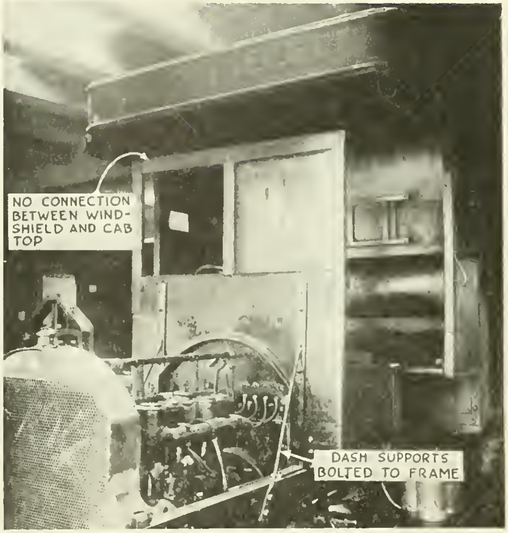
In maintaining its trucks, the Doelger company has worked out several very ingenious mechanical short-cuts which are shown on this and the other pages of this article. These include a method for preventing the breakage of windshield glasses; hand trucks for moving tools about the garage and means for reclaiming dirty waste and of saving oil which would otherwise be lost down the sewer drains.

Eliminating Broken Windshields

A practical solution for broken windshields has been found by bracing the shields from the chassis frame instead of from the roof. It was found that the vibration and swinging of the roofs was responsible for the damaged windshields and, as a result, they are now made separately. Instead of connecting with the roof, the windshield now runs to within 2 ft. of it as shown on page 25. A flexible leather cover reaches from the windshield to the roof.

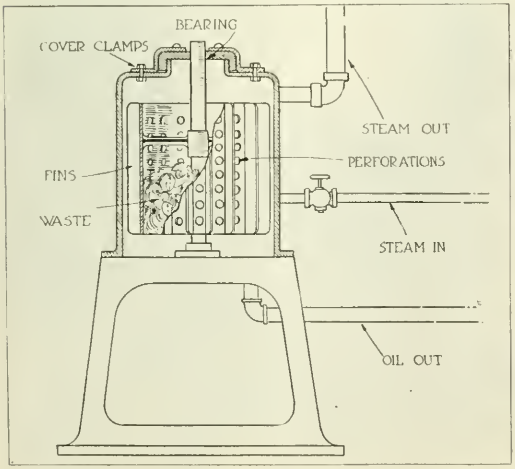
The company has found it advantageous to have its cylinder boring, axle repairing, and such big work done outside of its own shop. Though it has machine shop facilities and other means at its disposal for this work, quicker deliveries may be had from the outside, because of the almost continuous need for these facilities by the brewery department. On the other hand, once an improvement is made or a part ordered, enough are purchased to last the company for some time. One rule of the company is that parts must not be scrapped until they are absolutely useless. Due to the interchangeability of parts in the eleven Benz-Gaggenaus, there is much opportunity for the substitution of completely worn out parts by but slightly worn ones, which have been laid aside for such emergencies.

A number of time and labor saving innovations have been installed by the company in its garage. Besides the charging facilities, portable lights and water system, mentioned above, the company has established a unique method of filling its oil tanks by gravity. The tanks are on the third floor and filled from the fourth floor by means of a pipe led from a funnel, as shown in the illustration on page 26. A runway is built over this funnel so that a barrel of oil may be run over it and the oil allowed to run down through the pipe. This saves time by keeping the barrels off the garage floor and saves money by eliminating waste oil and the cost of maintaining pumps for filling the tanks. Only two labor


NO CONNECTION BETWEEN WINDSHIELD AND CAB TOP
DASH SUPPORTS BOLTED TO FRAME

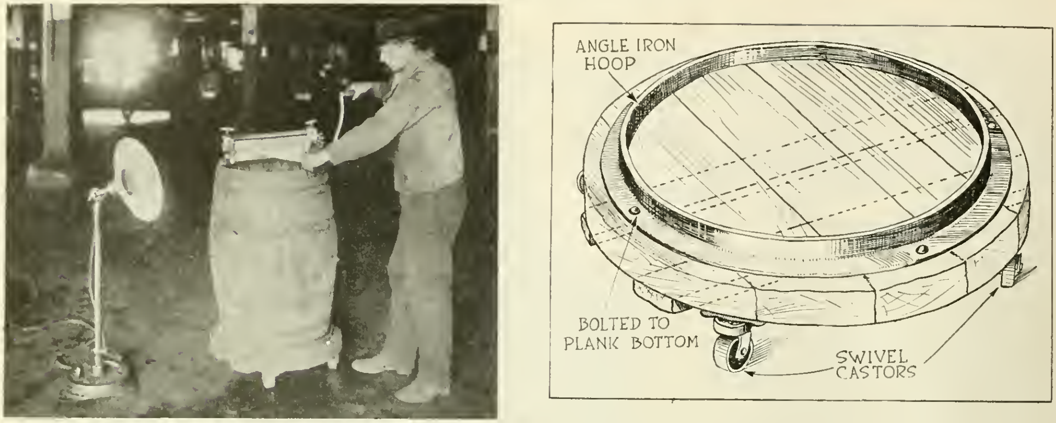
Windshield Bracing Eliminates Damage from Vibration

It was found that the vibration and swinging of the roofs of the trucks damaged the windshields and, as a result, the windshields are now separate. Instead of attaching to the roof, they are now braced by supports from the dash to the frame and run to within 2 ft. of the roof. A leather cover reaches from the windshield to the roof



Steam Washing Machine Which Cleans Waste and Rags and Saves Oil

Instead of throwing away all dirty waste and cloths, they are thrown into a vat which is whirled by steam, pressing against fins. At the same time, this steam escapes through the perforations into the vat and washes the waste. All oil is collected from the drain-pipe and filtered



Soap Barrel Mounted on a Four-Wheeled Swivel-Castor Truck

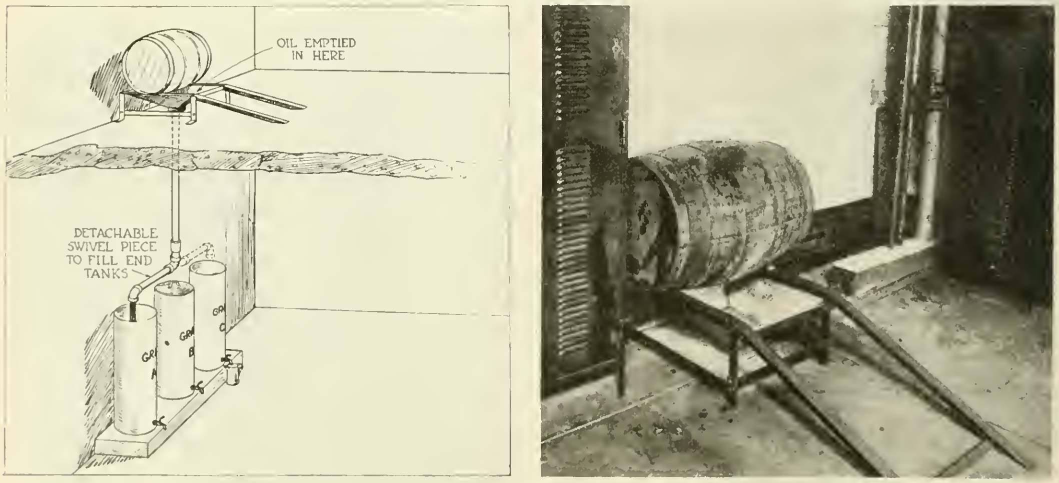
All need of rolling cumbersome barrels by hand is obviated with this truck. Time is saved by the above method of portable lighting and soap carrying when the vehicles are being washed at night. The wringer is for chamois cloths

operations are necessary, that of rolling the full barrel onto the stand, opening the bung and removing the empty barrel.

Another time-and-labor saver is a barrel mounted on a four-wheel swivel-castor truck. The barrel is used for conveying soap and water around to the trucks when being washed. This truck may also be used expeditiously for carrying other loads. Mounted on the soap barrel is a clothes wringer for wringing chamois cloths. The water from these chamois cloths tend to keep the soap in a proper solution.

A saving on the purchases of new waste is made by the company through the use of a steam washing machine, made by the Oil & Waste Saving Machine Co., Rochester, N. Y. The accompanying illustration shows the machine in the process of receiving waste to be washed. The waste is put in a vat whose sides are perforated so that the steam, which is also used to whirl the vat by means of fins on the outside, may escape through and wash the waste. Any light oil or dirt is taken completely out of the waste or rags. All of the water and oil is run out of a pipe at the bottom and from there out to the sewer. If the waste is particularly oily, the oil is collected in a pail at the end of the pipe and then filtered.

The company also uses an oil separator for reclaiming oil from the floor washings. It is claimed that the savings for a month average about three barrels. The separator operates on the same principle as most other types, in that the oil, being lighter than water, will float on the top of the water and will drain off through a pipe leading to an oil chamber.



Method of Filling Oil Tanks in Doelger Brewing Co.'s Garage

The rolling of the barrel onto the stand, the opening of the bung and the removal of the empty barrel are the only labor operations necessary in this method of filling by gravity. No oil is wasted and the cost of maintaining pumps is eliminated

Repairshop of the Peter Doelger Brewing Co., on Fifth Floor of Garage

In order to avoid confusion, all of the heavy repair work has been concentrated on one floor. Sections have been set aside for maintenance on the electric and the gasoline trucks, and a blacksmith shop takes care of all forging, bending, etc. The equipment for tearing down the trucks is complete, including a portable crane as well as an overhead pulley run on a trolley. The latter is used mainly for lifting the electric vehicle bodies. Five skylights give excellent lighting

Getting Business for the Motor Truckman

(*Continued from page* 23)

that the motor trucks may be more efficiently operated. After this preliminary situation has been studied, he confers with Mr. Pratt to determine if his experience can be used to point out any other method for further increasing the efficient operation of the trucks selected to do the work.

A price will then be set on the work. If accepted by the shipper the work will be turned over to some member of the association, preference being given to those who subscribed the money for the establishment of the bureau. Mr. Thompson will then keep in close touch with both the truckmen and the shipper for whom the work is being done to see that it is carried out properly and to suggest any changes in the method of truck operation which may present themselves during the actual performance of the work.

How Payments Are Made

After the work has been completed, payment is made by cash or check made out to the Motor Truckmen's Division of the association or paid to the truckmen direct. In case the payment is made to the association, 7½ per cent of the total amount is deducted for the service rendered and the balance forwarded to the motor truckmen doing the work. In cases where the shipper has truck work done at different periods during the month, the payment for the work is usually made within 30 days after the end of the month and the payment to the truckmen made within a week after the amount has been received by the bureau. The fact that the bureau is operated by a truck users' association for the benefit of its members obviates the drawbacks of an individual truck broker who, in many instances in the past, has collected the money from the shipper only to withhold it from the truckmen on technical grounds for undue periods.

Places Reliance in Truckman's Honesty

If the payment is made direct to the motor truckmen, the bureau relies upon the honesty of the truckmen to send the bureau a check for 7½ per cent of the amount. Mr. Thompson checks up on the amount of business done by any truckman from time to time by visiting the various shippers daily to find new work and to determine whether the work performed by the trucks is being done satisfactorily.

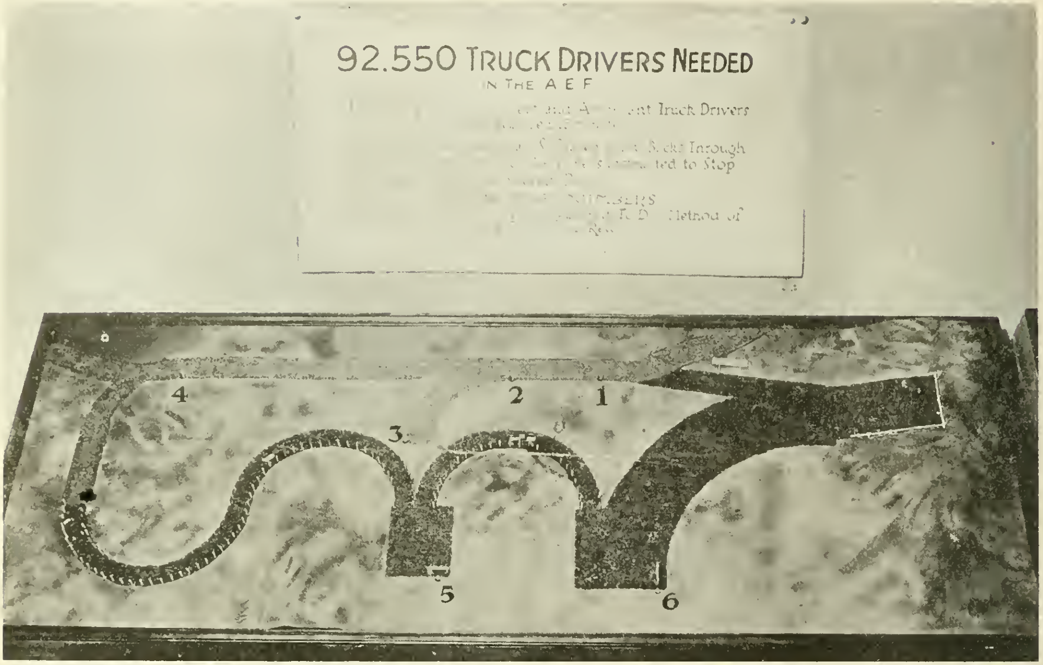
If a truckman receives one job from a shipper through the bureau and later receives additional work direct from the same shipper without the order passing through the bureau office, the truckman pays into the bureau the same 7½ per cent of the total amount of work. The honesty of the truckmen must be relied upon to do this, although it is checked up by Thompson continually circulating among the shippers and by obtaining duplicate copies of the amounts paid to the truckmen members of the association each month. If a truckman is once found withholding such brokerage fees he is, of course, not given any future work and his unreliability made known to the shipper.

The bureau does not assume any liability to the shipper nor guarantee payment to the truckmen. It insists, however, that each truckman to whom work is given must carry his own liability insurance, including fire, theft and collision, on both the truck and the goods carried. It prefers that the shippers pay their bills direct to the truckman, leaving it to the latter to forward the 7½ per cent brokerage to the bureau, as this relieves the bureau of much clerical work.

Successful Work Performed

On this basis, the bureau has proved to be self-supporting during the 4 months of December, 1918, and January, February and March, 1919. In December the income on paper was $100 more than the expenses, although all of the money earned had not been turned in during the month. During January the bureau

(*Continued on page* 36)



A model of the testing track for military truck drivers. It was used to rate 92,550 drivers for war trucks. The numbers refer to posts stationed along the course. The work which has to be performed between any two consecutive posts is told in detail in the accompanying article

Truck Owners May Learn Much from Method Used by Government in Selecting Drivers

Examinations Given All Applicants May Be Adapted to Commercial Usage Without Serious Difficulty—War System 90 Per Cent Perfect

THE manner in which the Motor Transport Corps secured 92,550 truck drivers for military service should be of interest to every commercial truck user because every owner hires one or more drivers every year. The problem of securing the army truck drivers was out of the ordinary, of course, because of the large number which had to be selected in a short period of time. Then, too, the military discipline which was instilled in the war truck driver while he was still a private and before he became a truck driver is entirely lacking in commercial service, where ofttimes the mandates of a labor union limit the amount of work which a driver performs in an ordinary working day.

It is too often the practice of the ordinary commercial motor truck owner to hire his drivers on the recommendations which the applicant offers. Many times a driver in making application for a new job will state that he has driven the make of trucks which are owned by the company to which he is applying, when in reality he has not done so.

Then, again, the ordinary man who has driven one or two makes of trucks generally imagines that he knows all about motor truck construction and is capable of making repairs on the road. Motor truck drivers on the average are very glib individuals, and unless they are put to some sort of test in driving a truck will convince an owner that all of their claims as to proficiency and experience with commercial vehicles are correct.

All Drivers Should Be Examined

Many truck owners have learned to their sorrow that it is not a good business proposition to hire a driver unless he is first given some sort of simple test which will prove beyond doubt whether or not he is capable to take sole charge of and responsibility for a piece of mechanism valued anywhere between $1,000 and $6,000.

These same conditions existed when the Government issued its first call for motor truck drivers. Thousands of men who had perhaps driven their own passenger cars presented themselves and claimed that they were competent to drive any kind of a motor truck. By the exhibitions which these men performed at many of the camps throughout the country it soon became evident that the Government must devise some method of separating the competent motor truck drivers from the incompetent and to work out some simple plan whereby a driver classed as competent would really prove to be competent under all average driving conditions. It was seen that all of this work must be done before the driver was given a new truck which he might irreparably damage if he were allowed to operate it in a manner dictated by his own notions of truck driving.

The Plan in General

With these problems to solve, the Government evolved a plan which has worked out very satisfactorily. The plan divides the work into two parts: 1—An oral examination, and 2—An actual test in driving a truck under all conditions which a truck driver might expect to meet in actual service. Contrary to the general conception of military transport, it is not unlike ordinary every-day haulage over our good main-line highways. There is nothing sensational about military highways transportation except being under gunfire and of traveling at night in convoy formation with no lights whatsoever. So far as the driving of the trucks is concerned, they are operated in much the same manner in war work as they are in peace haulage.

The military authorities soon found out that they could not run trucks across country, and that if they were to be relied upon to bring up all sorts of ammunition, supplies and men, they must have good roads over which to run. It was because of this decision that each of the army corps operating on the Western front was furnished with road gangs of several thousand men each. The great feat which motor trucks performed in supplying Verdun with its ammunition and bringing up fresh corps of men with all their necessary supplies, equipment and small arms ammunition was due to the fact that several thousand coolies were constantly engaged day and night in keeping the roads over which the trucks ran in perfect repair. It has been said on good authority that the holes made by gunfire in any roadway being used for supplies were filled up by the engineers and their coolie labor within 10 minutes after the hole was made.

It was this great similarity between military highway transportation and commercial haulage which enabled the Government to devise a system and put it into effect in this country so that it would result in turning out men capable of driving trucks under all conditions on the other side.

Oral Test a Preliminary

The oral test was simply a preliminary means of securing a good line on the applicant's previous experience and of rating him temporarily as an apprentice, a journeyman or expert. Many men who passed the oral test successfully were found to be deficient in actually driving the truck later on. These men, in the great majority of cases, had read books on the subject but were unable to apply the knowledge thus secured under actual driving conditions.

The actual driving test under the Motor Transport Corps plan was made on a specially-designed testing course, a model of which is shown in the illustration on the top of the opposite page. While, of course, the average commercial truck owner has neither the facilities nor the money to build such a testing course for hiring his truck drivers, conditions of streets and grades very similar to those reproduced in the special testing ground at the camp can be found on the public highways in or adjacent to any of the large cities in this country. It would seem to be well worth while for the ordinary commercial truck owner to acquaint himself where such public streets are located so that in testing out applicants he can put them through their paces under conditions which will include anything which the ordinary driver is liable to encounter.

The Test Course Layout

As shown in the accompanying illustration, the test course is laid out with a level stretch which leads to a down grade of approximately 5 per cent and then onto a long straightaway and back to the starting point with an S-curve, a semicircular stretch of roadway and then an upgrade back to the level road from which the truck started. The various parts of the course are marked off by numbered posts as indicated on the illustration of the model course given herewith. The total length of the course is 1100 ft., of which 600 ft. is the hill and staked-off portion. The hill is 36 ft. wide and 50 ft. long.

On the applicant's arrival at the field testing station or truck course he is given command of a standard make of truck and provided with a tester, who sits on the driver's seat with him to give him instructions and to score him for his proficiency in order to rate him as an apprentice, journeyman or expert driver.

The Actual Test

The actual testing is conducted as follows: The scorer instructs the driver to take the truck up to Post 1, which is the start of the test. He drives along a level road to Post 2 and turns off on a short curved road to Post 3 at the end of the curve. He must then back up to Post 2 on the same straightaway road, on the other end of which is located Post No. 4. This short preliminary run indicates whether the recruit can drive a truck at all or gives evidence of his ability to proceed with the balance of the test. It also gives the applicant a familiarity with the throttle and gear-changing mechanisms and allows him to become acquainted with the characteristics of the truck.

After the recruit has backed up to Post 2 from Post 3 at the end of the short curved road, he must proceed to Post 4 at the far end of the straightaway and then turn to the left and enter the large S or reverse curve section, which is outlined by means of vertical posts or stakes set about 10 ft. apart along the edge of the road. He is instructed to drive through the reverse curve at whatever speed he regards as most suitable. To obtain a perfect score in negotiating the reverse curve he must not stop his truck, drive it in a jerky, irregular manner or knock down any of the stakes.

Difficulties Increased Gradually

In emerging from the reverse curve, the driver enters a large square, at one corner of which is a vertical board set up on stakes to which he must drive up to and stop with the front of his engine hood or radiator at the center of the board, which is known as Post 5. It will be noticed that the difficulty of the course is increased gradually from Post 1 to Post 5. Between Post 5 and Post 6 is perhaps the hardest part of the entire test, since the driver must back around a complete semicircular road furnished with limiting side stakes and continue backing until the tailgate of the truck is close up to and in the center of a second vertical board, Post 6, supposed to represent a loading platform.

Leaving Post 6 he must start to run up the grade to the starting point. Just before the top of the grade, he must stop his truck and turn it around with no more than one backing and without stalling the engine or grinding the gears. After this is done the test is completed by running to the starting point.

According to Capt. E. O. Buhler, U. S. A., the truck test outlined above proved 90 per cent correct and was adopted early in our military preparations, but not until the Government had shipped abroad many so-called expert drivers who fell far short of their own rated ability and who seriously impaired the efficiency of the military highway transportation means.

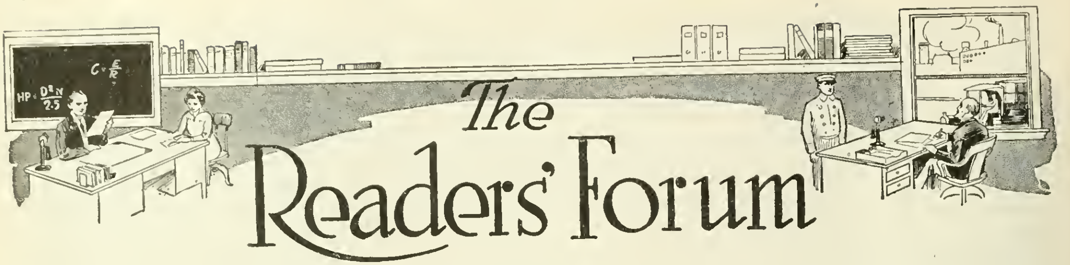
How Scoring Was Done

In the determination of the rating to be given a recruit, a system of scoring was employed in which a single point, 1, was given if the driver completed satisfactorily each portion of the test between Post 1 and Post 2, between Post 2 and Post 3, and so on. If he failed in operating the truck between any two posts he was given a 0 count. In starting from Post 1 and running to Post 2, the manner in which the recruit started the engine, used the clutch, adjusted the spark and throttle controls and changed gears were factors considered by the scorer.

The thoroughness of the test, and particularly that part between Posts 5 and 6, may be realized when it is known that the stakes outlining the semicircular road were about 4 ft. high and 5 ft. apart, and afforded a clearance on either side of the truck of not much over a foot. If the driver was competent to back the truck around the curve without touching one of the stakes he was credited with a single point, 1, but if he touched one stake he was given a score of 0. Not over 25 per cent of the men got a full single point for this test. There are 24 points in all. For making three or less failures a man is rated as expert; four to nine, a journeyman; ten to fifteen failures, apprentice, and sixteen or more failures, a novice.

At one of the camps where the testing grounds were set up over 60,000 men were examined between June and August, 1918.

In addition to the driving test outlined above, each recruit was also examined as to his physical and mental fitness for the work. This included testing of the applicant's vision and hearing and all-round general fitness.



The Readers' Forum

FIRMS HANDLING TRUCK EXPORTS

Many Truck Companies Have Their Own Export Departments in New York

To the Editor, COMMERCIAL VEHICLE:

Will you give me a list of foreign truck exporters and if possible the names of the trucks they handle?—M. BROWN, Motor Truck Assn. of America, New York City.

Below is a list of all the foreign truck export companies which we know of together with the names of the trucks they handle. If the space designated for the name of the truck is blank, it is because we have no record of what truck is being handled by that company. As you will notice, there are several companies which handle more than one line of trucks.

Name and Address of Company	Truck Handled
All Trading Corp., Chicago	Titan
Seller Distributing Co., Inc., Detroit,	Kelly-Springfield
Pennsylvania Steel Export Co., Philadelphia, Pa.	Commerce
Allied National Corp., New York City	——
American Motors Co., New York City	Rush
P. Aubeck, New York City	Avery
Auto Sundries Co.	Detroit
Automotive Products Corp., New York City	Hall
Manuel Caragol & Son, New York City	——
H. H. Chipman, Ltd., New York City,	Old Reliable, McFarlan, Reo, Duplex
Clyde Cars Co., New York City	Clyde
J. B. Crockett Co., New York City	Clyde, Pierce-Arrow
Wm. J. Farrell, New York City	Kissel, Little Giant
Flint & Co., New York City	Walter
Gaston, Williams & Wigmore, Inc., New York City	Packard, Riker, Dodge Bros., Peerless, Reo, Selden, Vim, F. W. D.
J. Gossner, New York City	Brockway, F. W. D.
Harper, Marshall & Thompson, New York City	Fulton
Industrial Export Co., New York City,	Winther, Corbitt
Pablo Homs, New York City	Indiana
Imperial Export Co., New York City,	Brockway
R. M. Lockwood, New York City	Federal
Stanley A. Martin Co., New York City,	Bethlehem, Lamson, Corbitt
Melchoir, Armstrong & Dessau, Inc., New York City	Stewart, Laurel, Fulton
C. W. Moody, New York City	Gramm-Bernstein, United States
O'Neill Bros. Co., Inc., New York City	——
Sangarsa Co., New York City	——
John Simmons Co., New York City	Jumbo
J. E. Sitterly, New York City	Wichita Falls
W. T. Stevens, New York City	Mack
Trans-Oceanic Trading Co., New York City	——
Vulcan Trading Co., New York City	Chase, Master
John D. Williams & Co., New York City,	Maxwell

A great many of the large truck companies have established their own export departments in New York City. Among these are: Bethlehem Export Co., Brockway Motor Truck Co., Dart Motor Truck Co., Denby Motor Truck Co., Federal Motor Truck Co., G. M. C. Export Co., Gramm-Bernstein Motor Truck Co., Indiana Truck Co., Packard Motor Car Co., White Co.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

TRAILER PRODUCTION FOR 3 YRS.

Estimated Output Shows 19,000 Made in Period, Excluding War Orders

To the Editor, COMMERCIAL VEHICLE:

Will you please give us any information you have available as to the number of motor truck trailers of all kinds made during the years 1916, 1917 and 1918 and also the total value of such trailers?—O. E. B., Detroit.

There are no accurate figures available on the number of motor truck trailers manufactured in the years mentioned, although THE COMMERCIAL VEHICLE in its issue of Jan. 1, 1918, estimated that the trailer production for commercial usage during the three years mentioned was as follows:

1916	3,000
1917	6,000
1918	10,000

The above production estimates are exclusive of all government trailers ordered for military purposes for carrying ammunition, guns, tool-shops, shoe-repairing outfits, traveling kitchens, etc. It was estimated in the Jan. 1, 1918, issue that the orders for military trailers would be close to 200,000 with all designs of both two- and four-wheeled trailers. Records as to how many of these estimated orders have been completed are not available. It is known, however, as stated on page 19 of THE COMMERCIAL VEHICLE for Jan. 1, 1919, that only 5,228 retailers of all types had been shipped overseas for military use from the beginning of the war to Dec. 1, 1918.

WINSLOW STEAM TRUCK

Is Chicago Made—Dunning Engine Is Also Made in Same City

To the Editor, COMMERCIAL VEHICLE:

Will you give us the names and addresses of the manufacturers of the Winslow truck and Dunning engine, both shown at the Chicago motor truck show?—C. B. HOADLEY, Scott & Hoadley, Los Angeles, Cal.

The maker of the Winslow steam truck as shown at the Chicago show is the Winslow Motor & Engineering Co., Chicago, Ill., and the maker of the Dunning engine is the Dunning Engine Co., Chicago, Ill.

TRUCK LOADING OVER SIDEWALKS

No New York Law Against the Use of Roller Gravity Conveyors

To the Editor, COMMERCIAL VEHICLE:

Will you please advise us if there is any city ordinance or police regulation in the City of New York which would prohibit the use of roller gravity conveyors to load or unload goods from motor trucks across the sidewalks into the delivery entrances of buildings or manufacturing or distributing plants?—LAMSON Co., Boston, Mass.

THE COMMERCIAL VEHICLE has made a thorough investigation of the problem of loading or unloading vehicles by means of mechanical devices placed on the sidewalk and finds that there are no city or police restrictions against the use of such devices, including roller gravity conveyors, provided the conveyor or other apparatus is not left on the sidewalk more than 3 ft. in front of the house and not hung at any lower height than 5 ft. above the sidewalk.

The law covering the unloading of vehicles across the sidewalks and the use of mechanical devices in the operation is given in Articles 1 and 2 of Chapter 23, Article 15, Section 188, of the Code of City Ordinances, Bureau of Incumbrances, City of New York, of which Edward Brady is chief. The law is as follows:

"1—*Merchandise—No person shall hang or place any goods, wares or merchandise, or suffer, maintain or permit the same to be hung or placed at any greater distance than 3 ft. in front of his house, store or other building, and not a greater height than 5 ft. above the level of the sidewalk.*

"2—*Wares or merchandise in process of loading, unloading, shipment or being received from shipment, may be transferred from motor trucks or other vehicles over the sidewalk by use of skids or by backing up the vehicles on the sidewalk while so doing.*"

While there is no law preventing the use of roller gravity conveyors for loading or unloading trucks across the sidewalks, it is the policy of the police department to permit the use of such devices only when they do not become a public nuisance, as would be considered the case where such devices were so used on busy thoroughfares as to block pedestrian traffic. In such cases either the truckman delivering the goods or the company receiving them may provide steps or other equipment to enable pedestrians to walk over such devices with safety.

TRUCK COST FORM ARTICLES

Dates of Publication of Stories with Our Standard Cost-Keeping Sheets

To the Editor, COMMERCIAL VEHICLE:

Can you refer us to articles which you have published regarding the operating and maintenance costs of motor trucks?—E. T. DEWEY, Dodge Bros., Detroit, Mich.

Articles published in THE COMMERCIAL VEHICLE relative to motor truck hauling, with particular reference to those dealing with operation and maintenance costs, are as follows:

Reo Company Operates Own Overland Haulage Line to Get Incoming Goods from Detroit, March 1, 1919, pages 21 to 23. The Reo Company has installed a regular line operating between Lansing and Detroit. Figures on the cost of operating these trucks are given on cost sheets on pages 22 and 23 of this article.

Trucks Save Money Hauling Hogs in St. Louis, February 1, 1919, pages 30 and 31. The saving effected by bringing hogs to the stockyard by trucks instead of on foot is brought out in this article.

Department Store Contract Delivery Eliminates All Labor and Equipment Worries, January 15, 1919, pages 5 to 8. On page 7 of this article is a reproduction of one of the monthly cost sheets of the Standard Cost Keeping System for Motor Trucks, as compiled by THE COMMERCIAL VEHICLE, showing the figures for the operation of a Ford truck for a month.

Motor Trucks Enable Lighting Company to Give More Efficient Service Within a 90-Mile Radius, January 15, 1919, pages 25, 26 and 27. This is a story of how an electric lighting company was able to give its customers better service by the use of trucks. Cost figures on THE COMMERCIAL VEHICLE forms are also published with this article.

26½ Tons of Goods Carried Daily Over the Road Between Detroit and Flint by Trucks, November 1, 1918, pages 12 and 13. In this article the cost of operating a line of trucks is pointed out. The rates charged by the company for hauling materials are also given.

Detroit Truck Owner Finds Success by Developing Motor Truck Line in Poorly Served Territory, November 1, 1918, pages 47, 48 and 49. Estimated daily cost figures on THE COMMERCIAL VEHICLE form for a 3½-ton truck operated by the Detroit Distributing Co. is reproduced on page 48 of this issue, in connection with this story.

Buffalo Industrial Tractor Maker Finds Costs of Road Motor Trucks Indispensable, October 15, 1918, pages 20 to 23. This company has found the necessity of keeping close tab on truck operation costs, and with the article are published several cost forms as used by the company showing the cost of operation.

Gotham Laundry Trucks' Success Due to Reliable Service, October 1, 1918, pages 5 to 9. With this article on the operation of the trucks owned by the Twentieth Century Laundry Co. are published two sets of cost forms.

Truck Operating and Maintenance Costs in New York City, July 15, 1918, pages 20, 21 and 22. The necessity for efficient truck usage is pointed out in this article, and cost forms are published with it.

City of Buffalo Finds Motor Sweepers More Efficient Than Horses, June 1, 1918, pages 5 to 9. The saving which the City of Buffalo has experienced by the use of motor-driven equipment instead of horses is brought out in this article. On pages 6, 7, 8 and 9 are reproduced forms of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks.

Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton, April 1, 1918, pages 5 to 9. This article tells of the service which the Ohio Freight Delivery Co. gives Sandusky, Akron and Canton. A cost estimate for one of the 3½-ton trucks in operation is given, together with the rate scale of the company.

2-Ton Lumber Truck Replaces Three Horse Wagons and Pays for Itself in 1 Year, March 15, 1918, pages 26 and 27, gives the cost of operating a 2-ton Republic truck used in the lumber business in Buffalo, N. Y.

One Lumber Truck Saves $1,016 in 37 Days on Haul of 192 Miles, December 1, 1917, pages 6 and 7, is an article about a 2-ton Diamond-T truck used in the lumber business in Hunts, N. Y.

Great Reading Public Served Efficiently by Newspaper Motor Trucks, October 15, 1917, pages 5 to 9, and also pages 24 and 25. The ton-mile figures given on pages 6 and 7 cover sixteen 1500-lb. Stewarts owned by the Buffalo *Evening News*. Those on pages 8 and 9 cover the operation for a year of six Ford delivery vehicles operated by the same newspaper company. The cost figures on pages 24 and 25 refer to a Reo 2-ton truck in the moving van business in Dowagiac, Mich.

Gotham's Fleet of Municipal Gas-Electrics Saves $71,345 Yearly, June 1, 1917, pages 5 to 8, gives the actual cost figures covering the operation of a fleet of nineteen gas-electric tractors and trailers used in the model street cleaning district of New York City.

MAKERS OF ARMORED BODIES

International Motor and Armored Motor Car Companies Built Several

To the Editor, COMMERCIAL VEHICLE:

Where can we procure armored bodies for mounting on Republic trucks for army service?—H. L. DEWEY, Republic Motor Truck Co., Alma, Mich.

So far as THE COMMERCIAL VEHICLE knows, armored bodies are made by two companies, the International Motor Co., New York City, and the Armored Motor Car Co., Philadelphia. The International made its armored bodies to be mounted on Mack chassis and the Armored company built similar bodies for the King Motor Car Co., Detroit, Mich., shortly before our entrance into the war. Armored bodies would have to be made on special order, but we believe either of the two above-mentioned companies will be able to give you what you want.

WHO SELLS CROWN TRUCK PARTS?

Crown Commercial Car Co. Out of Truck Business for Last 3 Years

To the Editor, COMMERCIAL VEHICLE:

We desire the address of the manufacturer or anyone who can supply parts for the Crown motor truck.—M. SCHOBER, Schober Bros., Waukesha, Wis.

The Crown truck was made by the Crown Commercial Car Co., North Milwaukee, Wis., but this company discontinued the manufacture of trucks in April, 1916.

However, you might be able to get parts for this truck from the Puritan Machine Co., 122 Lafayette Boulevard, Detroit, Mich.

DRAWBAR CHART FOR TRUCKS WITH WORM DRIVE

Troy Trailer Co.'s Table Good for Trucks With All Forms of Drive

To the Editor, COMMERCIAL VEHICLE:

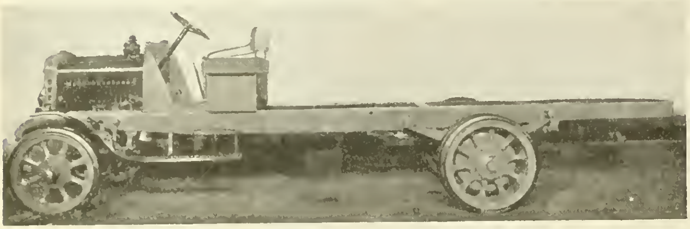
On pages 56 and 57 of the Nov. 1, 1918, issue of THE COMMERCIAL VEHICLE there appeared a tractive force chart prepared by W. R. H. Hudson of the Troy Trailer Co., Troy, Ohio. The footnote on page 57 specified that the chart is applicable for all motor vehicles having chain, bevel, double-reduction or internal-gear drive, but that it is not applicable for use with worm-driven trucks.

Will you please tell us why the chart is not applicable to worm-driven vehicles and what changes would be necessary in the chart to make it adaptable for calculating trailer loads which could be hauled by worm-driven trucks? If it is impossible to change the chart as published, will you please tell us how we may develop a chart which would be applicable for use in connection with worm-driven trucks?—W. B. OLIVER, Stability Motors Co., Philadelphia, Pa.

W. R. Hudson informs THE COMMERCIAL VEHICLE that the note stating that the chart was not intended for use with worm-driven trucks was included because of the fact that at the time the chart was prepared trucks with worm drives were comparatively new and that his company had had little or no experience with worm-driven trucks hauling trailers. The reservation implied in the note was made at that time because the company was skeptical as to whether the claimed efficiency of the worm-drive method of power transmission could be maintained after a truck had been in service for a year or more and wear in the worm and worm wheel had taken place.

While the Troy company has not made any definite tests to determine just how the efficiency of the worm drive is affected by a year or more of service, it has now come to the conclusion, from such observations as have been made, that the loss of efficiency due to wear is at least not any greater than the other forms of drive, and accordingly is of the opinion that the chart mentioned is applicable for worm-driven trucks as well as those with any other forms of final drive.

Gramm-Bernstein Internal-Gear 1½-Ton Job Has Body Features



New 5-ton Master truck, internal-gear driven

GRAMM-BERNSTEIN SPECIFICATIONS

Capacity, tons	1½
Price	$1,895
Wheelbase, in.	138
Tires, front	36 x 3½
Tires, rear	36 x 5
N. A. C. C. hp	22.5
Speed, r.p.m.	1500
Gear-ratio in high gear	7.22 to 1
Final drive	Int.-Gear

THE Gramm-Bernstein Motor Truck Co., Lima Ohio, has for some time had plans perfected for a new 1½-ton truck, but contracts for Class B trucks for the army have tied the factory up until just recently. These contracts have now been completed and the way is being cleared for production on this new model. The outstanding features of the new model are an internal-gear-driven axle and a combination body which is really three bodies in one, the construction being such that the owner may have a flare-board, express body, a high-sided body or a tarpaulin covered body with but slight change in parts. The company is also making heavy-duty worm-driven models in 2-, 2½-, 3½- and 5-ton capacities.

A Continental Red Seal 3¾ by 5-in. engine is the power plant in this new model and electric starting and lighting system of North East make is stock equipment with the exception of the starter, which is figured extra. A Columbia battery is used. The dry disk clutch and selective sliding gearset are both of Fuller manufacture and are made in a unit with the engine. There are three forward speeds.

The rear axle is of the internal-gear-drive type, being of Clark manufacture. Propulsion is taken through the springs and driving torque also. The half-elliptic Perfection springs are of vanadium alloy, and the frame is especially strong, having thick cross members integrally gusseted with two rear diagonal braces to prevent torsional strain and misalignment. Two sets of brakes, both operating on the rear wheels, are used. The hand brake is external expanding and has a drum diameter of 16 in. and a width of 2 in. The foot or service brake is internal expanding, its drum diameter being 15½ in. and the width 1½ in. The steering wheel is at the left and the gearshift lever in the center. The steering gear is of Ross design. The propeller shaft is in two pieces, with three universal joints to prevent whip that might occur in a long one-piece shaft.

The radiator is of the vertical finned tube type of Gramm-Bernstein make, being of cast type and cushioned to the frame by springs. The case is of malleable iron.

Single North East ignition, Stromberg gravity fed carbureter, and Bimel wood wheels with square spokes are other features. The engine lubrication is splash-pressure, the oil trough pan furnishing splash for the connecting rods, pistons and auxiliary pockets over the bearings. A plunger pump is used for the main bearings and timing gears. The frame is of pressed steel of semi-flexible construction. Both front and rear tires are solid as standard equipment, pneumatics being extra.

New 1½ and 5-Ton Master Models of Worm and Internal-Gear Drive

MASTER SPECIFICATIONS

	JI	JW	B
Capacity, tons	1½	1½	5
Price	$1,890	$1,990	$4,890
Wheelbase, inches	142	142	170
Tires, front	34 x 3½	34 x 3½	36 x 6
Tires, rear	34 x 5	34 x 5	40 x 6 or 12
N. A. C. C. hp	27.20	27.20	32.40
Speed, r.p.m.	......	......	......
Speed, m.p.h.	......	......	......
Gear-ratio in high gear	10.75 to 1	10.75 to 1	10.75 to 1
Final drive	Int.-gear	Worm	Worm

THE Master Trucks, Inc., Chicago, is offering a choice of a Torbensen internal gear axle and a Timken worm axle in its new 1½-ton job, styled the Master Junior. It has also brought out a 5-ton worm-driven model. The 1½-ton worm-driven model is represented by Model JW and sells for $1,990, while the internal-driven job, Model JI, sells for $1,890. With these two exceptions, the two models are identical. A feature of the 5-ton job is use of Smith cast steel wheels with oval spokes. This is the only model of the Master line that is equipped with cast steel wheels. The 1½ tonner uses Prudden wood wheels with square spokes. The three new models, as in former practice, are assembled from standard parts and employ Buda engines and Fuller dry-multiple-disk clutches and three-speed gearsets in unit power-plants on the 1½-ton jobs, and a Brown-Lipe dry-multiple-disk clutch and Brown-Lipe four-speed gearset placed amidship on the 5-tonner.

The cylinders of the four-cylinder power-plant are cast in block, the valves being on the right. In the case of the 1½-ton model, the engines are placed under the floor of the cab. The crankshafts in both engines are carried in three bearings.

Cooling is taken care of by a radiator of a vertical finned tube type on the 1½-tonners and by a horizontal finned tube type on the 5-ton job. The radiator cases

New 1½-ton internal-gear driven Master truck are of cast iron. Water circulation in both cases is by centrifugal pump. Master carbureters, gravity fed from tanks under the seat, are used on both sizes of trucks.

A McKenna suction governor, which is acted upon by suction in the inlet manifold, is used in the 1½-ton job. The Pierce governor is used in the 5-tonner. Ignition is taken care of by an Eisemann high-tension magneto in both jobs. Engine lubrication on the 1½-ton job is by splash-pressure, in which the oil is fed by a plunger pump to the main bearings and to the other bearings. The 5-ton engine lubrication is also pressure, but the oil is force fed by a gear pump.

Parish & Bingham pressed steel frames of rigid construction are used on both models. The drive is taken by the springs, as is the torque, on the Hotchkiss plan. Elliptic springs are mounted on front and rear in both jobs. On the 5-tonner both the service and hand brakes are of the dual internal-expanding type. Left-hand steering and center control are used on all models.

View of 2-ton internal-gear driven truck produced by the Louisiana Motor Car Co., Shreveport, La., showing the model on its trip from Detroit to Wynne, Ark. The illustration shows the truck on the verge of backing into the Tennessee River just after it left the ferry

Louisiana Motor Car Co. Enters Truck Field with 2-Tonner

L M C SPECIFICATIONS

Capacity, tons	2
Price	$2.735
Wheelbase, inches	164
Tires, front	36 x 4
Tires, rear	36 x 4
N. A. C. C. hp	27.20
Speed, r.p.m.	1233
Speed, m.p.h.	15
Gear-ratio in high gear	8.2 to 1
Final drive	Int.-gear

THE Louisiana Motor Car Co., Shreveport, La., has entered the commercial vehicle field and will start out with an internal gear-driven 2-ton job. This company has been building the former Bour-Davis automobile and is about to announce a new passenger car, ready for production this spring. The company recently sent one of its trucks, built and designed by William Ross of Detroit, overland from Detroit to Wynne, Ark., encountering bad road conditions throughout the trip. With the exception of its own frame, the company has assembled the truck with standard parts, such as a 4⅛ by 5¼ in. Continental engine, a Russel internal gear-drive axle, Borg & Beck clutch, a Detroit Gear & Machine Co. four-speed selective gearset placed amidship, a Shuler front axle and Mather springs, which are half-elliptic on front and rear.

The four-cylinder Continental 4⅛ by 5¼ in. engine is mounted under the hood. The cylinders are cast in block, with the valves on the right. Cooling is by means of a horizontal finned tube radiator with a case of cast iron. Water circulation is by centrifugal pump. A Stromberg carbureter, vacuum fed from a 35-gal. tank under the seat, is used. A Pierce governor of the centrifugal type is employed. Ignition is by Bosch single high-tension magneto, and the clutch is of the dry-plate type. The clutch facing is of copper asbestos.

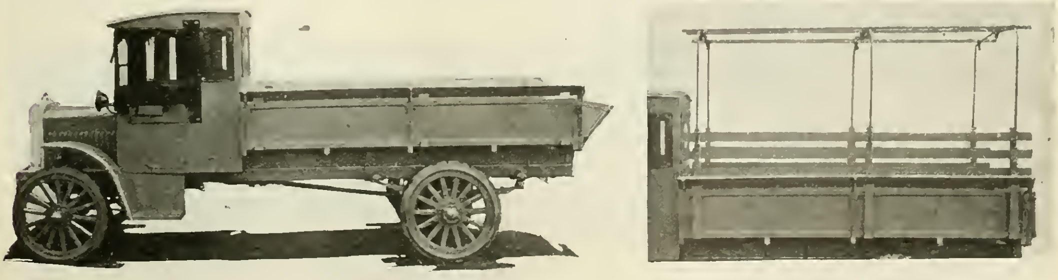
Engine lubrication is of the splash-pressure type, the oil leads feeding to the main bearings. There is an oil reservoir in the bottom of the pan, the oil being pumped to the main bearings. The other parts are splash lubricated.

A Thermoid fabric universal is on the front of the gearset and a Baker Gun & Forging Co. metal type on the rear. A Lavine steering gear is mounted on the left, with center gearshifting and control. The hand brakes are internal expanding, while the foot brakes are external contracting. Solid tires are standard equipment all around. Rear wheels are equipped with dual solids.

The accompanying illustration shows the first truck built by the company. As stated before, this truck was driven over roads which were just in the making at Wynne, and connecting with Texarkana, Ark., made passing through impossible.

The truck was sent out with a 6000-lb. load, the trip lasting 16 days. In going over some of the bridges along the Dixie Highway the condition of the spans was in such a poor state that the rear wheels would break through before the truck got across.

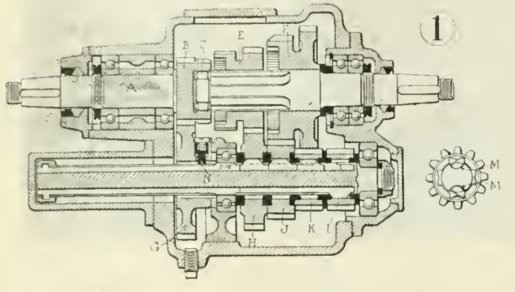
When crossing the Tennessee River at Johnsons Village over to Eva, Tenn., the frame of the truck caught on the wood approach to the ferry, which was the only thing which prevented the truck from backing into the river.

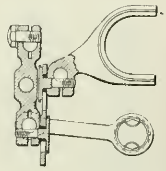


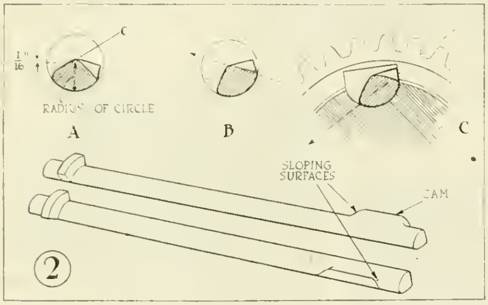
Left—Flareboard body on new 1½-ton Gramm-Bernstein truck. Right—View showing tarpaulin covered body with high sides

Campbell Gearset in Constant Mesh—Ohio Offers Three Trailers

Tilting Key Locks Layshaft Gears in New Gearset—Trailers Have Unusual Drawbar Assembly







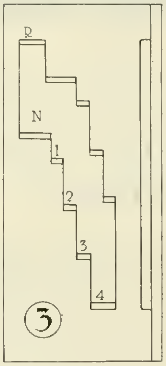


Fig. 1—Cross-sectional view of four-speed Campbell gearset. Fig. 2—Keys used in transmission. Fig. 3—Change speed lever plate

Campbell Constant-Mesh Transmission

THE Campbell constant-mesh type of transmission made by the Campbell Transmission Co., Buchanan, Mich., is a gearset wherein the gears are constantly meshed and the countershaft or layshaft gears locked internally by what is termed a rolling key. Thus the different speeds except high gear are secured by shifting the key under the desired gear.

Inasmuch as the clutching devices are located immediately under the layshaft gears and not at the sides, the Campbell transmission is shorter than other constant-mesh types, resulting in but 6 in. center to center between bearings on the layshaft, and this on a 2- to 3-ton four-speed truck transmission. Model 50 is illustrated. One of these has been in use for several months in a 2-ton Garford truck at the Great Lakes Naval Station, where it has been subjected to much severe handling. A representative of THE COMMERCIAL VEHICLE drove this truck over all sorts of roads, bringing the gearset lever into the various speeds without touching the clutch pedal and regardless of engine revolutions.

Fig. 1 shows a cross sectional view of the four-speed truck transmission, together with details of the layshaft gears, cam plate and shifting mechanism. As shown, the gears are in third speed. The primer shaft *A*, which connects to the engine or clutch shaft, is supported on two No. 308 single row ball bearings and carries on its inner end the constant mesh gear *B*. The latter is recessed for the solid roller bearing *C* supporting the main shaft *D*, which is supported at the rear by a double row No. 308 ball bearing.

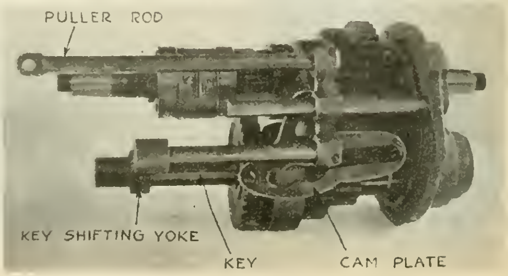
Shaft *D* is splined for the sliding member *E*, while the double gear *F* is spooled on the shaft and revolves with the shaft only when *E* is clutch-meshed with it; that is, the external teeth of the sliding gear are meshed with the internal teeth in *F*. As shown, *F* stands still, the shaft revolving inside of it. The bearing surfaces of this part of the shaft and inside the gear *F* are hardened. High gear is obtained when *E* is brought forward to clutch-mesh with *B* in practically the same way as is done in conventional gearsets, where the internally cut form of sliding gear is used in place of a dog clutch.

Immediately below gear *B* and in mesh with it is the constant gear *G*, an integral part of the layshaft. Adjacent to *G* is a single row No. 308 ball bearing, and then follow gears *H*, *J*, *K* and *L*, constituting the third, second, first and reverse speed gears respectively. The reverse pinion idler is not shown, but is just back of *K* and *L*, being the same length as these two combined. The bearing at the rear end of the layshaft is a single row No. 406. Attention is called to the fact that the bearings of the layshaft are close to the gears where the greatest load comes, minimizing the danger of a sprung shaft.

The gears of the layshaft except *G* are mounted on collars or rings acting as bearing surfaces. This can be a steel on steel construction or through brass bushings, balls, etc., as these bearings carry none of the load, but only the weight of the gear. The transmitting action is secured by simply sliding the key or keys along the circular longitudinal grooves *M* in the shaft until they slip under the rings of the desired gear, after which the key automatically and positively rolls into contact with one of the broached openings on the inside of the gear. This action is shown in the cross section view of gear in Fig. 1. One key takes the load and the other the backlash.

The keys are shown in Fig. 2, and constitute the chief feature of the Campbell transmission. In the truck job the keys are drop-forged from ¾-in. round stock, with 1-in. face. Referring to *A*, Fig. 2, it will be noted that the portion *O* is made 1-16-in. larger than the true radius of the 3-4-in. circle. Also the key clears the shaft by 1-32-in., that is, the face of the key must roll in its groove 1-32-in. before it comes in contact with the gear. The cams on the keys are made with sloping surfaces, which serve a twofold purpose. One of these is to assist in the engagement of the gear and the other to release it.

The gears cannot take the full load until the key has been first rolled up into place in the gear. Therefore, instead of a shearing strain across the cam, as shown at *B*, Fig. 2, the key is under com-



Shifting mechanism, showing single pull rod at top pression, as shown by the dotted line in C, Fig. 2.

It is stated the gears cannot become noisy, as the pitch line is not disturbed. Also the tilting key clutches the gear directly in the center and therefore the gear is not distorted on the shaft, though there may be considerable play between gear and shaft. The layshaft gears are reversible, that is, they can be turned completely around from their present position on the collars to distribute the wear.

In direct drive on high gear the keys are not used, for the clutching gear *E* meshes with *B* as in a conventional gearset. In high gear the following gears revolve: *B*, *E*, *G* and *H*, but *H* is only engaged with *E* for ⅛ in. This is done so that in shifting from high to third the gears are aligned and the key is so timed by the cam lever plate that it will not engage *H* until *E* is fully meshed with it. In going from third to second the key engaged in *H* releases first and then clutching gear *E* engages the double gear *F* for first and second speeds. Here again the key is timed so the gears are fully meshed before the load is taken. Thus there is no chance of stripping the teeth in any of the gears, even with the clutch in. The key shifting yoke at the extreme forward end of the layshaft has just enough play in it so the key slips into position under the selected gear, even though the driver attempts to make the shift very slow. This action is hastened by the sloping surfaces of the keys.

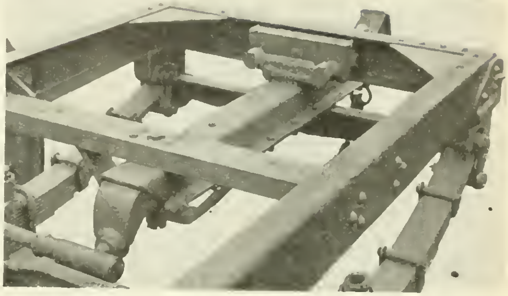
All gears are 6-8 pitch with the following ratios: Reverse, 1 to 4.81; first, 1 to 4.00; second, 1 to 2.62; third, 1 to 1.50; fourth, 1 to 1.00.

The cam plate which works in conjunction with the key-shifting mechanism makes it possible to use but a single rod between transmission and lever set. The cam plate also acts as a locking means for each speed. Thus, to pull the sliding gear out of high to another speed without operating the pull rod it would become necessary to shear the cam plate itself, which in a 2-3-ton job is ⅜ in. thick. With the cam plate layout it is impossible to get two speeds at one time.

Concerning lubrication, it is pointed out that the lubricant will last for a very long time, as the gears do not revolve constantly and therefore will not wear out the oil or grease. Also proper oiling of the gears on the collars is accomplished by the keys themselves, which act as pumps, carrying the oil back and forth in the grooves of the layshaft.

In order that the transmission may be readily adapted without altering present day chassis layouts the makers purposely have kept the design simple. While some of the construction details have been carried out along lines of accepted gearset practice, changes have been made only where necessary, in order to better support the rolling key principle. Incidentally the rolling key is not a new idea it being an improvement of the Bliss punch press key, in use for over 35 years. The manually operated Bliss punch press key is slow acting, requiring a certain amount of time for engagement, while the Campbell key rolls automatically into place regardless of engine or shaft speds.

Unlike various internal clutching devices developed from time to time, the Campbell key does not get a blow as it comes into place under the gears. This accounts for the fact that the company has yet to experience a single instance of where a key has sheared in use, regardless of how carelessly the shifts are made. Keys taken from an old Know car which carried the first Campbell transmission showed that after 8 years' continuous use they had worn but .008 in.



Automatic locking device on drawbar of Ohio trailer

Three Ohio Trailers

THE Ohio Trailer Co., Cleveland, is concentrating its work on the production of three models, 2, 3 and 5-ton jobs. Other sizes will be going through the factory later. The return of peacetime conditions finds the company with increased capacity after serving the government's needs. The company is ready to swing into production, as soon as normal conditions arrive, on a line of trailers, ranging in size from the ¾-ton, two wheel automobile trailer to the 5-ton tractor or truck trailer.

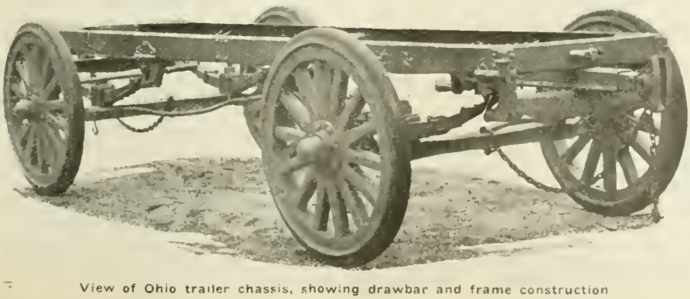
The trailers are featured by the unusual drawbar and frame construction. The drawbar assembly is new and it contains a compression spring for absorbing the shocks incidental to starting and stopping. It is of the bumper-head type, and this permits the employment of trailers in trains of three or more. The large coupling bearings tend to prevent wear, with consequent snaking of the trailers. The construction of the drawbar is U-section steel, which minimizes the danger of breakage from careless operation. The drawbar is packed with grease and requires lubrication but once in 6 months.

The automatic locking device used on the drawbar has the working parts enclosed in a grease-tight housing. This housing is filled with a mixture of graphite and grease and the supply is sufficient to last for about a year. When the pawls are thrown up the bar can move from side to side, incidentally turning the rear wheels, and when the pawls are thrown down the bar is rigidly locked in the center.

The frame is of pressed steel and corresponds to motor truck frame practice to a great extent. The ends are tapered, thus giving the greatest strength at the center. This gives frame flexibility. By mounting the frame as low as possible a low center of gravity is secured and side sway is reduced.

Practically all bushings throughout the trailers are of the oilless type, bronze impregnated with graphite. These do not require any outside lubrication during the life of the vehicle.

The axles are designed and built especially for the trailers. All parts are properly heat-treated to insure against breakage. The steering knuckles are of nickel steel. The wheels are of the artillery type made to S. A. E. standards and constructed with the maximum number of spokes. The tires are solid, pressed on.



View of Ohio trailer chassis, showing drawbar and frame construction

OHIO TRAILER SPECIFICATIONS

	2-ton Inches	3-ton Inches	5-ton Inches
Wheelbase ...	96	91	90½
Length of frame	144	144	144
Depth of frame.	4⅝	5½	7
Width of frame .	33	34½	40
Spring size......	42x2½	46x3	46x3
Axle beam... ...	2x2¾	2¼x3	2½x4
Tires	36x3½	36x5	36x6
Tread	56	58	68

Getting Business for the Motor Truckman

(*Continued from page 27*)

collected more than it spent. A similar result was true for February, and also during March to the date of this writing, when the cash outstanding and the commissions actually paid in are 125 per cent of the total investment of $1,050 covered in a 5-month period with 4 months of actual operation and one month of preliminary work.

When Mr. Thompson was hired he was given a drawing account of the funds provided against 2½ per cent of the total amount of business secured. In setting prices on work to be done for shippers, an average price of $30 per 5-ton truck per day was used as a basis. The $30 a day rate was taken on average operating conditions, thus allowing a larger income if the trucks were operated at a higher rate of efficiency. In many cases this has been done, some of the trucks earning as high as $48 a day.

The Salesman's Salary

At the rate of 2½ per cent for the salesman's salary on the basis of a minimum of $30 a day for each 5-ton truck kept busy, the salesman's income would be as follows: Seventy-five cents a day for one truck kept busy; $3.75 a day for five trucks; $7.50 for ten trucks and $15 for twenty trucks. At the present time, on an average of eight trucks are kept busy every day of the week. As the work increases and additional contract work is secured, it is evident that at least twenty trucks should be kept busy daily. This would insure the salesman $15 a day, or $90 a week. The amount which the salesman can earn is dependent almost entirely on his own initiative and may even run to $100 or $125 a week.

Much of the success of the bureau has been due to a study of the conditions under which the trucks would have to operate before the shipper was given any price on the work or before the work was turned over to the truckmen. Instead of having a truck loaded and dispatched to the consignee at a time when he cannot receive the goods, Mr. Thompson determines beforehand the proper hour for delivery and is thus able to route the trucks so that they have the least possible idle time. This elimination of idle time is further accomplished by dividing the work secured among one or more truckmen instead of giving it all to one man. For instance, if a job requires the use of twelve trucks, the work will be given to several truckmen, each of which may have one or more trucks idle for part of a day but not for the entire day. This will enable each truckman to keep all of his vehicles running to full capacity and will in addition give the shipper a quicker and better service than would be the case if all the work was given to one man who already had work for his trucks to do for the major portion of the day.

As an example of the benefit of studying beforehand the conditions under which the trucks must work, Mr. Pratt told of a contract for hauling beans from one of the New York docks to a warehouse three or four blocks away. The beans were unloaded from the hold of the ship onto the upper deck of the dock and allowed to run by gravity into the body of the vehicle hauling them through a chute in the floor of the upper deck. In one case it was found that the entire shipment of beans had been unloaded directly over one of the chutes, although there was a row of six or seven chutes which might be employed for loading. Horse wagons had always previously been used for the work and never made more than three or four trips a day. The horse wagons would stand in line and lose much time simply because only one of the chutes would be used.

The motor truckman who was given the work began to haul beans in the same manner until Mr. Thompson suggested that the beans be unloaded on the upper deck of the dock so that two or three of the chutes might be employed simultaneously. When this was put before the dock superintendent as one means of getting the beans off his dock quickly, he assented to it very readily, with the result that the idle truck time waiting in line was entirely eliminated and the trucks permitted to make eight or nine trips a day instead of three or four.

Unloading at Warehouse

He then took up the question of unloading the beans at the warehouse, and found that in the old horse-method of unloading considerable more time was wasted by an unloading gang which had to be taken from other work whenever the wagon backed up to the unloading door. He asked the warehouse superintendent if the unloading gang could be kept at the door continuously. The superintendent said that they could be kept there all day, provided the unloading could be carried on quickly enough to prevent their loafing. Accordingly, the next time beans were unloaded on the dock, a fleet of eight or nine trucks was put on the work and four or five of the upper deck unloading chutes employed, with the result that the beans were hauled to the warehouse so quickly that one truck was all ready to unload as soon as the previous one was ready to drive back to the dock for its next load. Five tons of beans were unloaded at the warehouse every 15 minutes until the complete shipment was put into the warehouse. Thus, by simply studying the conditions under which the trucks would have to work, and improving them, the truckman was able to make more money than ever before; to compete in work which had been done by horse wagons from time almost immemorial; the dock superintendent to get rid of his beans quicker than ever before, and the warehouseman to get them into his plant so much quicker than ever before that he will now not have anyone else except the truck bureau unload any of his beans, and in addition has been responsible for the bureau securing similar bean haulage from other warehouses in the same vicinity.

Selling Truck Service

If this case of the bean haulage is a fair example of the kind of efficient service which the bureau will continuously give shippers, it is a foregone conclusion that its work will be permanent and greatly in excess of the amount now done. When that time arrives, it is evident that more than one salesman will have to be employed, and that a manager of the bureau with the ability of Mr. Pratt will have to give his whole time to the work. Then the bureau will be in a position to sell its services to all classes of shippers at a nominal rate of $1 a year, a contract to supply truck transportation as required during the period of the contract. It can select the trucks used in the work from among the members of the association if the bureau is kept strictly a truck users' organization, or from members outside of the organization, provided the bureau is made into a stock company to assume full responsibility for all liability.

If it handles the entire work in this manner for the motor truckman, first giving him the work, then pointing out how the work should be done and finally collecting the bills from the shipper and turning over the truckman's share after the brokerage has been deducted, the bureau will practically become an organization equivalent to the executive or sales departments of large trucking concerns.

A bureau of this kind will thereby relieve the small truck owner from employing an executive or business-getting department and furnish him with work obtained more cheaply than he could get it himself because the work will be obtained on a large scale rather than individually. The truckman will then become a mere operator with none of the ordinary overhead charges. Accordingly the bureau could charge a brokerage of at least 15 per cent and still get business for the owner of a small fleet more cheaply than he could obtain it himself. A bureau performing this work would be similar to the various forms of consulting engineering, production and sales organizations which now exist in other lines of business. It is a new thought in the motor trucking business, and one which will undoubtedly prove of great value to the small fleet owner.

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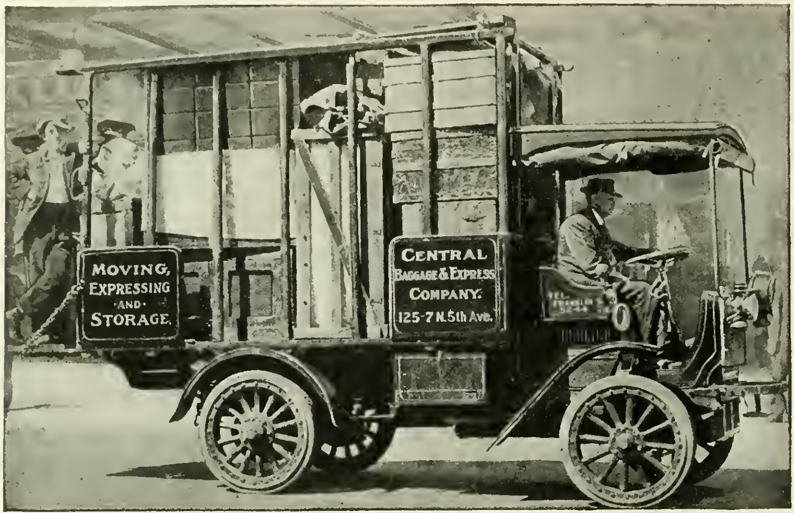
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Unloading Means, Manure Dump and Washstand Suggested at Kansas City Stockyards

This Magazine Recommends Plain Type of Four-Door Unloading Chute Location for Benefit of Truck Owners Hauling Livestock

OUT in Kansas City, Mo., so many thousand hogs, together with calves, cattle and sheep, were hauled into the stockyards by means of motor trucks during 1918 that the stockyards company was unprepared to handle them in a satisfactory manner. During 1918 a grand total of 143,917 animals, consisting of cattle, calves, sheep and hogs, were driven into the yards on the hoof, by passenger cars and by motor trucks. During 1917 a grand total of 106,074 were driven in by all methods, an increase of 37,843 animals, or a 36 per cent gain in 1918, as compared with the year previous.

The greatest increase was in hogs, 96,337 of which were hauled to the yards over the roads during 1918, as compared with 61,684 in 1917. This is an increase of 34,653 in number, or a gain of 56 per cent.

75 Per Cent of Hogs by Trucks

With the possible exception of calves, more motor trucks are used to bring in the hogs than any other kind of livestock. Of the 96,337 hogs driven into the yards during 1918 by all manner of vehicles, approximately 75 per cent, or 72,253, were brought in by motor trucks. This is merely a good approximation of the number moved on trucks, since the stockyards company keeps no records making a distinction as to the number of animals driven in by the hoof, by horse wagon, by passenger car or by motor trucks. All of the livestock brought in other than by railroad are simply lumped under the head of "Drive-Ins." During 1917 the total number of hogs driven into the yard was 61,684, and those most closely identified with the work at the stockyards estimate that approximately 60 per cent of that number took their last ride to the yard pens via the motor truck route.

Sixty per cent of 61,684 is 37,010. Subtract this number from the 72,253 hauled by trucks in 1918, and it gives an increase of 35,243 in the year, a gain of 95 per cent. In other words, the receipts of hogs by motor truck were almost doubled during 1918 as compared with 1917. This one fact visualizes in the best possible manner the great new business which has grown up in hauling not only hogs but other livestock to the Kansas City stockyards by means of motor trucks.

Suggestions Offered by THE COMMERCIAL VEHICLE for Improving the Facilities for Handling Drive-In Cattle and Hogs at the Kansas City Stockyards

1—That the unloading of cattle and hogs be segregated to give the greatest speed in unloading and to relieve vehicular congestion.

2—That a plain platform to which the trucks may back up be provided instead of any of the swinging types of unloading devices.

3—That a place for dumping manure be provided and that a place for a washstand with running water be provided in any event, the cost of the maintenance of such equipment to be worked out satisfactorily between the stockyards company and the truckmen using it.

4—That four gates be provided for the unloading of hogs at the same time and that sufficient maneuvering space be provided in front of the unloading platform to enable the trucks to back up, unload and leave quickly; that at least two gates be provided for the unloading of cattle. In both cases, hogs and cattle, the gates may be side by side so that one or two men can attend to the unloading at both gates.

5—Details of suggested unloading platforms are given on page 8.

6—Perhaps the concern now buying manure from the stockyards company can arrange to buy that scraped out of the trucks after unloading or get it free in lieu of providing a washing platform.

The development of this new motor truck work is no flash-in-the-pan movement occasioned by the war, but which can now be expected to die out because hostilities are over. While there is no question that the war gave the movement an original impetus which insured its success, the use of the trucks in the work is based on sound economic principles and is therefore bound to endure on a firm foundation. The present year, with no war, in all probability will see more livestock hauled by motor trucks to the Kansas City stockyards than ever before in the history of the yards, and the receipts for the first 3 months of 1919 bear out this prediction, because they are greater than in the corresponding months of 1918.

Reasons for Truck Use

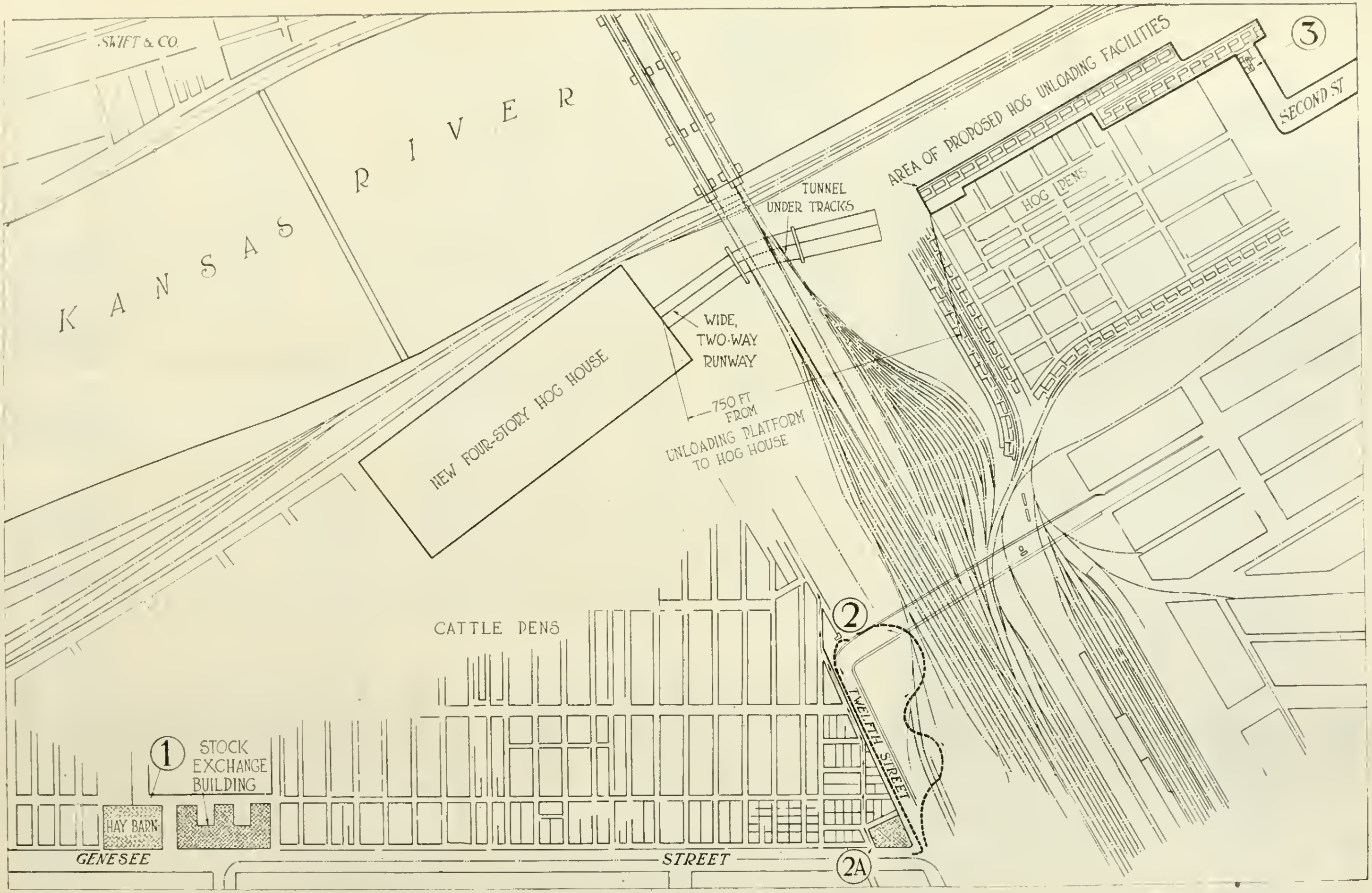
The motor truck has become such an important factor in livestock haulage as to place this method of transportation on an enduring foundation because the truck offers the following advantages to the stock raiser:

1—It offers the quickest kind of delivery.

2—It is cheaper than shipping by rail under average conditions because the shrinkage by truck is less than by rail.

3—The farmer is able to get his stock to the yards when the market price is highest.

4—The farmer can dispose of his stocks when they are ready for market and does not have to wait until he has a



Layout of the Kansas City Stockyards, Giving the Location of the Unloading Facilities at the Numbered Positions

Cattle and calves are loaded and unloaded directly from or onto the ground at the courtyard of the Exchange Building at Location No. 1. Cattle were unloaded during the day at Location No. 2 and hogs at night. Location No. 2A was used to reach No. 2 when the Twelfth Street road and the devious course over the railroad tracks in the adjacent yard, as shown by the dotted line, were both shut off by work begun on the new trolley car viaduct running along Twelfth Street and turning off to the right just before Location No. 2. Location No. 3 shows where the present one-truck hog loading and unloading chute is situated. The heavy black line in the upper right corner incloses the area in which the new hog unloading facilities will be provided. More details of these facilities are given in the illustrations on page 8. They will permit four trucks to unload at the same time.

Drive-In Receipts of the Kansas City Stockyards for 5 Years from 1914 to 1918

	CATTLE		CALVES		HOGS		SHEEP	
Year	Total Drive-Ins	Estimated Drive-Ins by Trucks	Total Drive-Ins	Estimated Drive-Ins by Trucks	Total Drive-Ins	Estimated Drive-Ins by Trucks	Total Drive-Ins	Estimated Drive-Ins by Trucks
1918	16,572	12,429	14,049	10,539	96,337	72,253	16,959	12,719
1917	15,413	9,248	12,097	7,258	61,684	37,010	16,880	10 128
1916	11,738	5,869	8,792	4,396	55,043	27,521	6,671	3,335
1915	9,709	3,884	5,931	2,372	47,561	19,024	4,090	1,236
1914	10,357	3,107	6,071	1,821	58,329	17,492	5,201	1,560

freight carload or club with some neighboring farmers before he can order a freight car which may be spotted on the siding nearest to his farm in 2 days or 5 days or more. At that time the stockyard prices may have dropped 2 cents or 3 cents a pound, which, on ten hogs weighing 300 lb. apiece, would be a loss of $60 or $90, far more than the cost of the truck transportation.

5—The truck gives a direct delivery from the farm to the stockyards, eliminating the handling from the farm to the nearest siding under one authority and then the rail transportation under another authority.

Better Facilities Wanted

By understanding the main underlying reasons for the successful use of motor trucks in hauling livestock, one is able to visualize the great increase of 95 per cent in the number of hogs hauled into the Kansas City stockyards in 1918 and to understand the conditions with which the Kansas City Stockyards Co. had to contend. It is self-evident that facilities considered adequate for handling the 106,074 animals of all kinds except horses driven into the yards in 1917 would not be sufficient to handle the 143,917 moved by trucks and wagons in 1918, or to take care of the 95 per cent increase in hogs during the same year.

The stockyards company, through its general manager, E. C. Senter, was anxious to provide the additional facilities required to properly handle the great increase in drive-ins by motor trucks, but was not quite certain as to the best method of accomplishing that end and of providing means which would take care of the still further increases in the number of motor truck drive-ins for all time to come. The work of installing any new facilities was further hindered by the new construction at the yard made necessary by the great fire of Oct. 16, 1917, when all of the hog houses were completely destroyed and about twenty-five acres of cattle yard, together with all of the scales, hay barns and other facilities in that area. For the balance of 1917 and until March, 1918, all hogs had to be handled in the north yard, where facilities were inadequate.

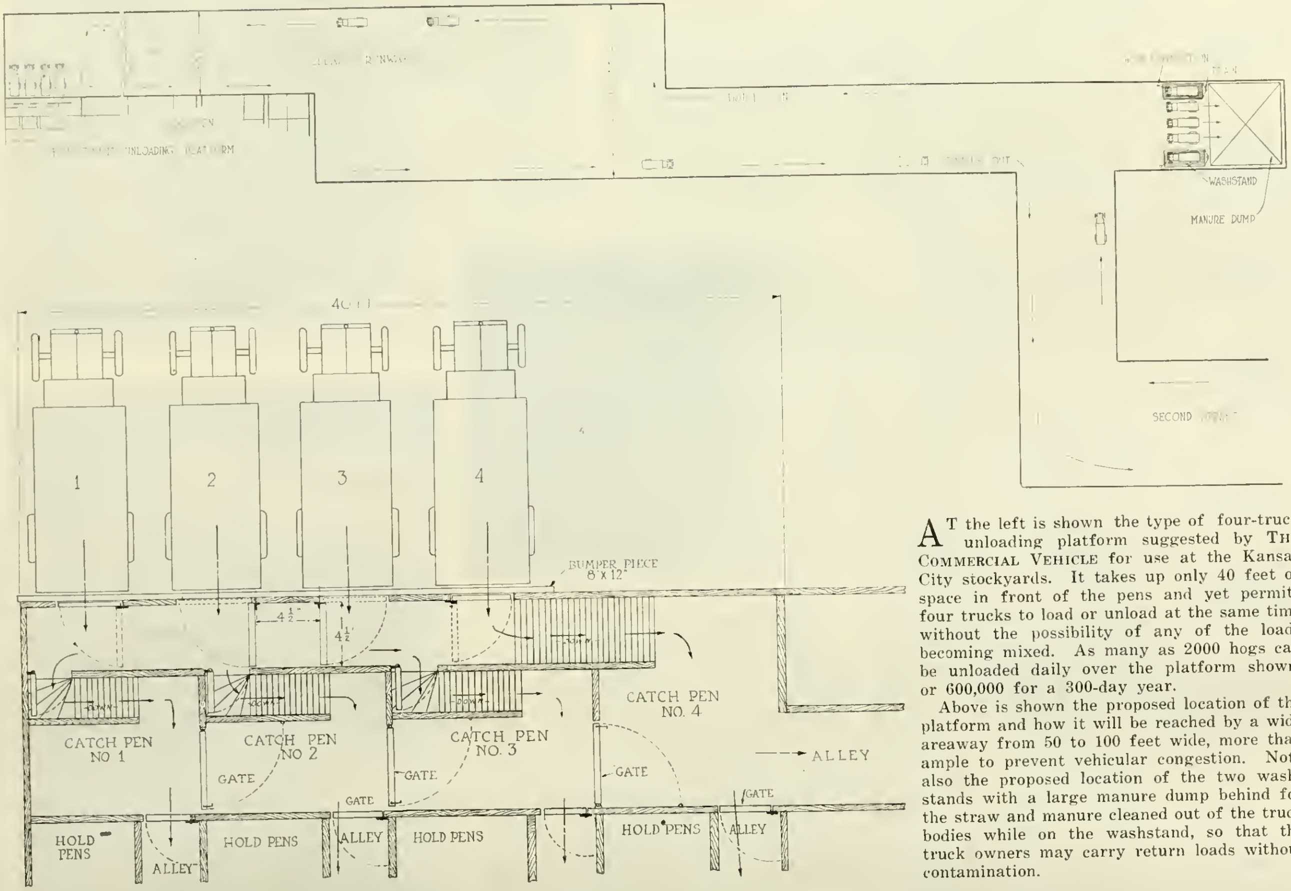
In order to overcome these conditions, the Stockyards company has designed a new hog house which will be completed during the summer of 1919, and which will be the most modern and up-to-date in the world. It will be a four-story concrete structure about 2000 ft. long and 250 ft. wide. It will have a daily capacity of 35,000 hogs on the selling or main floor, and can accommodate as many on each of the three upper floors, or a total of 140,000 hogs.

The new building is divided into seventeen units, of which thirteen have already been completed. While the location of the new hog house is ideal for handling the rail shipment of hogs, it is not favorably positioned in regard to handling those hogs which reach the yards over the highway. At the present time the closest end of the hog house is 910 ft. and 1,625 ft. respectively from the

Here they are trying to make a steer going out of the yards jump into the wagon from the ground

Conditions found to exist at the temporary location for loading and unloading of cattle in the courtyard of the Exchange Building. The figures refer to the corresponding numbers on the large plan of the stockyards shown on the opposite page. In the view to the left, the cow in the truck is hesitating before jumping out onto the ground. At the right, one cow is having trouble in getting up the steep tailgate runway into the truck body. Loading of this character is wasteful of time and money

Proposed Kansas City Facilities Will Enable 2,000 Hogs To Be Unloaded Daily



AT the left is shown the type of four-truck unloading platform suggested by THE COMMERCIAL VEHICLE for use at the Kansas City stockyards. It takes up only 40 feet of space in front of the pens and yet permits four trucks to load or unload at the same time without the possibility of any of the loads becoming mixed. As many as 2000 hogs can be unloaded daily over the platform shown, or 600,000 for a 300-day year.

Above is shown the proposed location of the platform and how it will be reached by a wide areaway from 50 to 100 feet wide, more than ample to prevent vehicular congestion. Note also the proposed location of the two washstands with a large manure dump behind for the straw and manure cleaned out of the truck bodies while on the washstand, so that the truck owners may carry return loads without contamination.

two points at which hogs at this writing are now unloaded from the trucks.

City Closes Street

The difficulties of providing better loading and unloading facilities for the motor trucks were further increased in August, 1918, when the city of Kansas City took possession of one of the public streets previously used by the trucks to reach the cattle and hog unloading chutes. The city entirely blocked the street by digging holes for the foundation of a new trolley car viaduct and the Stockyards company could obtain no satisfaction from the city's authorities as to why the street could not be opened to traffic again since no work was done on the foundations from the time the holes were dug until this writing in March, 1919. Not knowing when access could be had to the present unloading chute, the Stockyards company was justified in not attempting to increase the facilities at those points because it was not certain that they could be used even after they had been provided.

It was at this point in the development or layout of any new facilities for cattle loading or unloading that Joseph Husson, editor of THE COMMERCIAL VEHICLE, was asked, through Benjamin S. Brown, THE COMMERCIAL VEHICLE'S representative in Kansas City, to visit the stockyards and make suggestions as to what new and better facilities could be provided. This request was made of THE COMMERCIAL VEHICLE editor in view of the fact that he had previously visited and made analytic studies of the loading and unloading methods and other facilities provided at the stockyards in Fort Worth, Tex.; Cincinnati Ohio; St. Joseph, Mo., and Omaha, Neb.

This Magazine Helps

As a result, the editor of THE COMMERCIAL VEHICLE made a special trip to Kansas City from Chicago and spent 3 days in studying the existing conditions at the Kansas City stockyards, after which he made certain specific recommendations, which are given in full on page 5. This work was done without charge to the Stockyards company, whose general manager, E. C. Senter, co-operated in the most admirable manner. It was done simply and entirely as a service to the motor truck owners and operators who haul livestock to the yards in an attempt to increase the efficiency of those trucks and as a means of assisting the Stockyards company to work out the new facilities and at a minimum of expense. Work of this character is entirely legitimate by a magazine whose sole aim of existence is to assist motor truck owners in getting the maximum efficiency out of their vehicles and of publishing the results of such work as the easiest, quickest and most satisfactory manner of disseminating such knowledge throughout all parts of the nation as the means of helping other truck owners who are confronted with the same or similar problems.

Here is another view of the cattle loading at the Exchange Building courtyard. The truck driver, with a rope around the calf's neck, is trying to persuade it to jump from the ground into the truck body

The loading and unloading conditions at the yards were found to be very bad. The facilities or lack of facilities could be summed up as follows:

1 Great vehicular congestion at the loading and unloading chutes.

2—Lack of a place to dispose of manure from the trucks so that they might carry return loads.

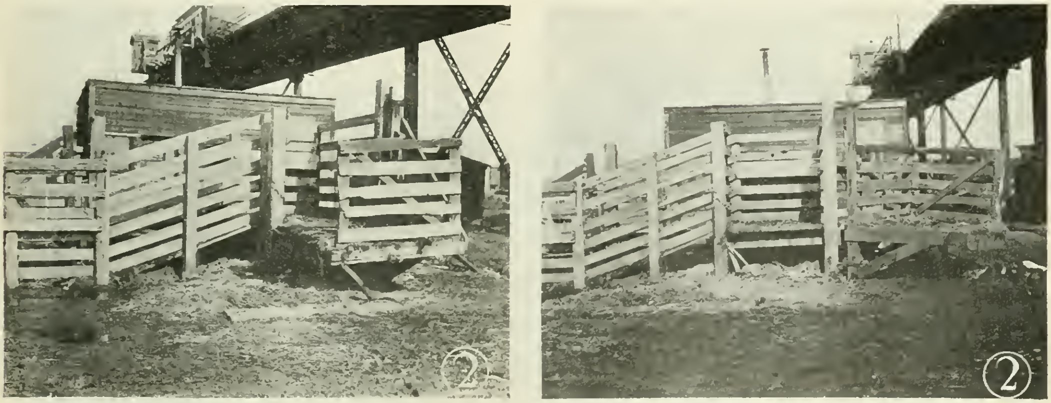
3—Lack of a suitable washstand where the bodies could be cleaned after the manure has been scraped out of them.

4—Lack of suitable unloading chute for cattle and calves.

5—Lack of a hog unloading chute where more than one truck can load or unload at the same time.

Cause of Vehicular Congestion

The great vehicular congestion at the stockyards was due to two causes: 1—The lack of proper unloading and loading facilities, and 2—To the fact that the great majority of the animals are hauled to the yards very late at night or very early in the morning so as to reach the yards in time for sale on that day's market. From the table of drive-in receipts given on page 7 it is seen that the total truck drive-in receipts during the year 1918 were about 107,940 animals divided as follows:



Cattle are unloaded at this platform at the Twelfth Street gate during the day, and hogs at night. Although the platform is made to swing around in back of the truck, most of the truck men prefer to back up to it when in its swing-out position, as shown at the left, thus indicating that a truck need not be damaged in backing up if the driver is careful

Another scene at the courtyard of the Exchange Building, showing a calf being loaded into the tonneau seat of a passenger car by the "hand - elevator" method

Cattle	12,429
Calves	10,539
Hogs	72,253
Sheep	12,719
Total	107,940

For a 360-day year it is thus seen that approximately 300 animals are brought to the yards daily. The great majority of the trucks used in the work are not over 2 tons in capacity, due principally to the condition of some of the roads in the outlying territory from which the stock is hauled. An average of four cattle and fifteen hogs, calves and sheep to the load is about the ordinary drive-in load.

Average Number Carried

Assuming these figures, the average number of animals of all kinds carried per truck load is about twelve, which, divided into the average of 300 animals received a day, would indicate that twenty-five trucks bring in loads daily for a 360-day year. However, Monday, Tuesday and Wednesday of each week are the largest receipt days with fewer drive-ins on the last four days of the week, so that in the beginning of the week the number of trucks far exceeds the average, while during the latter part of the week it is less than the average. On a busy Monday as many as 100 trucks bring in their loads, and at times there are as many as ten or twenty trucks waiting their turn to get at the unloading chute for either cattle, calves or hogs.

Delays of this kind are, of course, very expensive to the motor truck owner in that they reduce the working ability of his trucks and likewise reduce his earning capacity. He must either charge a higher rate in order to make an allowance for the time lost due to the delays in unloading or give a lower rate per 100 lb. to meet competition, with a consequent lower percentage of profit.

While the truck traffic into the Kansas City yards from a territory within a radius of 30 miles sometimes amounts to 100 loads a day, it has only been within the past few months that there has been any attempt made by the truck owners to get loads back to their country districts. This has been due to the fact that there are no facilities at the stockyards for cleaning the manure out of the trucks or for washing out the bodies so that other goods, such as food products, grain or other feeds may be hauled back without contamination.

In talking with one of the truck owners, it was found that he drove 8 miles off his route in order to reach a place where he could scrape the manure out of the body and have access to a water hose for washing out the body. He then had to go back on his route to pick up the goods to be taken to the rural center from which he operated his vehicles.

Instances of this kind simply go to prove the great economic value which would result if a washstand and manure-disposal facilities could be provided at the stockyards or at some adjacent point.

At the time the conditions at the stockyards were studied, it was found that there were two locations where cattle and calves could be unloaded and two places where hogs could be unloaded, one of the latter being at a gate at which cattle were unloaded during the day and hogs at night. The first of the two places where cattle and calves could be unloaded was to one side of the large areaway surrounding the Stock Exchange Building.

No Facilities for Loading and Unloading

There no facilities whatever were provided for either loading or unloading cattle and calves. If the truck owner did not provide himself with a high tailgate which could be swung onto the ground, he had to make the animals jump out of the truck bodies onto the ground in order to unload them. Similarly, he had to make them stand on their hind legs and place their fore feet into the rear of the truck body and then push them up bodily in order to load them.

While it is almost impossible to believe that such conditions could exist at the Kansas City stockyards, the illustrations reproduced on pages 6, 7 and 8 show the animals actually jumping off the trucks onto the ground and being loaded

Two scenes near the Twelfth Street unloading platform. When the city shut off Twelfth Street, the only access to the platform, the trucks had to run through the muck and mire between the tracks in the nearby railroad switching yard. The lack of any road is shown clearly in the view to the left. At the right is shown a truck which got stuck in the mire and unloaded its cattle onto a sand pile instead of trusting to the jump-off method into trucks by "hand elevators." While to the uninitiated it might seem that these methods of loading and unloading were dangerous to the life and limbs of the cattle or calves so unloaded, it is a strange thing that so far as known none of the animals so handled have ever broken their legs in the operation.

What Pictures Show

Other illustrations on pages 7 and 8 show that considerable trouble is experienced by the truckmen, even when they have provided themselves with tailgates which can be swung down onto the ground to act as runways for the animals in getting on and off the truck bodies. This trouble is due to the fact that the angle of the tailgate when swung down to the ground is too steep for the cattle or calves to ascend or descend without considerable urging on the part of the men in charge of the loading or unloading.

The writer on one occasion timed the loading of five cows and two calves being taken out of the yards for fattening on one of the nearby farms. The truck used was a 2-ton Reo provided with a hinged tailgate which, when swung down on the ground, was set on an angle of about 45 deg. to the horizontal.

The Twelfth Street road to the cattle unloading platform, seen by the small house in the background, under the viaduct. The street is impassable, as shown, and the trucks had to run over the railroad tracks, as shown on page 10, and by the dotted line route shown on page 6

Each of the cows balked as soon as it came to the tailgate and no amount of beating with sticks or whips could urge it to try and walk up the tailgate, which was provided with cross cleats too far apart to be of any service in giving the animal a firm footing. Finally the driver had to tie a rope around the neck of the animal, pass the rope through one of the side stakes near the front end of the body and bring the free end back to the rear of the truck, where the driver and his helper proceeded to pull on it with all their strength and at the same time whack the cow on its hind quarters with heavy flat sticks or boards. This operation had to be gone through with to load all of the cattle. After these were loaded, it was an easy matter to get the calves to go up the tailgate or to lift them bodily onto the truck platform. The entire loading operation took 12 minutes. If some form of loading platform level with the truck floor had been provided, the same operation could have been done in 2 or 3 minutes or 5 minutes at the utmost. Sometimes the animals fall off the tailgate while being loaded because of turning around sideways, as shown in the illustration at the bottom of page 7.

One Swinging Device Used

At the second unloading gate for cattle in the day and hogs at night a level platform the height of the truck body was provided together with a horizontal swinging platform which could be swung around to touch the tailgate of the truck after it had been driven up parallel to the fixed part of the platform without the necessity of backing up to it. The revolving platform is shown in the illustration on page 9, and was designed with a view to eliminating the necessity of backing the trucks up to the fixed portion of the chute. In cases where the driver was careless in backing up, the platform was more or less damaged and sometimes the truck as well. The writer watched a score or more of trucks unload cattle at this chute, and without exception everyone preferred to back up to the swinging portion of the chute rather than to drive up parallel with its face and then swing the pivoted platform around to meet the tailgate of his truck.

The Closed Street

The unloading gate just mentioned is located at what is known as the Twelfth Street entrance to the stockyards. It was reached by the trucks running along Twelfth Street, a public thoroughfare under the jurisdiction of the city authorities. However, as previously mentioned, this street was closed to traffic when excavations were made for the foundations of a new trolley car viaduct. No satisfaction could be obtained from the city authorities and it was necessary for the trucks to travel a very devious course through mud and over railroad tracks in the adjacent railroad classification yards in order to reach the unloading chute. The difficulties presented in reaching the unloading gate by this means is well illustrated in the pictures reproduced on page 10.

On one occasion, as shown on page 10, a large 3-ton truck with a full load of cattle got stuck in the mire and had to unload the animals onto a sand pile in order to get them down onto the ground. Apparently the driver was not willing to trust to the jump-off method followed near the Stock Exchange Building. While the writer was at the yards, the route over the railroad tracks was cut

(*Continued on page* 44)

The present hog unloading chute, showing how the trucks have to wait in line because there are facilities for only one truck unloading at a time

Saving on the Little Things

IN the maintenance of motor trucks, it is the little things that count. This holds true for both repairs and the methods employed in cleaning or fixing up small truck parts. For instance, most of the large or major truck repairs begin initially as a small repair and only grow into a large one because the remedying of the small repair is neglected.

Perhaps it is a loose bolt, which, not being tightened, permits wear that eventually results in a lost or broken bolt and a consequent damage to the part supported by that bolt. Or it may be a grease cup with no grease in it, or one half filled with grease and half with dirt or dust. It may be an improperly set valve stem which would only take a few minutes to fix but which if not set up properly results in rapid valve wear with a corresponding loss of fuel.

It is such small items which suggest to either the small or large truck owner that he give his vehicles a thorough daily inspection. This insures the discovery of the small ailments before they become serious and develop into repairs which run up to a hundred dollars or more.

Much money can be saved in the labor cost of truck maintenance by making use of many small devices worked out by truck owners, public garagemen handling trucks or by the service stations of motor truck makers. It makes no difference where the idea originates, provided the device or method devised is applicable to truck maintenance. For instance, there is a cheap and efficient method of cleaning truck driving chains and of moving them from the place where cleaned to the truck on which they are to be applied. There are several machines manufactured for cleaning cotton waste and for reclaiming the dirty oil from the waste. The waste is saved and so is the oil. Then there are simple ways of filling oil tanks without spilling the oil; of removing the storage batteries of electric trucks; of tipping over carbides of storage battery acid without spilling it or getting on one's hands or clothes, and of moving all sorts of equipment from one part of the garage floor to another by means of specially-designed hand trucks mounted on caster wheels.

All of these devices save the truck owner money in that they save the time of the mechanic or helper. In most cases the devices are simple and inexpensive to make. The wise truck owner will apply the principles of such devices to others which he can use in the maintenance of his own trucks, no matter whether he operates one or a dozen vehicles.

Hauling Livestock by Trucks

A BRAND new industry of hauling livestock to stockyards from the neighboring farms within a radius of from 25 to 40 miles by means of motor trucks has grown up during the past year. Over a million head of cattle, hogs, calves and sheep were hauled to the five or six principal stockyards in this country during 1918 alone.

While there is no doubt that the shortage of railroad cars and railroad congestion gave this new truck industry a considerable impetus, the use of trucks in such work is a permanent one because its growth has also been due to a few fundamental advantages as compared with shipping livestock by railroad. These fundamental advantages are explained at greater length elsewhere in this issue.

It is pertinent to point out, however, that the haulage of livestock by motor trucks offers a lucrative field for the farmer or local expressman provided the work is carried on in a thoroughly businesslike manner. In this, the truck operator must pay particular attention to the loading and unloading devices at the points where the animals are picked up. It is just as important to have some sort of chute or runway at the farms as it is at the stockyards.

If the proper kind of co-operation is carried out between the truck owners hauling livestock and the stockyards management, it will be found that the latter will meet them more than half way in providing suitable washstands and facilities for disposing of manure so that the vehicles can carry loads on their return trips back to the rural communities.

War Truck Surplus to Be Taken Care Of

Will Be Offered to Federal Departments and Makers

WASHINGTON, D. C., April 1—A possible surplus of army trucks and passenger cars is now considered likely and in event that there are more vehicles than can be used by the army these will be disposed of by the Director of Sales according to a plan which is designed to protect both the War Department and the automobile industry. After the inventories, which are now being taken by the War Department, are completed, if it is found that there is a surplus of motor vehicles, the different branches of the government will first be consulted to learn whether a surplus in the War Department of motor trucks and passenger cars can be used to fill their requirements. Various manufacturers of trucks and automobiles will next be approached to ascertain whether they will take over the vehicles of their own make to market them with their own machines to secure a fair market price for the government and at the same time prevent disturbances of market conditions. The net surplus remaining after the various branches of the government and the manufacturers have been consulted will be disposed of to the public either through auction or by sealed bids. Full publicity will be given this sale throughout the country in order that the government may realize the best results. In the meantime the public should understand that no motor trucks or passenger cars are being sold. It is anticipated that between the various government departments and the manufacturers, whatever surplus is available will be taken up by them.

MASS. WOULD RAISE FEES

BOSTON, MASS., April 6—Mayor Peters attempted to raise a lot of money for Boston through tripling the fees of motor vehicles, including trucks, and the plan of the Highway Commission to legislate off the roads practically all heavy trucks struck a snag in the legislature. There were two hearings on the questions. Truck owners and dealers went up and registered strong protests. Mayor Peters' bill would have the present fees multiplied three times. The Highway Commission proposed \$15 for 1 ton, \$30 for 1½ tons, \$40 for 2 tons, \$50 for 2½ tons, \$75 for 3 tons, \$100 for 4 tons, \$150 for 4½ tons, \$200 for 5 tons, \$200 for each ton above 5.

Why the Highway Commission recommended any such fees is an enigma, for they had as much chance of getting them as a man has to buy the Washington monument at the capital for a nickel. Before the hearing Colonel Sohier, chairman of the commission, and the truck dealers had a conference, and the former stuck to his fees, refusing any compromise. So when the hearing was held the dealers stated that they were willing to accept fees doubling the present rates, which are \$5 for 1 ton and \$3 for each additional ton. That would make a 5-tonner pay \$34 instead of \$17. But a number of the truck owners refused to agree to any increase whatsoever. One big contractor stated that on an investment of \$6,000 he now pays in taxes and fees \$886.20, and that was enough. Some of the members of the committee want to put the fees up, but others do not. During an intermission in the hearing Colonel Sohier made up a new schedule that he offered the committee. This called for \$10 for ½-ton, \$20 for 1-ton and \$10 for each additional ton up to and including 5 tons, and \$100 for each additional ton above 5. The Highway Commissioner stated that he frankly believed the heavy trucks should not be allowed on the roads. The dealers objected to this raise. For example, where there are some trucks like the Mack rated at 5½ tons they would pay \$160, while a 5-tonner would pay only \$60. It was decided to appoint a sub-committee to confer and see if any compromise could be reached.

NEW MAKERS FOR GIANT TRUCKS

CLEVELAND, OHIO, April 2—The motor truck division of the Chicago Pneumatic Tool Co. was purchased by C. A. Finnegan, of Buffalo, N. Y., owner of the Buffalo *Commercial*, and A. Webber, who is interested with Finnegan in various enterprises. The business will be carried on with all branches and employees as before, with the exception that it will be greatly enlarged with vigorous policies inaugurated. H. B. Young will be associated with the new company in an executive capacity and will be located at Chicago.

The Chicago Pneumatic Tool Co., owing to its immense holdings in the tool factories, could not give the truck department necessary attention and therefore sold its interests to the new company which will devote its energies to the manufacture, production and improvement of the Giant trucks.

GOVERNOR SIGNS VEHICLE TUBE BILL

ALBANY, N. Y., April 11—Governor Smith signed to-day the Sage-Adler bill appropriating \$1,000,000 as this State's share toward starting the construction of the New York-New Jersey vehicular tunnel. The total cost of the tunnel will be \$12,000,000, one-half of which will be borne by New York and the balance by New Jersey.

The tunnel is to be used only for pedestrians and vehicles. The bill provides that it shall be constructed under the Hudson River between a point in the vicinity of Canal Street, New York, and a point in Jersey City to be decided upon.

Work on the tunnel is to be done by contract as directed by the New York State Bridge and Tunnel Commission, in co-operation with authorities appointed in New Jersey. The commission is authorized to enter into a contract with the New Jersey representatives for the joint operation, repair and maintenance of the tunnel. It is believed that within 20 years the construction cost will have been returned from the tolls.

Truck Has New Future in Railroading

Morse Says New Element Should Be Considered

NEW YORK CITY, April 11—That the railroad of the future may find it more economical to tear up short line tracks and develop motor truck transportation in its place was the forecast made recently in an address on the future status of the railroads by C. A. Morse, assistant director of operation in charge of engineering and maintenance for the U. S. Railroad Administration. Mr. Morse delivered his paper before members of the New York Railroad Club.

"The perfection of the motor truck and tractor has introduced a new element into the transportation problem that should be taken into consideration at this time, while studying the reorganization of the whole transportation question," said Mr. Morse.

"Where, heretofore, development of the country for 50 miles either side of a trunk line of railroad has required the construction of light branch lines, it is a question to be seriously considered whether this policy should be continued or whether good wagon roads should be constructed and the products of farms, and passenger travel should not be handled by motor trucks to the main line.

"Taken alone and considered as a unit practically none of these small branch lines pay expenses, but as gatherers of freight and passengers to increase density of traffic on the main lines they are sources of profit.

"As, however, the traffic gathered by them is turned over to the main line with a deficit attached which has to be overcome during the main line movement before any profit is made, it would be a decided advantage if this traffic could be delivered to the trunk line by means of the motor truck, without this bill of expense attached.

"Investigation of this subject may show the desirability, as good roads are completed, of the taking up of many branch line railroads and utilizing the abandoned road bed for improved motor road, thus decreasing the expense of maintenance and operation of our railroads and giving in its place a well located motor road. Such a change would call for increased facilities at stations along the main line for passengers and for hauling freight, including storage, trackage, etc., but it would mean the concentration of supervision and labor, permitting better housing and living conditions for employees."

MEAD HEADS DETROIT BUS LINE

NEW YORK CITY, April 11—A motor bus line similar to that of the Fifth Avenue Coach Co.'s system in this city is being planned for Detroit. Plans are now under way for the formation of a company, of which R. W. Mead, formerly president of the Fifth Avenue Coach Co., will be president.

Government Trucks to Pay Revenue Tax

Direct Sales Through Factory Are Not to Be Taxed

NEW YORK, April 7—It is likely that the Internal Revenue Bill will hold that sales of trucks and passenger cars made to the Federal Government, or to the various State governments, are not exempt from the new war revenue tax. Under neither the old nor the new law are there any provisions specifically exempting the government. Under the old law, however, government purchases have been held to be exempt. Under recent interpretations of the new law, such sales apparently are not exempt. It is pointed out, however, that when dealers are approached by a State regarding the purchase of a car the dealer may pass the order along to the factory and act as a commission man, instead of taking title to the car, and then resell it. The National Automobile Chamber of Commerce points out that under such a plan no tax will apply.

UNION SWITCH TO MAKE SHAFTS

SWISSVALE, PA., April 5—The Union Switch & Signal Co. has purchased machinery for finishing crankshafts and camshafts, and will be ready for delivery about June 1. The company manufactures its own forgings.

MOTOR FREIGHT ROUTE STARTED

INDIANAPOLIS, Ind., April 11—Express service at freight rates is what is promised the people of Indiana by the newly incorporated International Transportation Co., that city. One of the lines which will pass through Lafayette will begin operation in 3 weeks. Lines have been established leading out of Indianapolis to Chicago, to Fort Wayne, to Toledo, and to Dayton, Ohio. Each of these lines will at first have several routes. The one giving the most business to the company will be finally selected as the permanent one. Between Indianapolis and Chicago there will be three routes, one by the way of Lafayette; one by the way of Monon and Frankfort and the third by the way of Logansport. The permanent route will be selected after the lines have been in operation long enough for the company to determine by the volume of business which is rendering the greatest service to the people and is paying the most to the company. The company has its headquarters in the Merchants' National Bank Bldg., Indianapolis, and is incorporated for $500,000.

Two kinds of service will be offered by the company, through and local. The through freights will be carried in 5-ton trucks and with 5-ton trailers, which will make no stops except those that are necessary between the terminal cities; and the local freight will be carried by 2-ton trucks which will stop at towns and farm houses on the way and pick up whatever freight the merchants and farmers have for transportation to other towns and individuals on the route. It is expected that the through service trucks will make the trip between Indianapolis and Chicago in 1 day. This will make the service as rapid as the present express service, and the rates will be the same as the regular freight rates now charged by the railroads.

In order to facilitate the business of the company, along the routes the company will have its own telephone lines with a regular despatcher, to whom the truck drivers will report from the different towns through which they pass for instructions and to report any accidents or delays on the route.

TRUCKS FOR HOSPITAL USE

WASHINGTON, April 10—The 1000 motor trucks which were recently turned over by the War Department to the Health Department, as announced in a past issue of THE COMMERCIAL VEHICLE, will be used for the transport of soldiers, sailors and marines between government hospitals. These trucks were transferred without charge to the Secretary of the Treasury, who directs the Public Health Service under Public Act No. 326, which authorizes such transfers, and directs the Secretary of War to supply as many motor trucks and as many motor-driven vehicles not required by the War Department as may be required by the Public Health Service for its hospitals.

CLINTON PLANS NEW TRUCK

DETROIT, April 4—The Clinton Motor Truck Co. is bringing out a 1-ton truck of a new design. This model was on the market before the war, but owing to war work and scarcity of material, manufacture was suspended. The Clinton company will locate its main plant in Cleveland, as most of the material used in the manufacture of the truck is produced in that vicinity.

PIERCE-ARROW SALES

BUFFALO, N. Y., April 8—Gross sales of the Pierce-Arrow Motor Car Co. increased about 27 per cent during the year ended Dec. 31, 1918, or from $32,565,908 in 1917 to $41,354,439 in 1918. In this period the company produced 8,635 vehicles of which 1,168 were passenger cars and 7,467 were trucks. In 1917 the company produced 7,703 vehicles of which 2,532 were cars and 5,171 were trucks.

Coming Events

April 16	New York City, Monthly Meeting of Motor Truck Assn. of America, Automobile Club of America, 247 West 54th Street.
April 17-19	Lincoln, Ill., Motor Vehicle Show, Court House Square.
April 24-26	Chicago, Sixth National Foreign Trade Convention, Congress Hotel.
May 10-17	Bristol, Va.-Tenn., Great Southern Automotive Show.
May 20-24	Quebec, Can., Good Roads Congress.
Sept. 22-24	Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue Stratford Hotel.

Gasoline Prices May Be Increased

Oversupply of Fuel with No Prospective Market Cause

CHICAGO, April 3—It is predicted, and with reasonable certainty, that this coming summer the price of gasoline must go up. This has been brought about by the abrupt disappearance of a market for fuel oil, which it was believed would continue well into 1919 and possibly to 1920. The Allied governments during the war made tremendous demands on the fuel oil supply of America. Fuel oil commanded a good price, and it was this alone which enabled the refiners to offer gasoline at the restricted Government price and still operate the refineries at a net profit, they state.

With the end of the war came the end of the demand for fuel oil, with the result that the price dropped to about 80 cents a barrel, or 1.6 cents a gallon. When it is considered that last summer the price of fuel oil was about $2.50 a barrel or 5 cents a gallon, the deficit is very apparent. The most logical expectation is that the price of gasoline will rise.

The present situation is considered serious by the refiners. The total capacity of the mid-continent refineries is about 330,000 bbl. of crude a day. Operation is cut to a third of this capacity, resulting in the production of about 50,000 bbl. of fuel oil a day, for which there is no market. If the refineries are to continue, a market for these 50,000 bbl. must be found, the oil men say.

EDISON REDUCES PRICE

ORANGE, N. J., April 3—The Edison Storage Battery Co. has brought out a new price list which reduces the price of types A, B and C Edison cells approximately 16 per cent.

MAGNETO MAKERS ORGANIZE

NEW YORK CITY, April 2.—Five of the principal manufacturers of magnetos have banded together for the purpose of instituting a propaganda campaign to popularize the more extensive use of magnetos on various forms of automotive equipment. The association has established headquarters at 110 West 40th St., New York. It includes Splitdorf Electrical Co., Newark, N. J.; American Bosch Magneto Co., Springfield, Mass.; Simms Magneto Co., East Orange, N. J.; Eisemann Magneto Co., Brooklyn, N. Y., and Ericsson Mfg. Co., Buffalo, N. Y.

NOVEL SELLING SCHEME

CLEVELAND, April 2—W. E. Cobb, district sales manager for the Four Wheel Drive Auto Co., Clintonville, Ill., is using the movies to successfully promote FWD sales. He carries a small motion picture machine, about the size of a suit case and is able to show in any darkened room the FWD at its most difficult tasks.

N. A. C. C. Appoints Show Committee

Pulcher Chairman to Arrange for Next Year's Exhibit

NEW YORK CITY, April 9.—Martin L. Pulcher, vice-president of the Federal Motor Truck Co., has been appointed chairman of a motor truck show committee of the National Automobile Chamber of Commerce to arrange for proposed exhibits of trucks in New York and Chicago next winter during the same weeks as the National Passenger Car shows. Associated with him on the committee are A. J. Wipple, general sales manager of the Diamond-T Motor Car Co., Chicago, and David S. Ludlum, president of the Autocar Co., Ardmore. Several additional members of the Motor Truck Committee have been appointed as follows: David C. Fenner, Mack Bros. Motor Car Co., and R. H. Salmons, Selden Motor Vehicle Co. F. W. Fenn, who has handled the Rural Motor Express Department of the N. A. C. C., has been made secretary of the Motor Truck Committee. D. C. Fenner has been appointed chairman of a committee to co-operate with the S. A. E. in furthering truck standardization work and associated with him are Fran-Davis (Pierce-Arrow), F. A. Whitten (General Motors), E. M. Sternberg (Sterling), F. F. Beall (Packard). Another committee has been appointed to revise the standard service and repair parts policies of the N. A. C. C. as they relate to trucks. Members of the committee are: Chairman, E. T. Herbig (Service), F. H. Drew (Packard), W. M. Ladd (Pierce-Arrow), A. B. Cumner (Autocar), F. H. Harris (Republic.)

MICHIGAN GOOD ROADS ASSURED

DETROIT, April 7—Michigan has voted overwhelmingly in favor of the $50,000,000 good roads bond issue, the project carrying in nearly every precinct by a 4 to 1 vote. From the inauguration of the good-roads campaign until the very end, there was no organized opposition. In two or three of the rural counties, farmers who could see no direct benefits organized "dirt roads" associations and conducted a feeble fight.

The press of the state, however, ridiculed the dirt road men to such an extent that the opposition was smothered before it got started. The campaign for the good roads movement was brilliant and complete in every detail. It was directed by the Michigan State Highway Assn. backed by every automobile club and Chamber of Commerce in the state.

TO ENFORCE OHIO ROAD DRAG LAW

CLEVELAND, OHIO, April 2—The enforcement of the road dragging law is being sought by the motor organizations affiliated in the Ohio State Automobile Assn. It is pointed out that the grading and scraping of roads in the spring is worth several times such work done after the rainy season.

Two years ago on behalf of the automobile clubs there was written into the state highway code a provision requiring the dragging of earth or unimproved roads at certain intervals. This was made compulsory on local road officials because in some localities great diligence was shown in caring for the dirt roads while elsewhere they were neglected and soon became impassable.

TRUCK SALE BIDS WITHDRAWN

WASHINGTON, D. C., April 10—Requests for bids on motor trucks and passenger cars made by the Zone Supply and Port Storage officer at Baltimore to the public during the early part of March have been withdrawn because he did not specifically state that the vehicles offered for sale were only of scrap value and not usable. New proposals asking for bids will be sent out by the War Department in the near future which will distinctly state that these trucks and passenger cars are beyond repair and only good for scrap purposes. The total number of vehicles offered for sale is less than 100.

MAY CURTAIL USE OF TRAILERS

DETROIT, April 6—Detroiters interested in motor trucks and transportation over state highways are raising a strong protest to the bill which has just passed the state legislature forbidding the use of more than one trailer per motor truck or power unit on highways. The bill has passed both houses and is now ready for the governor's signature.

Governor Sleeper was to-day asked to withhold his signature pending a meeting of Detroiters interested, called for to-night at the headquarters of the Detroit Transportation Assn.

The bill, as it stands, truck operators believe, will greatly handicap the plans of the Government to cut the cost of living by delivering farm produce by parcel post, and will block the efforts of motor truck express routes now in operation in the state to haul freight over the roads at a minimum cost. If limited to the use of one trailer the operators will carry greatly increased loads with greater damage to the roads.

ROAD CONSTRUCTION MATERIAL FREIGHT RATES HIGH

WASHINGTON, D. C., April 2—That the existing high freight rates for road construction materials will be maintained is evidenced in correspondence between the Highway Industries Assn. and the U. S. Railroad Administration. Protests were filed by the Highway Industries Association against the U. S. R. R. Administration plan, which will allow the reduction of freight rates on road building materials only if such are purchased by Federal, State or municipal agents. The association pointed out that this would give very little relief. In reply the Director General of Railroads stated that no reductions are now contemplated on the freight rates of materials for road building to be purchased by any other than the government, the states or municipalities.

Orders for Concrete Roads Placed

Eleven States Let Contracts for Hard-Surface Roads

NEW YORK, April 11—During the past few days, reports from all over the country on road improvement indicate that waiting is soon to be replaced by actual work. Secretary Houston, of the U. S. Department of Agriculture, issued a statement, in which he said that sentiment is growing throughout the country, even in the newer sections, in favor of more substantial roads. That this is true is indicated by the following recent awards for concrete highway construction, these being but a few of those reported during the past week or so.

Minnesota. Anoka County, Minn., let a contract on March 28 for 6.6 miles of 18 ft. concrete road. The pavement will be 6 in. thick at the sides, 8 in. at the center, and reinforced. Crushed trapped rock aggregate will be used.

Pennsylvania.—On March 27 the Pennsylvania State Highway Department let 43½ miles of concrete road contracts. Pennsylvania has a very pretentious roadbuilding program for the year and has already let contracts for more than 100 miles, the expectation being that contracts for several hundred more miles will be let and completed this year, under its statewide roadbuilding plan.

Indiana.—On March 28 a contract was awarded to build approximately 3 miles of concrete road, 24 ft. wide, on what is known as the Michigan Road.

Michigan.—A contract for 2 miles of 16 ft. concrete road west and north of Dutton, Kent County, Mich., has just been awarded. This pavement will be 6 in. at the sides and 8 at the center.

California.—A contract by the State Highway Department calls for 11.4 miles of concrete road that will complete connection of San Diego with the Imperial Valley District.

Georgia.—Fulton County, Ga., recently awarded its first concrete highway contract for the year for 57,000 sq. yds. of concrete pavement in the vicinity of Atlanta on Cascade Avenue.

Kansas.—Two counties in Kansas have awarded large contracts for concrete highways. Near Wichita, in Sedgwick County, a contract for 7⅜ miles of 18 ft. concrete road on Central Avenue Road has been awarded. Near Topeka in Shawnee County, 10 miles of 18 ft. concrete road on the Furt to Fort Road was awarded.

New Jersey.—Section 2, of the Fort Lee Turnpike in Bergen County, N. J., will be improved with concrete pavement 24 ft. wide. The pavement will be 7½ in. thick at the sides and 10¼ at the center, reinforced.

Oklahoma.—Tulsa County, Okla., has commenced work on its $2,000,000 bond issue project by awarding contracts for about 8 miles of 18 ft. concrete road.

Tennessee.—The Rossville Boulevard near Chattanooga is being improved with 35,200 sq. yds. of concrete pavement. This work is being done under the joint auspices of the U. S. Government and Hamilton County, Tenn.

West Virginia.—Fayette County, W. Va., recently awarded a large number of contracts on three of its road projects, one for 6.3 miles of concrete another for a 5-mile concrete road, and another for a 6-mile concrete road.

FREIGHT RATES TO FAR EAST LESS

WASHINGTON, April 4—New and reduced rates on export traffic to China, Japan, Australia and the Philippine Islands, applying from Missouri River territory east through the Pacific Coast ports, have been issued by the United States Railroad Administration. Trucks and tractors may now be sent at the rate of $3 per 100 lb.

Motor Truck Assn. to Meet April 16

Meeting Is First of Series on Better Maintenance Methods

NEW YORK CITY, April 11—The April 16 meeting of the Motor Truck Assn. of America, to be held at the Automobile Club of America, will be the first of a series of service instruction meetings, which will be held from time to time by the association. This series of talks will be of particular interest to service men, transportation managers and garage superintendents.

The speakers at this meeting will be Major W. N. Britton, engineer, Kelly-Springfield Tire Co., who will speak on "Tires." His talk will be illustrated with slides. V. W. Kliesrath, chief engineer, Simms Magneto Co., East Orange, N. J., subject, "Magnetos," and A. C. Russell, special representative Vacuum Oil Co., New York, subject, "Oils."

AMERICAN BOSCH CONVENTION

NEW YORK, April 2—The American Bosch Magneto Co. closed its first sales convention Thursday, March 27. The morning of the first day was taken up with an automobile trip around Springfield, with an inspection of the works in the afternoon and business sessions in the evening. Wednesday and Thursday were given over to a discussion of trade matters and a review of new products. On Wednesday evening 100 executives and department heads sat down to a banquet at the Nayassett Club.

PHILADELPHIA GETS RURAL EXPRESS

PHILADELPHIA, PA., April 3—Within a few days fifty to sixty motor trucks will be running to this city from nearby rural points, carrying fresh farm produce to the consumer direct from the farms by means of post office trucks. The prices, considerably below city market figures, are listed at room 236 in the post office building, where there is also a growing list of over 400 farmers who are supplying produce.

Trucks are already being operated on six routes. Returned soldiers are being used as drivers. Eggs, poultry and vegetables form the bulk of the merchandise transported.

The territory covered by the trucks ranges from eastern Maryland to central Pennsylvania. It is intended to make Philadelphia the center of this experimental plan. All small shipments are made by parcel post trucks.

All the consumer has to do is to order what he wants from a farmer on the list posted and the post office will do the rest. The person ordering the goods pays the postage. The charges are 5 cents for the first pound and a cent for each additional pound. Several large army trucks have been turned over to the local post office to be used for carrying the larger shipments.

Recently when fresh eggs were selling in Philadelphia grocery stores at 50 to 60 cents a dozen a motor truck, the first in the local experiment, arrived from the Lancaster farming region with eggs for householders at 35 cents. The first stop was at the Commercial Museum. The truck carried 85 crates of eggs, weighing 4200 lb. It left Lancaster at 6:30 the previous day and arrived at 4:30 p. m. The eggs actually cost 32 cents, with 3 cents for postage. Fifteen separate operations and several days are thus saved by motor truck transportation of farm produce.

CHANGES IN GARY COMPANY

GARY, IND., April 9—Important changes in the personnel of the Gary Motor Truck Co. have been made recently, although the officers remain as heretofore.

Frank Dawson has been appointed general manager of the company. He was formerly factory manager of the Randolph Motor Truck Co., of Chicago, was later with the Mogul Truck Co., St. Louis, and in 1916 was appointed factory manager for the Master Truck Co. E. Von Rakowski, who has been closely associated with Dawson for several years, has been appointed chief engineer. Theodore B. W. Zumstein has entered the sales department. The Gary Company has just closed a contract with the Cooper Motor Co., Kansas City, with branches in Omaha, Tulsa, and other western and southwestern cities for more than a million dollars worth of Gary trucks, which are to be delivered within the next 12 months.

BIG YEAR FOR WHITE

CLEVELAND, OHIO, April 2—Gross sales of the White Motor Co. increased 53 per cent during the year ending Dec. 31, 1918, over sales for 1917, the increase being $13,810,348. After deducting federal income, war and express profits tax, the profits for the year were $6,380,585. A further deduction of the reserve for federal income, war and excess profits tax, estimated at $3,700,000, and dividends of $1,280,000, leaves a balance for the year 1918 of $1,400,585. This compares with $2,520,308 in 1917. The decrease is caused by the larger federal taxes.

The annual report of the company points out that the financial condition at the end of the year was excellent. Production was, of course, largely influenced by the requirements of the war, in addition to a largely increased commercial demand, which, however, it was necessary to curtail because of the war. Sales included 6451 trucks for the United States and French governments as against only 1358 trucks which were produced for war purposes in 1917.

The company has sold in all to the Allied nations, including the United States, nearly 18,000 trucks at a valuation of over $52,000,000. At the time the armistice was signed there were, in addition to these, 5700 trucks on order, with a valuation of approximately $16,000,000, which were canceled.

More Trucks Exported in Feb. Than Jan.

874 Trucks Shipped from N. Y. Valued at $2,921,399

NEW YORK CITY, April 2—Although the new year started well with big figures for the month of January, February automotive exports from the port of New York show another substantial gain in number and value of trucks, cars and in value of parts exported.

Totaling the various items for January gives $4,274,827. The total for February is no less than $6,870,057, an increase of over 60 per cent. In January 515 trucks valued at $1,604,418 were shipped. The totals for February are 870 trucks valued at $2,921,399.

PHILADELPHIA ASSN. MEETING

PHILADELPHIA, Pa., April 5—Secretary W. H. Metcalf reported at the March meeting of the Motor Truck Assn. of Philadelphia that conferences with the Harrisburg legislators on the Ditrich and Buckman bills have resulted in a virtual agreement on 26,000 pounds as the maximum weight for trucks, a length of 25 ft. and a width of 90 in.

Several members, including Chairman Schwaake, of the traffic committee, in speaking of the proposed restrictive laws at Harrisburg, emphasized the necessity for constant watchfulness on the part of the trade against the passing of adverse measures. Attention was called to a bill just introduced, requiring pneumatic tires on all motor trucks.

NEW BODY BUILDER

PORTLAND, MICH., April 2—The Ramsey-Alton Mfg. Co., which was a chair factory before the war, wagon parts plant during the war, is now going to engage in the manufacture of bodies for motor trucks. The concern has several hundred thousand dollars' worth of material on hand and most of this can be worked up into truck bodies.

ASSOCIATED HIGHWAYS ASSN. IS FORMED

KANSAS CITY, MO., April 6—Twenty-eight interstate highway associations have so far qualified for membership in the Associated Highways of America. They represent about 50,000 miles of marked highways, reaching to nearly every part of the United States. By the time Congress convenes the organization will be further strengthened. And it will back a bill for a Federal Highway Commission. The Associated Highways of America will present the combined system of marked highways of its membership as the plan for Congress to adopt for the federal system to be built and maintained by the Government.

The fact that the proposed system covers the United States thoroughly and has the support of aggressive members of road associations is expected to relieve Congressmen of the necessity of deciding which highways shall be built.

Road Condition Data Available to Truck Owners

Highway Information Furnished to Truckmen on Request in Eleven States—Work Carried On Under Supervision of the Weather Bureau

MOTOR truck owners need no longer hesitate about accepting goods to be transported overland between cities because of lack of knowledge of the condition of the roads, for the Weather Bureau of the United States Department of Agriculture is now giving a daily highways weather service in eleven States and the District of Columbia. This service is distinct from the ordinary weather bureau information furnished for many years past.

One of the typical cards showing the condition of three of the main line roads in the State of Wisconsin is reproduced on this page. As may be seen, it gives the condition of the Milwaukee-Fond du Lac, Milwaukee-Kenosha and Milwaukee-Madison highways.

This service began first during the winter of 1917, when the War Department began driving its military trucks overland from points of manufacture to the eastern seaboard for transshipment overseas. At that time the service was only given in the States of Michigan, Ohio, Pennsylvania and Maryland. The great growth of overland haulage by means of motor trucks during and since the war has resulted in the service being extended to other States in which ordinary commercial vehicles are daily engaged in moving goods over the highways.

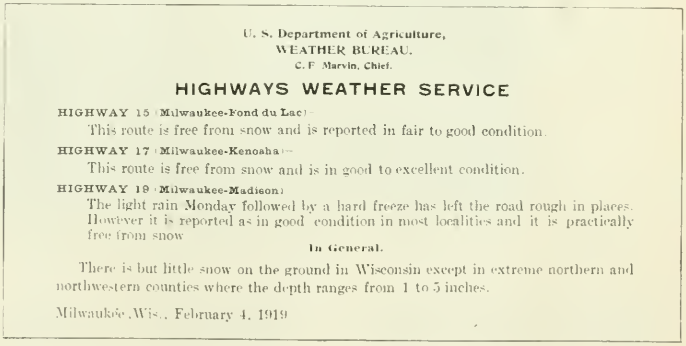
Year Round Service

The service is given all the year round and reports on the condition of the roads as affected by either rain or snow or extremely dry weather. As seen in the report for the Wisconsin highways, it is stated that the Milwaukee-Fond du Lac road is free from snow and is reported in fair to good condition. Similarly, the Milwaukee-Kenosha route, which is over a concrete highway, is reported to be free from snow and in good to excellent condition. On the Milwaukee-Madison highway it is stated that the light rain the day before the report was issued was followed by a hard freeze, which left the road rough in places but which nevertheless did not put it into such bad shape as to make it impassable for motor trucks.

The highways weather service is also included in a larger type of weather bureau card, a sample of which is also reproduced at the bottom of this page. The larger card is also issued daily and gives high and low temperatures and rain and snow precipitations for the preceding 24 hours. As shown in the card reproduced herewith, for Little Rock and vicinity the conditions of the Little Rock to Memphis, Little Rock to Fort Smith and the Little Rock to Texarkana roads, the main lines leading out of Little Rock, are given in full.

Service for Truck Owners

This new type of highways weather service is one which all motor truck owners who operate their vehicles out-



U. S. Department of Agriculture,
WEATHER BUREAU.
C. F. Marvin, Chief.

HIGHWAYS WEATHER SERVICE

HIGHWAY 15 (Milwaukee-Fond du Lac)—
This route is free from snow and is reported in fair to good condition.

HIGHWAY 17 (Milwaukee-Kenosha)—
This route is free from snow and is in good to excellent condition.

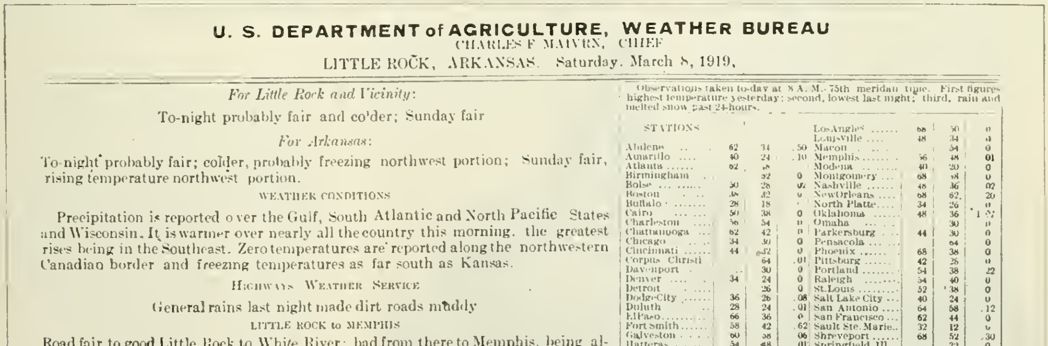
HIGHWAY 19 (Milwaukee-Madison)
The light rain Monday followed by a hard freeze has left the road rough in places. However it is reported as in good condition in most localities and it is practically free from snow

In General.

There is but little snow on the ground in Wisconsin except in extreme northern and northwestern counties where the depth ranges from 1 to 5 inches.

Milwaukee, Wis., February 4, 1919

A reproduction of one of the 3½ by 7¼ in. Highways Weather Service postcards now issued daily in eleven States and the District of Columbia for the benefit of motor truckmen and others using the main highways



U. S. DEPARTMENT of AGRICULTURE, WEATHER BUREAU
CHARLES F. MARVIN, CHIEF
LITTLE ROCK, ARKANSAS. Saturday. March 8, 1919.

For Little Rock and Vicinity:

To-night probably fair and colder; Sunday fair

For Arkansas:

To-night probably fair; colder, probably freezing northwest portion; Sunday fair, rising temperature northwest portion.

WEATHER CONDITIONS

Precipitation is reported over the Gulf, South Atlantic and North Pacific States and Wisconsin. It is warmer over nearly all the country this morning, the greatest rises being in the Southeast. Zero temperatures are reported along the northwestern Canadian border and freezing temperatures as far south as Kansas.

HIGHWAYS WEATHER SERVICE

General rains last night made dirt roads muddy

LITTLE ROCK to MEMPHIS

Road fair to good Little Rock to White River; bad from there to Memphis, being almost impassable east of the St. Francis River.

LITTLE ROCK to FORT SMITH

Roads bad to fair Little Rock to Fort Smith, being impassable Paris to Lavaca.

LITTLE ROCK, to TEXARKANA

Roads good Little Rock to Hot Springs; bad to fair Hot Springs to Texarkana

Observations taken to-day at 8 A. M.-75th meridan time. First figures highest temperature yesterday; second, lowest last night; third, rain and melted snow past 24-hours.

STATIONS							
				Los Angles	68	50	0
				Louisville	48	34	0
Abilene	62	34	.50	Macon		54	0
Amarillo	40	24	.10	Memphis	56	48	01
Atlanta	62	48		Modena	40	20	0
Birmingham		52	0	Montgomery	68	48	0
Boise	50	28	02	Nashville	48	36	02
Boston	48	42	0	NewOrleans	68	62	20
Buffalo	28	18		North Platte	34	26	0
Cairo	50	38	0	Oklahoma	48	36	[illegible]
Charleston	56	54	0	Omaha		30	0
Chattanooga	62	42	0	Parkersburg	44	30	0
Chicago	34	30	0	Pensacola		64	0
Cincinnati	44	32	0	Phoenix	68	38	0
Corpus Christi		64	.01	Pittsburg	42	26	0
Davenport		30	0	Portland	54	38	22
Denver	34	24	0	Raleigh	54	40	0
Detroit		26	0	St.Louis	52	38	0
Dodge City	36	26	.08	Salt Lake City	40	24	0
Duluth	28	24	.01	San Antonio	64	58	.12
El Paso	66	36	0	San Francisco	62	44	0
Fort Smith	58	42	.62	Sault Ste. Marie	32	12	0
Galveston	60	58	06	Shreveport	68	52	.30
Hatteras	54	48	.01	Springfield, Ill		32	0
Huron	32	14	0	Springfield, Mo	54	38	01
Jacksonville	66	58	04	Swift Current	26	−2	0
Kansas City	46	34		Tampa		64	1.72
Key West		76	0	Vicksburg	68	52	.64
Knoxville	58	38	0	Washington	56	38	0
Little Rock	58	46	.14	Williston	24	−2	0

A typical Weather Bureau daily report card, 4 x 9 in. In addition to the usual weather information, the card also includes statements as to the condition of the main highways in the area covered. Truck owners may obtain this service free upon request side of the city limits should make the most of because the conditions given can be relied upon. For instance, if the highway weather bureau service states that any certain road is impassable due to rain or snow, it would be unwise for the motor truck owner to attempt to run his vehicle through except in cases of the most urgent necessity.

The States in which the service is now given include Pennsylvania, New York, New Jersey, Ohio, Michigan, Wisconsin, Wyoming, North Dakota, Missouri, Arkansas and California in addition to the District of Columbia.

The Methods Pursued

In each State the methods pursued are somewhat different, although in almost every case the work is carried on from one or more of the large centers of population in each particular State. For instance, in Pennsylvania, one project between Pittsburgh and Harrisburg is controlled from Pittsburgh. The Weather Bureau organization receives daily reports from the assistant superintendents of highways along the Lincoln Highway, and bulletins these reports at certain specified points and furnishes cards like those reproduced on the preceding page to newspapers and other interested organizations such as motor truck associations. Warnings of heavy snows in the mountains of Pennsylvania are telegraphed to the State Superintendent of Highways at Harrisburg, where they are given out by that individual for the benefit of traffic over the roads in that portion of the State. From the Philadelphia office of the Weather Bureau cold wave and heavy snow warnings are telephoned to the motor truck and passenger car organizations in the eastern section of Pennsylvania and to fifteen individual overland motor truck companies who have made a request of C. F. Marvin, Chief of the Weather Bureau, for such a service.

In New York a similar telephone service of cold wave, snow or heavy rain warnings on the truck routes between Buffalo and Albany is given to motor truck organizations and other interested truck companies. This service is under the supervision of the Weather Bureau organization in Buffalo, Rochester, Syracuse and Albany.

In New Jersey the work is centralized in Trenton, from where information is furnished to designated officials throughout the State by telephone and telegraph. Maps and bulletins giving road conditions throughout the State and warnings of the approach of cold waves and heavy snows as indicated in the State forecasts are also given.

In Ohio the work is carried on from Columbus, Dayton and Cleveland. Columbus serves central Ohio and the bureau there telephones information of the approach of heavy snow or rainstorms to motor truck organizations requesting the service. A similar work is carried on from Dayton for the southwestern portion of Ohio. In Cleveland reports are received by mail each day from Toledo, Fremont, Norwalk, Elyria, Cleveland, Akron, Ravenna, Youngstown and Lisbon. These reports are re-issued as bulletins for publication in the newspapers and for distribution to motor truck organizations in cities in northern Ohio.

In the State of Michigan the work is carried on from Detroit and Lansing. From Detroit, daily forecasts for western Pennsylvania and notices of cold wave and heavy snow warnings for northern Illinois, Indiana, Michigan, Ohio, Pennsylvania and Maryland are telegraphed to the United States Motor Transport Corps in Detroit as occasion requires and the information furnished to the officer in command of the territory named. The condition of the highways from Detroit to Grand Rapids is given out from the Lansing office, which telephones warnings to motor truck associations and to other individuals on the office's card index system of the approach of heavy rains or snowstorms as indicated in the state forecasts.

Wisconsin Telephones Road Conditions

In Wisconsin the condition of the main motor truck routes are given out by telephone, telegraph and bulletins from the three cities of Milwaukee, Waukesha and Madison for the roads in the vicinity of the respective cities.

Cheyenne is the center of the work in Wyoming. There reports of conditions along the roads are secured by mail and summarized for publication in newspapers and card bulletins.

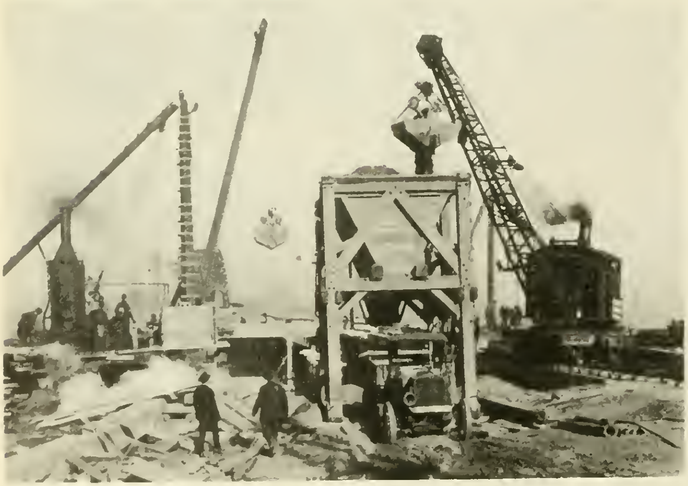
In North Dakota the work is carried on from Bismarck. The state weather forecasts are used to secure information on road conditions, which is telephoned to interested associations and individuals.

A similar service in Missouri is carried on from St. Joseph. Road reports are received from the Department of Agriculture's corn and wheat stations and the information published on the corn and wheat bulletins during the periods that the service is in operation.

Eleven correspondents, mostly connected with passenger car associations, are employed to gather the road information in Arkansas and to send it to Little Rock, where it is disseminated by daily post card bulletins.

In California the work is carried on from San Francisco by the California State Railroad Commission, which has supervision of all the state highways. Snow fall observers in the mountain sections telephone to San Francisco all of the precipitation data available.

From Washington, D. C., snow, ice and rain bulletins are furnished by the Highways Transport Committee to forty-four addresses throughout the central and eastern portion of the United States.



View of the west subway approach to Cleveland's new $5,000,000 bridge. The White truck in the picture is one of thirty-five which hauled dirt from the excavations

Trucks Help to Construct Cleveland Subway

CLEVELAND, Ohio, is to have a new subway system. The completion of a new $5,000,000 high level bridge in the city will offer rapid and direct communication with the downtown business district for the 300,000 or more residents who live on the west side. An important factor in building the subway approaches to this bridge was a fleet of 5-ton White trucks which hauled earth and rock from the excavations to dumping points 1 to 4 miles distant.

Part of the material removed from the tunnel was distributed by the trucks alongside of retaining walls and for supporting the main arches to the bridge.

Other loads hauled by the trucks consisted of concrete mixers, boilers, loading bins, lumber, booms, water pipe, paving blocks, concrete materials, crushed stone, gravel, tools and other essentials.

Ship-by-Truck Movement Invades South to Prove Great Benefits of Highway Transport

Macon, Georgia, Stages Big Demonstration in Which Four Fleets of Trucks Deliver 100 Tons of Goods to Nearby Cities within 50-Mile Radius

Unloading a 650-pound barrel of syrup from the 2-ton Mack at Marshallville, on the run to Montezuma, about 50 miles south of Macon

MACON, GA., April 3—That the manufacturer, merchant and farmer within a radius of 50 miles of Macon can ship his wares with greater disptach and at less cost than by railroad was amply shown by the four great freight trains of motor trucks which delivered close to 100 tons of merchandise out of this city to outlying points, the farthest of which was fifty miles away. Those who took part in the demonstration and probably the vast majority of those who saw the different phases of it could not help but feel that motor trucks are destined to replace the mule team of middle Georgia, for one thing, and overcome the many delays incident to shipping by railroads over short hauls.

Following closely on the heels of the Dixie national power farming demonstration held several weeks ago, the ship-by-truck demonstration to-day marks another epoch in the movement toward educating the Southern merchant and farmer to the motorization of his business. Some 3 weeks ago, for instance, the farmer was shown how he could increase his crop production by the tractor.

To-day he was shown how, with the motor truck, he could readily handle that increase, which the mule team is wholly incapable of coping with. One of the four runs, that to Fort Valley and Montezuma, was right through Georgia's famous peach growing country, where each year the task of moving the great peach crop becomes a serious problem.

The demonstration was not competitive in any sense of the term, nor could it have been with the varying road conditions, loads and sizes of trucks. It was merely put on by the Macon Chamber of Commerce to show not only local merchants, but those of the outlying territory, that it is possible at the present time to profitably ship by truck for distances up to 50 miles and over.

In practically every one of the smaller towns visited by the motor caravans it was a revelation to observe the faces of the merchants who secured their merchandise from Macon in less time than they had ever received it before. Take a case in Marshallville, for instance. There was a small storekeeper who had ordered a barrel of syrup in Macon on Wednesday, the day before the demonstration. Ordinarily this barrel would have been put in the freight house at Macon Wednesday or Thursday and probably would not have reached Marshallville until Friday. By Saturday afternoon the owner would perhaps have had it, 3 days from the time it was ordered, and all this assuming no delays in the railroad yards, etc. Instead, this merchant received his syrup at 2 o'clock Thursday afternoon by the truck. Likewise, the delivery of every piece of merchandise on the trucks to-day meant a saving anywhere of from 1 to perhaps 5 days. Some of the merchants place the latter figure as high as 10 days, for the shipments to Montezuma, 50 miles from Macon.

Résumé of Macon Demonstration

1—One hundred tons of goods moved overland to cities within 50 miles of Macon by four trains of trucks.

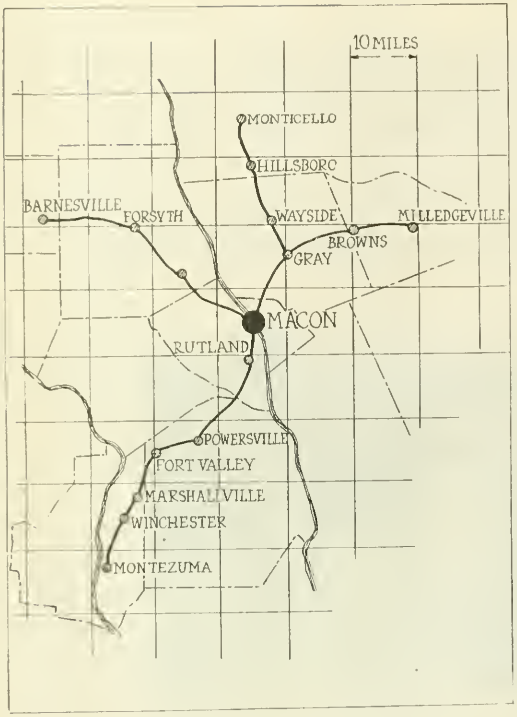
2—Thirty-seven trucks in four trains. Fourteen went to Montezuma: nine to Barnesville; eight to Monticello and six to Milledgeville.

3—Ship - by - Truck Movement proved great possibilities of truck haulage.

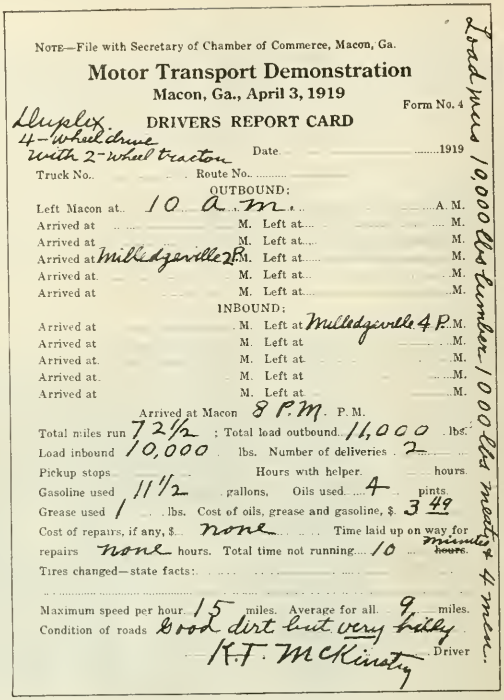
4—System of running trains could have been better. There was no official list of entries and some truck drivers did not have report blanks. There was no official system of checking or of recording fuel consumption.

All Sorts of Loads Carried

Every conceivable article of merchandise was carried to grocer, butcher, druggist and hardware dealer. In fact the cargoes were as varied as the colors and sizes of the trucks themselves. One enterprising Macon music dealer transported a player-piano to Montezuma and



Map showing the route of the four truck trains from Macon. One went to Monticello; one to Milledgeville; one to Barnesville, and one to Montezuma


NOTE—File with Secretary of Chamber of Commerce, Macon, Ga.

Motor Transport Demonstration

Macon, Ga., April 3, 1919

Form No. 4

Duplex 4-wheel drive with 2-wheel tractor **DRIVERS REPORT CARD**

Date 1919

Truck No. Route No. ....

OUTBOUND:

Left Macon at 10 a. m. A. M.

Arrived at M. Left at M.

Arrived at M. Left at M.

Arrived at Milledgeville 2 P. M. Left at M.

Arrived at M. Left at M.

Arrived at M. Left at M.

INBOUND:

Arrived at M. Left at Milledgeville 4 P. M.

Arrived at M. Left at M.

Arrived at M. Left at M.

Arrived at M. Left at M.

Arrived at M. Left at M.

Arrived at Macon 8 P. M. P. M.

Total miles run 72½ ; Total load outbound 11,000 lbs.

Load inbound 10,000 lbs. Number of deliveries 2

Pickup stops Hours with helper hours.

Gasoline used 11½ gallons, Oils used 4 pints.

Grease used 1 lbs. Cost of oils, grease and gasoline, $. 3^{49}

Cost of repairs, if any, $. none Time laid up on way for repairs none hours. Total time not running 10 minutes ~~hours~~.

Tires changed—state facts:

Maximum speed per hour 15 miles. Average for all 9 miles.

Condition of roads Good dirt but very hilly

K. T. McKinstry Driver

Load was 10,000 lbs lumber 1000 lbs meats & 4 men.

One of the driver's report cards, used by each truck in the demonstration. It shows the name of truck, route, time of departure and arrival, load carried, fuel used and other detail information

back, giving demonstrations of a novel apparatus on the truck whereby the piano could be lowered to the ground readily and likewise put back on the truck.

In all of the cities that were visited on the trip, that dealer produced music, which was supplemented several times by negro dancing.

Part of the demonstration was filmed by the Division of Films of the Firestone Tire Co., which concern also had entered in the Montezuma trip one of the two Firestone trucks which made the trip from Akron, Ohio, to Macon fully loaded with tires and will on the return trip carry back a load of Macon-made cotton fabric.

Big Load on F. W. D.

The heaviest load recorded was that of the Duplex Four-Wheel-Drive truck which, with a trailer, carried 10,000 lbs. of lumber, 1000 lbs. of meat and four men to Milledgeville, a distance of about 37 miles. That truck left Macon at 10 a. m. and arrived in Milledgeville at 2 p. m.

There were no mishaps of any kind, although a bridge between Byron and Powersville on the Montezuma run gave way under one of the big trucks when only half of the train had passed over it. This made it necessary for the remainder of the train to go back to Powersville and then to Fort Valley over another route.

The trip to Montezuma was made by fourteen trucks, one of them, however, a Sterling, going only as far as Fort Valley, as it had no freight for the other towns. This train left Macon at 10.05 a. m., reaching Byron at 11.45 and Fort Valley at 1.20 p. m., where the whole procession was halted for dinner, after which the trucks participated in a parade through the town. Montezuma, the destination of the train, was reached at 4.45 p. m. None of the trucks on the trip carried a return load, as the time did not permit.

The ship-by truck insignia as evolved by the Firestone Tire & Rubber Co.

List of Trucks on Run

Besides the White truck, entered by the Firestone Tire Company, on the Montezuma trip, the following trucks made up the train: Mack, 2-ton, entered by the International Mack Co., Plainfield, N. J.; Oldsmobile, ¾-ton, Steve M. Solomon, Macon; Reo, ¾-ton, Reo-Macon Co.; Stewart, ¾-ton, Albert S. Hatcher, Macon; Ford, 1-ton, McCord & Satterfield, Macon; Packard, 2-ton, A. J. Long Cigar & Tobacco Co., Macon; Sterling, 3½-ton, Southern Sterling Co., Atlanta; G. M. C., 1-ton, Southern Oakland Co., Atlanta; Republic, 2-ton, Williams Mfg. Co., Macon; Indiana, 1½-ton, Southern Truck Co., Macon; I. H. C., ¾-ton, Middle Georgia Paige Co., Macon; Stewart, 2-ton, Macon Transfer Co.; Wilson, 1-ton, M. E. Elliott Transfer Co., Macon; Dodge Brothers, Williams-Guttenberger Music Co., Macon.

The Mack truck in the above run was driven to Macon from Knoxville, Tenn., a distance of 350 miles in 2½ days. It was in charge of P. J. Degnon and driven by Robert Maddox of the inspection department of the factory. The Sterling truck reported that for the 58 miles on the round trip to Fort Valley 10½ gal. gasoline were used, ¾ qt. oil and ½ gal. water. The driver of the Mack stated his truck had not been filled with water since leaving Knoxville. All of the trucks performed well on the trip, although two of them got too near the edge of the road and buried themselves partly. They were able, however, to pull out under their own power. The roads on this trip, as well as the other three, were for the most part excellent, consisting of a hard sandy-clay structure. Each of the four trains was in charge of a conductor, T. L. Collings serving in this capacity on the Montezuma run and riding in the Firestone truck, which piloted the motor caravan.

The Barnesville Run

The capacity of the trucks assigned to the Forsythe and Barnesville run totaled 14 tons, but in all 15 tons of freight were carried. Conductor H. C. Roberts of that train turned in the following card: Left Macon at 10.15, stopping at Lorane, Bolingbroke, Smarrs, Forsyth, arriving at Barnesville at 3.40, and returning to Macon at 6.05 p. m. None of the trucks carried back any freight, excepting the Clydesdale, which had on it two buggies consigned to A. S. Hatcher Co., Macon.

Moving pictures were taken at Forsyth and the entire town turned out to greet the big highway freight train. A total of 84 miles was covered on the trip and the only accident consisted of a punctured tire. Except for a 4-mile stretch outside of Smarrs, the roads were in good shape and the trucks fitted with pneumatic tires romped over them as easily as passenger cars. In this connection it might be said that the trucks fitted with solid tires, such as the Mack 2-tonner entered on the Montezuma run, showed up equally well. A representative of The Commercial Vehicle was a passenger on the Mack and it was noted that each time the motor cavalcade pulled up in a town the solid-tired Mack was very little behind the seven pneumatic-shod trucks.

The fleet of trucks that went to Barnesville consisted of a 3½-ton Packard; Reo, ¾-ton; Wilson, 2-ton; I. H. C., 2-ton; Stewart, ¾-ton; Maxwell, 1-ton; Clydesdale, 2-ton; Kelly, 3½-ton, and the other Firestone truck which joined the fleet at Forsyth, having been delayed at Macon for several minutes for a tire-changing demonstration indulged in by members of the Macon Motor Corps of the Red Cross. The 3½-ton Packard on the trip was one of the two transcontinental Goodyear trucks driven to Macon from Akron, Ohio, for the demonstration.

At the top is shown a delivery made along the way on the run to Montezuma. The merchant was astonished that he got his order in less than a day, when under ordinary conditions by rail shipment it would have taken 3 or 4 days. At the bottom is shown the 2-ton Mack with a typical decoration

The Monticello Run

Each town along the route to Monticello had large delegations of citizens out to welcome the trucks carrying freight to Wayside, Hillsboro and Monticello. Although it was said that this was a busy time for the farmers, and that most of them were unable to leave their fields, they, nevertheless, were plentiful among the spectators. In practically all of the towns touched by the whole fleet of trucks sent from Macon, the mayors and other city officials took active part in welcoming the trucks and rendered assistance in handling the freight packages. The actual handling of the various shipments, looking after shipping bills, etc., was in charge of students of Mercer College. These students are members of the commerce class and will use their notes gathered on the trip as a basis for working out costs and other items incident to shipping by truck in this vicinity.

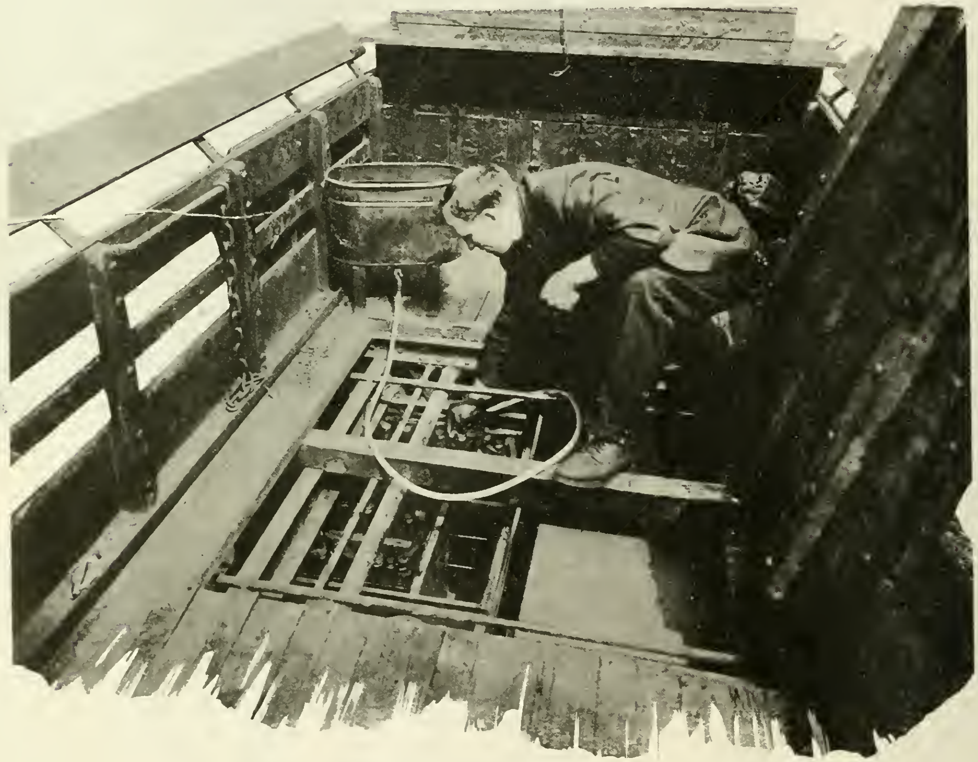
Conductor Milo Medlock of the Monti-

(*Continued on page 29*)

The new Firestone pneumatic truck tire and the new metal wheel which is provided with a slot so that the tire can be slid on the wheel rim without difficulty

The two trucks entered by the Firestone Tire Co. Part of the demonstration was filmed by the Division of Films of this company. One of these trucks was entered in the Montezuma trip. Both trucks made the trip from Akron, Ohio, to Macon fully loaded with tires. They will carry back a load of Macon-made cotton fabric on the return trip to Akron

Saving Money Maintaining Electrics



It Takes Only 5 Minutes to Flush a Battery in This Way

An ordinary copper washboiler of 5-gal. capacity, a 6-ft. rubber hose, and a trap-door arrangement in the floor of the truck are all that are needed in this time-saving method of flushing batteries. No pulling out of batteries is necessary each time distilled water is to be injected into the cells, nor is it necessary to move the batteries for minor repairs

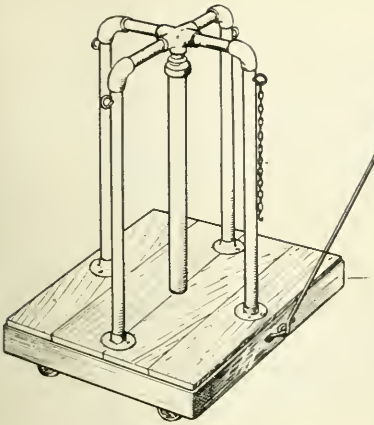
IN the maintenance of fleets of electric trucks, there are many methods and devices which will save the fleet owner both time and money. A number of them as devised and worked out by C. M. Geiger, superintendent of the motor truck fleet owned by the Peter Doelger Brewing Co., are fully described and illustrated on this and three succeeding pages. These include methods for flushing batteries without spilling any of the acid and without removing the batteries from their cradles; of removing the battery boxes quickly and with the minimum of labor; of conveying with ease the heavy driving chains back and forth to the cleaning tank, which is also designed to save kerosene; of removing the plates from the battery cells with a minimum of effort; and of a device for moving the heavy oxygen tanks without the need of laboriously rolling them around to each working place.

This is the second part of a series of articles regarding the maintenance of the Peter Doelger Brewing Co.'s fleet which is made up of both electric and gasoline trucks. The first article, outlining some of the most important of the methods and devices employed in the maintenance of the company's fleet of gasoline trucks, was given in full in the April 1 issue of THE COMMERCIAL VEHICLE.

Gasoline Trucks Garaged Separately

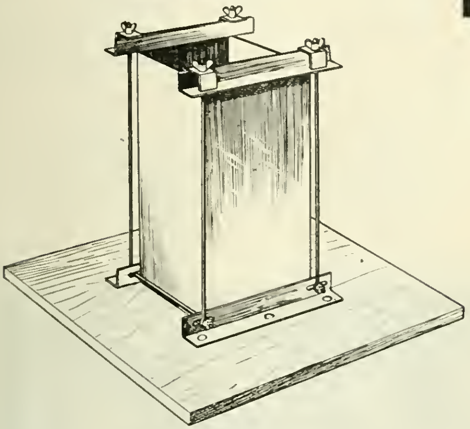
As told in that issue, the Doelger company found it wise to segregate the garaging and upkeep of the two classes of vehicles, maintaining the gasoline trucks on certain floors and employing a separate group of well-trained men for the gasoline vehicles and another group for the electric trucks.

There are, however, some methods which apply equally well to either the gasoline or electric trucks. One of these methods is the manner in which the trucks are inspected and reports made out on the work to be done. Each driver is given a card each day which lists all possible troubles that might occur to the engine or parts of his truck.



These Oxygen Tanks Are Always Ready for Work at Any Time or Place

No rolling by hand is needed by this method of carrying the oxygen tanks from one piece of work to another. The tanks are mounted on a four-wheeled swivel-castor truck, large enough to hold four tanks. The tanks are held in place by an arrangement of 2-in. piping from the floor of the truck up to within half the height of the tanks. Each pipe or post is equipped with a hook and a chain which encircles each tank



No Fussing Over Stuck Battery Plates by This Method of Cell Bracing

All you have to do is to stand on the wood base and pull up. The cell is firmly locked to the base by a device made up of four pieces of angle iron, six rods, four wing nuts and four small additional pieces of angle iron. It is adjustable for various sizes

Each night the cards are collected by the foremen of the gasoline or electric truck departments. By this method the repairman is helped in his work each night by knowing before his inspection of the trucks of any troubles that need his attention. After the repairs are made the cards are hung up on the side wall and so arranged that each truck's performance can be readily ascertained. For instance, if it is noticed that a certain truck has repeatedly been troubled by overheating, the suggestion of worn bearings or some other defect in the water circulating pump may be brought to the attention of the foreman. By this system of inspection and repairs the company can estimate on its purchases of parts and also on any needed changes in design.

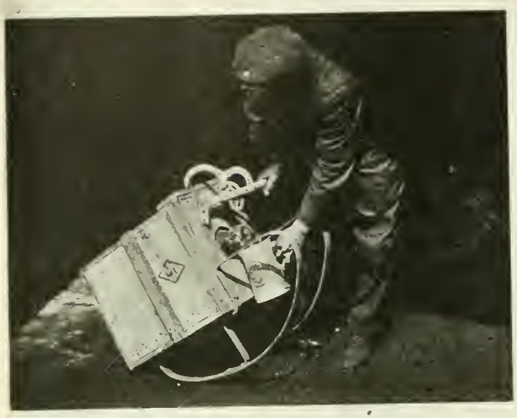
The trucks are garaged in a five-story building, located in back of the company's offices but on the brewery premises. The storage and maintenance of each class of truck are separate and distinct. The first floor is used entirely for the maintenance of the electric trucks. Complete charging facilities form part of the equipment on that floor. The second floor is used for the maintenance of electrics and gasoline trucks; the third floor for the storage of gasoline trucks only; the fourth floor for outside rental; and the fifth floor, on account of its excellent lighting facilities, for the machine shop for heavy repair and overhauling work On that floor, sections are established for a blacksmith shop, working benches, leather repairing department, and general overhauling of both electric and gasoline trucks. All lathe work is done in the machine shop in the brewery building, where machinery had been installed for brewery repair work before the purchase of trucks.

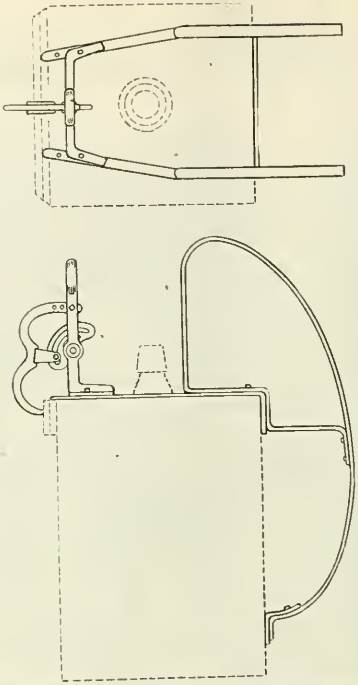
In describing the various methods used in the maintenance of the electric trucks, it is well to state beforehand that the Doelger company has been using these vehicles continuously since 1911, and under the leadership of Mr. Geiger the special maintenance means employed have been invaluable as time and labor savers.

Novel Trap Door in Body

The use of an ordinray 5-gal. copper wash tank, equipped with a spigot and a 6-ft. hose, has been a time and labor saver in the flushing of the batteries. Used in conjunction with a trap door in the body of the truck, large enough to expose all of the batteries, only 5 minutes time is needed to fill each of the cells in the batteries. This trap door obviates the need of pulling the batteries from out of their cradles every time they are to be flushed or minor repairs to be made. The copper tank is large enough to take care of all the flushing work and is easily conveyed from one truck to another.

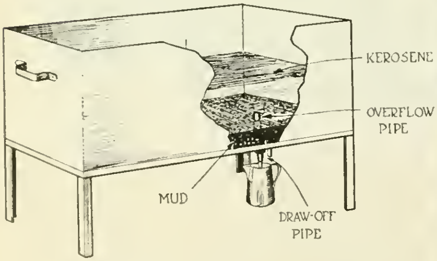
Should there be need of taking the batteries out of their cradles, a handy four-wheeled swivel-castor truck is used.





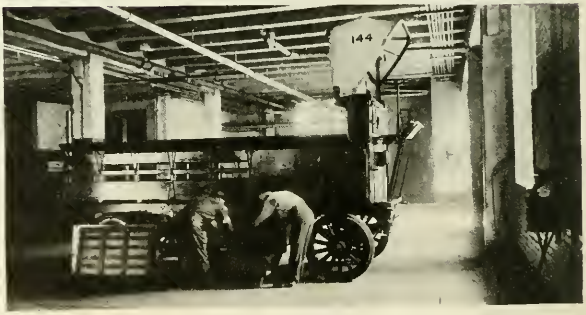
Acid Spilling Is Obviated by This Method of Tilting the Carboy

Fashioned after the old rocking chair design, this device enables tilting at any angle without danger of mishap or waste of the acid. The carboy fits snugly in the cradle and is held fast by means of a hook. The device is adjustable to various sizes.



No Kerosene Waste in Washing Chains

This 10-gal. tank is equipped with a spigot which allows the kerosene to run off after the oil and mud have settled to the bottom. Five sets of chains are washed at one time

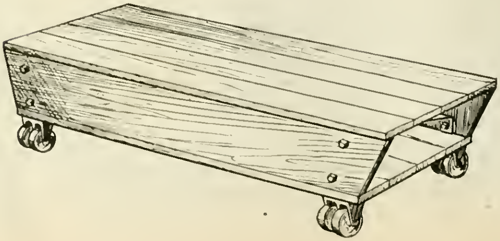


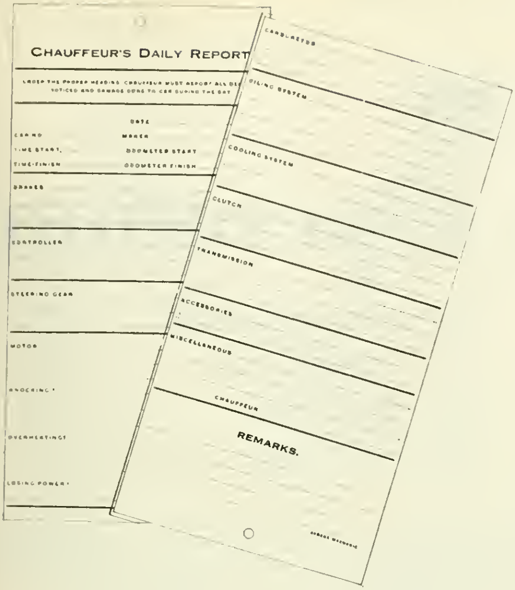
Little Effort Needed in Battery Removal

The batteries are slid onto the truck, not lifted. The truck is of the same height as that of the battery cradle floor from which the batteries are slid. It is wide enough to carry the full battery equipment, thus avoiding any lost motion

Batteries Are Slid Onto This Truck

Of the four-wheeled swivel-castor type, this truck is easily pushed around to the various electric trucks for the collection of batteries. Minor repairs on the batteries can be made without lifting the batteries off the truck





CHAUFFEUR'S DAILY REPORT

UNDER THE PROPER HEADING CHAUFFEUR MUST REPORT ALL DE
NOTICED AND DAMAGE DONE TO CAR DURING THE DAY

DATE
CAR NO. MAKER
TIME START. ODOMETER START
TIME-FINISH ODOMETER FINISH
BRAKES
CONTROLLER
STEERING GEAR
MOTOR
KNOCKING?
OVERHEATING?
LOSING POWER?
CARBURETOR
OILING SYSTEM
COOLING SYSTEM
CLUTCH
TRANSMISSION
ACCESSORIES
MISCELLANEOUS
CHAUFFEUR
REMARKS.

Drivers' Daily Reports Show Defects

A perpetual repair system like this enables the fleet owner to keep a good account of the running condition of his vehicles and enlightens him as to the proper method of handling the spare parts problem

This is rolled up to the cradle and is just high enough for the batteries to be slid onto, thus obviating any needless lifting or carrying. The truck is 5 by 3 ft. in size and large enough to carry three of the batteries at a time.

In order to protect the employes from accident, as well as to save time and labor when pouring sulphuric acid from the carboys, the company has installed a unique device which enables the carboy to be tilted at any angle without the chance of any spilling occurring. This device is shown in an accompanying illustration and is adjustable to most any size of carboy. It locks itself onto the carboy by means of a hook. The carboy fits snugly in a cradle and is tilted by means of a strap-iron rocker, fashioned after the old rocking chair design.

Hand Trucks for Oxygen Tanks

Instead of rolling the oxygen tanks around the floor to each particular piece of battery work, they are mounted on a four-wheeled swivel-castor truck. As there is much work done with these tanks, this truck has been designed to hold as many as four. These are held in place on the truck by means of an arrangement of 2-in. piping from the floor of the truck up to within half the height of the tanks. Each pipe, or post, is equipped with a hook and a chain which encircles each tank and prevents it from falling off the truck. A handle for pulling the truck is also part of the equipment.

A device to help in the pulling out of stuck or swollen battery plates has been designed by the company. Prior to its use, much time and labor were wasted in trying to get a purchase on the cells during the process of pulling out the plates. As a result, the battery is now firmly locked to a square board which is large enough for a person to stand on to hold the battery down while the pulling-up effort is being applied to the particular plate.

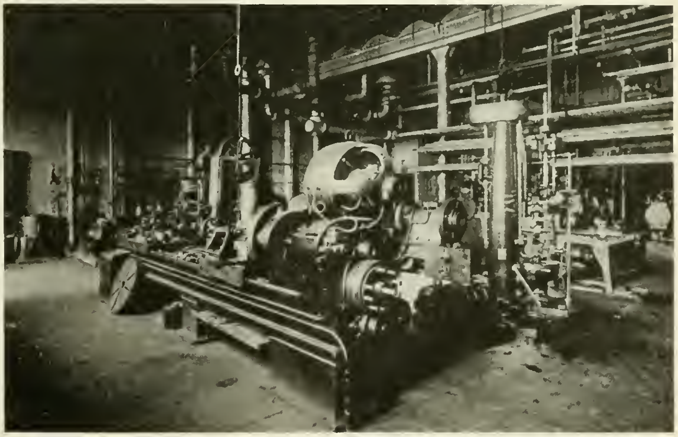
Plate Removal Device

This locking device is made up of four pieces of angle iron, six rods, four wing nuts, and four small additional pieces of angle iron. In operation, the battery is set directly on the wood base or platform and between two pieces of angle iron which are screwed into the base with the bosom of the angles outward and at a distance apart slightly larger than the length of a standard battery cell. Each of the angles screwed to the base is provided with two slots in the vertical arm near each end. These slots serve to admit two horizontal cross-wise rods which extend alongside of the battery cell. The slots permit the two rods to be moved inwardly or outwardly according to the width of the cell.

The vertical rods are prevented from slipping off the horizontal rods by means of nuts placed on the latter outside of the eyes. The upper ends of the four vertical rods pass through the horizontal arms of two other lengths of angle irons which are placed across the top of the cell at the edges where they do not hinder the extraction of the cell plates from the top. Because of the narrowness of the top angle irons, there is not sufficient space to turn down the wing nuts provided at the tops of each vertical rod, so that four small pieces of angle iron are provided and placed in an inverted position on the edges of the cross-wise angle irons to form a hollow square, the upper surface of which is used as a bearing surface for turning down the wing nuts to hold the cell rigidly in place.

Simple Chain-Washing Tank

The chains are carried to a 10-gal. tin washing tank, large enough to hold five sets of chains. After the chains are thoroughly cleaned in the kerosene, they are taken out and the oil and dirt are allowed to settle at the bottom of the tank. The tank is equipped with a spigot at the bottom and a pipe which runs from it through the bottom of the tank. This pipe extends about 2 in. from the bottom and is used for running off the kerosene after the oil and mud have settled to the bottom and accumulated to the height of the pipe.



Brewery Machine Shop Used for Truck Repairs

Though the garage has this equipment at its disposal, quicker deliveries may be had from the outside, because of the almost continuous need for these facilities by the brewery department

The Big 8 in Truck Operation

1—Driver
2—Tires
3—Gasoline
4—Overhauling
5—Depreciation
6—Insurance
7—Interest
8—Garage

IT is of the utmost importance to the motor truck fleet owner to keep in mind the relative amounts of the sums spent yearly in the upkeep of his vehicles. In the first place, it is too often overlooked that the yearly cost of maintenance and operation is nearly equal to or greater than the first cost of the truck with its body-dumping device and other accessories. In other words, the first cost of a motor truck, be it high or low, is by no means the criterion determining the purchase of one or another make of truck.

Buy Transportation, Not Trucks

To-day truck owners are buying transportation, not motor trucks, the latter being merely the means to the end and not the end itself. The owner wants a vehicle which will deliver the goods to be moved at the lowest cost per mile, per ton or per commercial ton-mile. In the determination of these costs, the first cost of the vehicle bears a very slight influence since from four to five times the amount of the initial cost of the truck will be spent during its life for its maintenance and operation. It is rather the operating than maintenance costs which determine whether the truck will show a low or a high cost per commercial ton-mile.

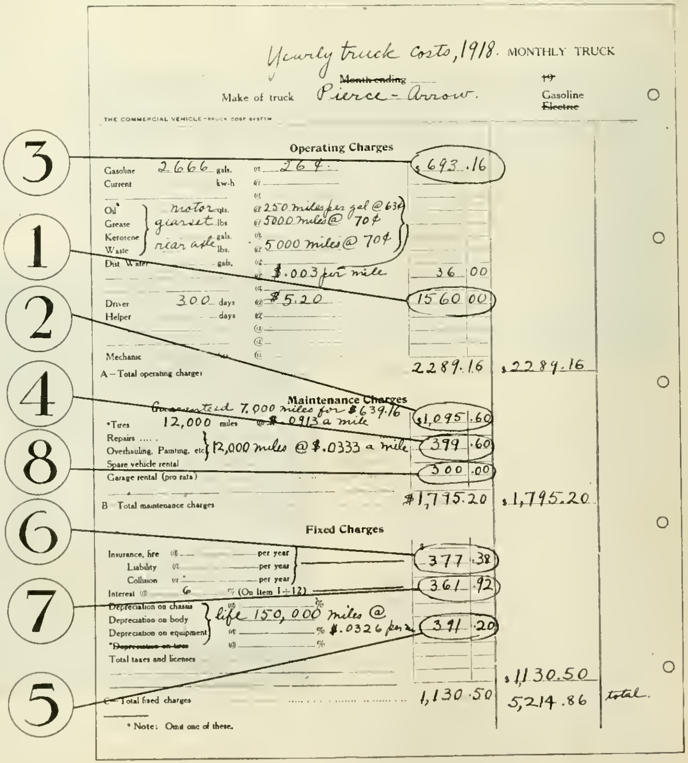
But how many fleet owners can tell you offhand the relative importance of the various items of truck maintenance and operation? How many can tell you what are the big 8 in truck operation?

To answer these very important questions THE COMMERCIAL VEHICLE reproduces herewith two motor truck cost forms originally published in its issue of April 1, 1919. The forms are the standard design which form a part of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. The forms given herewith show the yearly operating costs of a 5-ton Pierce-Arrow truck owned by Charles D. Heavey and operated in the contracting business in Philadelphia.

In the particular cost forms reproduced and which may be taken as fairly indicative of average conditions, the most important fact is the proof that the yearly operating and maintenance costs are almost equal to the original cost of the truck and its body. The actual figures in the case cited show a yearly operating cost of $5,215 as against an initial cost of $6,032, including a $400 body and a war tax of $132.

The Big 8

Then a further study of the form published on page 26 and which includes the



Yearly truck costs, 1918. MONTHLY TRUCK
~~Month ending~~ ~~19~~
Make of truck Pierce-Arrow. Gasoline ~~Electric~~
THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline 2666 gals. @ 26¢. $693.16
Current kw-h @
Oil* motor qts. @ 250 miles per gal @ 63¢
Grease giarset lbs. @ 5000 miles @ 70¢
Kerosene gals. @
Waste rear axle lbs. @ 5000 miles @ 70¢
Dist Water gals. @
@ $.003 per mile 36 00
Driver 300 days @ $5.20 1560 00
Helper days @
Mechanic @
A—Total operating charges 2289.16 $2289.16

Maintenance Charges

~~Guaranteed~~ 7,000 miles for $639.16
*Tires 12,000 miles @ $.0913 a mile $1,095.60
Repairs ….. / Overhauling, Painting, etc. 12,000 miles @ $.0333 a mile 399.60
Spare vehicle rental
Garage rental (pro rata) 300.00
B—Total maintenance charges $1,795.20 $1,795.20

Fixed Charges

Insurance, fire @ per year / Liability @ per year / Collision @ per year 377.38
Interest @ 6 % (On Item 1÷12) 361.92
Depreciation on chassis / Depreciation on body / Depreciation on equipment @ % life 150,000 miles @ $.0326 per m. 391.20
~~*Depreciation on tires~~ @ %
Total taxes and licenses
C—Total fixed charges 1,130.50 $1,130.50
5,214.86 total.

* Note: Omit one of these.

The big 8 in truck operation and maintenance as shown by a concrete case of a 5-ton Pierce-Arrow truck used in the contracting business in Philadelphia yearly operating, maintenance and fixed charges, shows that the big 8 of the motor truck cost of operation are as follows in the order named:

1—The driver.
2—Tires.
3—Gasoline.
4—Overhauling and repairs.
5—Depreciation.
6—Insurance.
7—Interest on investment.
8—Garage.

These items are the big 8 in the cost of motor truck operation and have a direct lesson for the fleet owner.

Taking up each of the items in the order given, it is seen that the driver of the truck is the most expensive single charge. This is true in two respects. First, in regard to the amount of money paid to the driver, which at $5.20 for a 300-day year amounts to $1,560 out of a total operating and maintenance cost of $5,215. Second, because the final cost per commercial ton-mile is influenced to a very large extent by the manner in which the driver operates his truck. If he is careless and indifferent, the resultant cost per ton-mile over any given period may be excessively high, notwithstanding that the truck is one of the best on the market and operated under the best possible conditions of loading and unloading. The problem of the driver, therefore, is one which the fleet owner must study in all of its aspects before he can expect to solve it in a satisfactory manner.

It is evident that with the upward trend in the price of labor in practically all industries the fleet owner cannot expect to affect any economy by a reduction in the daily wage paid the driver. Instead of the driver's salary decreasing, it is more likely to increase, so that some other means must be devised to secure more efficient work from the driver if the cost of the driver per unit of work done is not to be increased very perceptibly.

Bonus Systems

This brings up the question of bonus systems for the drivers for efficient work done and closed cabs with or without heaters as a means of securing a greater work output from the driver by keeping him comfortably warm even in the coldest winter weather.

The next item of the big 8 is the cost of tires, which at 9 cents a mile for a 5-ton truck cost $1,095 for 12,000 miles covered, with a tire guarantee of 7000 miles. The tires for the front and rear wheels of the truck initially cost $639.16. This item of tires is almost as large as that for the driver, and indicates that the fleet owner should exercise greater care in the selection and method of keeping his tires in repair so that the unit cost of 9 cents per mile may be reduced.

Tire costs and the loss of time during tire changes if they have to be made during the working day are important items, and ones which the fleet owner should never overlook. The long life of truck tires depends on a great many items. Aside from the condition of the roads traversed, which will affect the life of any tire, the more important considerations include the speed at which the vehicle is run and the care or carelessness exhibited by the driver in its operation. Overspeeding and overloading are two of the greatest of the truck evils and two which show their influence directly in the tire cost. Tires on trucks which are continually overspeeded and overloaded soon begin to show the effects of the abuse and disintegrate long before the mileage which should be secured has been reached.

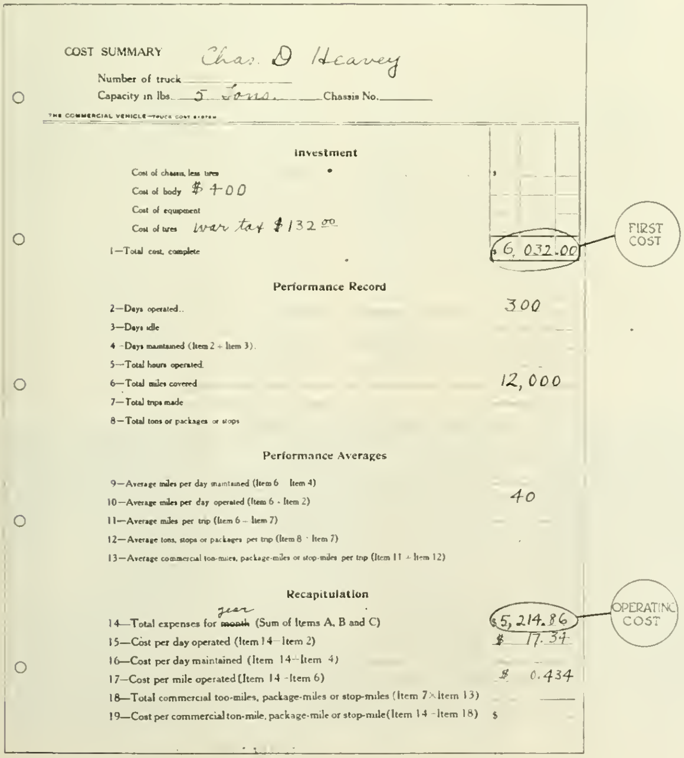
The manner of operating the truck and bringing it to a stop and starting it from a stop also have some influence on the wear of tires. For instance, if the driver drops in his clutch suddenly in starting the vehicle it sets up a sudden strain throughout the entire power transmission and eventually the tires. Similarly, if he brings his vehicle to a sudden stop by applying the brakes too quickly, the tires receive the full effect of the grinding or sliding action which tends to make them disintegrate.

Running in Car Tracks

Running in car tracks is also a tire evil in some cases. Where roads are fairly good and free from holes, drivers should not operate their trucks with the tires in the car tracks, since this action tends to wear off the edges of the tires, due to the cutting effects of the sharp edges of the track rails. In cases where the roads are full of ruts and holes or heaved portions of pavements, greater tire life may sometimes be secured by operating the trucks on the tracks, provided the latter are of the flat two-part type with the groove for the wheel flange in the center.

The third item in the big 8 is the cost of gasoline. The relative position of this item, as the third in the list, indicates its importance and the need for saving gasoline in any way possible. It is a pure waste to use gasoline at 26 cents a gallon for cleaning, when kerosene at about half the cost will serve the same purpose almost equally as well. Of course the proper adjustment of the carbureter and the manipulation of the spark and throttle controls have a large influence on the number of miles per gallon of gasoline secured. In most cases it is not good policy to allow the driver to attempt to adjust the carbureter, but to leave this work to the head mechanic in the garage, for the reason that drivers usually make the carbureter adjustments worse instead of better.

Another factor which sometimes increases the gasoline consumption very materially is the practice of allowing the truck engine to run while the truck it-



COST SUMMARY Chas. D Heavey
Number of truck ______
Capacity in lbs. 5 Tons. Chassis No. ______
THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires
Cost of body $400
Cost of equipment
Cost of tires war tax $132.00
1—Total cost, complete $6,032.00

FIRST COST

Performance Record

2—Days operated 300
3—Days idle
4—Days maintained (Item 2 + Item 3)
5—Total hours operated
6—Total miles covered 12,000
7—Total trips made
8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)
10—Average miles per day operated (Item 6 ÷ Item 2) 40
11—Average miles per trip (Item 6 ÷ Item 7)
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 × Item 12)

Recapitulation

14—Total expenses for ~~month~~ year (Sum of Items A, B and C) $5,214.86
15—Cost per day operated (Item 14 ÷ Item 2) $17.34
16—Cost per day maintained (Item 14 ÷ Item 4)
17—Cost per mile operated (Item 14 ÷ Item 6) $0.434
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18) $

OPERATING COST

The above cost form and that on the opposite page are two of the forms which comprise The Commercial Vehicle Standard Cost Keeping System for Motor Trucks.

self is standing idle during the loading or unloading operation, or while waiting in line to move up to the loading or unloading platform. Provided the number of such operations per day is not so large as to make the cranking of the engine too great a strain upon the driver's strength, the engine should be shut off while the truck is being loaded or unloaded. This aspect of gasoline saving will be assisted by the future development of engine starters, and particularly those for solid-tired trucks of from 3 to 5 or more tons capacity. On pneumatic-tired vehicles, where many stops have to be made in a day, the engine starter has already proven itself a greater gasoline economizer.

Going down the list of the big 8 to the fourth item, we find that repairs and overhauling form an important item in the cost of truck maintenance and upkeep. In the case of the 5-ton Pierce-Arrow cited, Mr. Heavey charged off overhauling, repairs and painting at the rate of a trifle over 3 cents a mile. For a yearly mileage of 12,000 this amounted to close to $400.

There are many ways to cut the cost of repairs, but the most important of these is to discover the repairs while they are still small ones and thus prevent them from becoming big ones. This may be done must economically by a brief but thorough daily inspection of the trucks. If this is done systematically and intelligently, it will result in lower repair costs. Thus a loose bolt or connection may be discovered before it drops out or becomes so loose as to improperly support the member affected and result in its breakage.

Overspeeding Is Costly

Excessive repair costs are generally due to overspeeding or overloading or to a general carelessness on the part of the driver. The matter of lubrication is also an important factor in low truck repair costs. The accessible location of grease or oil cups to make it easy for the driver to fill them without any great amount of trouble is one of the surest methods of proper chassis lubrication. A good driver should know every part of the chassis to be lubricated and how often each of the grease or oil cups serving to lubricate that part should be filled. The lubrication chart or diagram usually furnished by the truck maker gives this necessary information. If such a chart can be kept always before the driver's eyes by tacking it up on the wall in the garage or inside of the driver's cab, it will serve as a constant reminder to the driver that his truck is like any other piece of mechanism and requires constant lubrication.

Much money can be saved in truck repairs by efficient garage methods designed to save the time of the mechanic. If a device can be worked out which will enable the mechanic to do a job which previously took 40 minutes in one-half the time, the cost of that repair can be cut in half. This is a most important factor which the superintendent of the truck fleet should be continually studying. There is perhaps no truck garage in the country which is perfect, so that there is always work for the man in charge of the trucks to do.

Saving the Mechanic's Time

In the average motor truck garage it is perhaps safe to say that from one-half to three-quarters of the mechanic's time is spent in getting ready to do a job and the other one-half to one-quarter of his time in actually performing the work. This should suggest to the truck superintendent the evolution of devices and methods which will cut down the time required to get ready for a job. In this work most of the time is generally consumed in moving the tools required for the job to the part to be repaired or taking the part to the tools required in the work. Many of the devices which can save money in this respect have been described in past issues of THE COMMERCIAL VEHICLE.

MORE ABOUT THE BIG 8

The items of the Big 8 in truck operation and maintenance discussed on this and the two preceding pages are so important to the fleet owner that a series of articles on the particular items taken individually will appear in the next and succeeding issues of this magazine.

Perhaps the most recent of these are some of the devices employed by C. M. Geiger in the maintenance of the gasoline and electric trucks of the Peter Doelger Brewing Co., New York City. He makes use of some sort of wheeled hand-truck for the movement of tools or devices from one part of the garage to another. These small hand-trucks are inexpensive and yet do save considerable of the mechanic's time and make it unnecessary for him to be continually lifting. This elimination of lifting of course serves to husband the mechanic's strength and permit him to do better and quicker work once the job in hand is started.

Some of the wheeled trucks employed include a circular swivel-castor truck for moving the soapy water barrel required in washing the truck's body and chassis parts; a somewhat similar hand-truck for moving the tanks of oxygen required in welding work and for replacing storage battery straps; other plain platform trucks for moving heavy tools or truck parts and a similar pan-like hand-truck for carrying the vehicle driving chains from the trucks to the tank, where they are cleaned and greased, and back again to the trucks.

Other garage methods which save money include the reclamation of dirty waste and oil and devices for emptying oil barrels and of filling the truck oil reservoirs or cups without spilling any of the lubricant. Devices for reclaiming waste and the oil contained in that waste and of filling tanks without spilling were described and illustrated on pages 25 and 26 of THE COMMERCIAL VEHICLE for April 1, 1919.

The fifth item of the big 8 in proportion to the amount expended is the depreciation of the chassis, its body and equipment. This charge, of course, is affected to a large extent by the initial cost of the truck and what is fitted to it to enable it to accomplish its work.

Charging Depreciation

The manner of charging off depreciation by the estimated life of the truck in years but without regard to the estimated number of miles run per year has grown up because of the fact that the books of the truck owner are usually closed yearly and some certain sum has to be set aside at that time in order to provide a fund to purchase a new truck when the one at present in use is worn out. A more recent and more scientific method of determining upon depreciation is to assume a life of the truck of so many thousand miles and to apportion this over the estimated life of the truck considering the class of work being done. In the case of the Pierce-Arrow truck cited herewith, its life was assumed at 150,000 miles, which, however, seems high in the contracting field because at an average yearly mileage of 12,000 miles it would give the truck a life of over 12 years. While it is of course possible that this life may be secured, it seems high for the average case unless the truck receives the best care in both operation and maintenance.

The sixth item is that of insurance, which is almost equal to the item of depreciation and that of overhauling and repairing. The question of insurance is a most important one and should never be neglected because of its relatively high cost on account of the fact that without insurance one bad accident may wipe out the truck owner's profits for 2 or 3 years. The question of insurance is of particular importance when the truck is engaged in hauling other people's goods. When this is the case, insurance should be carried on the merchandise moved to protect the company against loss by accident or fire. Insurance of this nature is a business getter for the truck owner since it reassures the shipper against any possible loss, provided the insurance is taken out in a reliable company.

The seventh item of the big 8 is the interest on the truck investment, and which in the case cited amounts to $361.92 at the legal rate of 6 per cent on the total cost of the truck, its body and other accessories.

The eighth and last item is the charge for garaging. In this respect the owner must decide for himself whether it is more economical to maintain his trucks in a public garage or in one of his own. The solution of this problem depends upon the particular conditions existing in each case, although as a general rule an owner with five or more trucks can generally maintain such a number of vehicles more cheaply in his own garage than he can in a public one.

Ship-by-Truck Movement Invades the South

(*Continued from page 21*)

cello train turned in the following card: Left Macon at 10.10 a. m., arriving at Gray at 11.02, Wayside 12.27, Hillsboro, 1.19 p. m., and Monticello at 2.04 p. m. Eight trucks went to Monticello, consisting of a Stewart, ¾-ton; Reo, ¾-ton; White, ¾-ton; Chevrolet, ¾-ton; I. H. C., 1½-ton; Stewart, 2-ton; Indiana, 2-ton, and Republic, 1-ton.

Six trucks went to Milledgeville, loaded with produce and merchandise for the merchants of that city. The card turned in by Conductor E. W. Burke showed that the trucks left Macon at 10.05 a. m., arriving at Gray at 11.45 and Milledgeville at 1.07 p. m. The entire fleet on this trip was back in Macon at 5.45 p. m. The trucks on the run consisted of the Duplex 3-ton truck fitted with a two-wheeled trailer; G. M. C., 3-ton; Diamond-T, 2-ton; Stewart, 2-ton; Ford, 1-ton, and Reo, ¾-ton. Benjamin Gilham, traffic manager of the Macon Chamber of Commerce, was one of the passengers on this trip, while F. Rodger Miller, secretary of the association, went with the fleet to Montezuma.

It happened that S. T. Brown, a former resident of Monticello, had recently moved to Macon. His furniture was still in Monticello awaiting shipment. All of his household goods were loaded on the several trucks that went to Monticello and brought to the door of his residence in Macon free of charge.

D. F. White, district sales manager for the Firestone Tire company at Atlanta, the company that was first to enter the demonstration, said after the demonstration:

"This has been a great day for the ship-by-truck movement. It has been a great day for Macon. We brought our trucks here to help along the great movement toward educating the Southern merchant to see the value of this mode of transportation. After darkness developed and the business men sat down to rest, I venture to say they began to think of the possibilities of railroad strikes and then of the ship-by-truck movement. They will look into it and eventually buy a truck."

Another prominent person here for the demonstration was Wylie West, branch manager of the Firestone company at Atlanta, who just recently was instrumental in forming a line there and of organizing another ship-by-truck association.

As a prelude to the great demonstration of to-day, one-hundred and twenty three trucks, most of them loaded, paraded the streets of Macon on Wednesday afternoon. In all there were eighteen different makes of trucks represented. Leading the procession was the Lanier High School band, preceded by a platoon of police and six companies of cadets. After this came the official car carrying members of the Chamber of Commerce and city officials. First in the line of trucks were the two dust-stained Firestone trucks followed by the Goodyear trucks. Then came a long rumbling line of commercial vehicles, some brand new and gaily decorated with signs and flags, others, those of merchants here which have seen many hundreds of miles of use in and about the city.

All Conveniences in Touring Body on Truck Chassis

MANAGER HARRY J. DE BEAR of the New York City branch of the Maxwell Motor Sales Corp. has discovered a new ideal way of spending a vacation without the usual worry of railroad connections and the customary inconvenience of having to rely upon the various summer hotels for necessary accommodations.

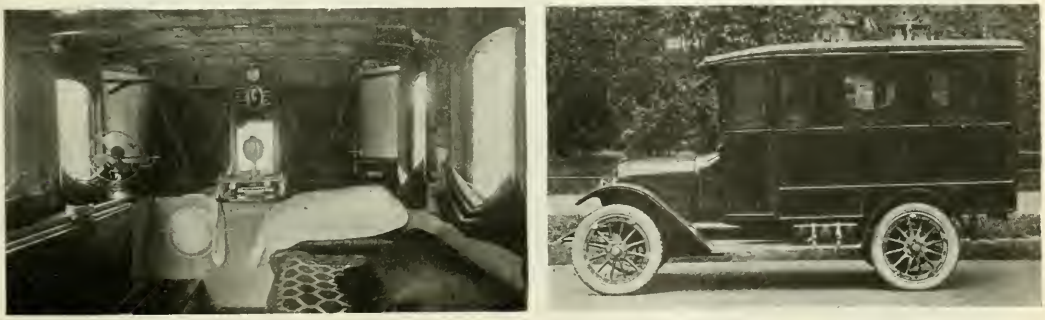
This is in the form of a specially constructed Maxwell truck body designed by Harry P. Radcliffe, a real estate man of Houston, Texas, and which he has been using, accompanied by his wife, for touring the United States.

The interior equipment contains the following: An electric fan, three electric lights operated by a switch, two water tanks with a capacity of 4½ gallons each, three mirrors along the side walls and one in front to show the roadway behind, ten windows covered on the outside with copper screens and within by silk curtains, a patented two-burner alcohol blast stove for cooking purposes, writing table and stationery, a rack filled with periodicals, a revolving chair for the person seated to the right of the driver, rubber matting on the floor, upholstery in Spanish leather, two large lined drawers to carry lettuce, tomatoes, celery and season's fresh vegetables, also meat, eggs, butter, etc.

There is storage space for considerable canned goods and provisions to last on a tour of many weeks' duration. There is also plenty of room for the couple to carry several complete changes of clothing and a surplus supply of alcohol for the stove and gasoline for fuel.

The car completely stocked with provisions weighs approximately 3060 pounds, and rides with very little vibration.

A well-devised locking arrangement makes it possible for the owner to leave the car on the beach or roadway without fear of anyone entering it. Two of Mr. Radcliffe's special features are a dust deflector adjusted behind the car and a curtain arrangement used in conjunction with the windshield so that the draft can be directed to any part of the interior of the car.



Interior and exterior views of the touring body mounted on a 1-ton Maxwell truck chassis. All the conveniences of a summer hotel are provided, with none of the disadvantages of having to worry about railroad connections and late trains

Motor Trucks Enable New England Drayage Co. to Triple in 3 Years the Tonnage Handled

Movement of 12 Million Pounds of Wool in Year Is Big Achievement

AFTER 25 years in business, Youlden, Smith & Hopkins, Boston, Mass., and one of the largest haulage concerns in that city, has tripled in 3 years the daily tonnage moved, by the use of a fleet of fifteen motor trucks. After the concern had been in business in Boston proper for 25 years, it delivered on an average of approximately 500 tons of local freight, a work which required the use of 150 horses. Three years ago the company began to substitute motor trucks and trailers for the horses so that it could increase its business by handling more tonnage and by covering a larger territory.

To-day the concern operates a fleet of fifteen 5-ton trucks and three 5-ton trailers. That equipment was purchased to handle the work of thirty horses, but has not only done that amount of work, but has enabled the company to accept haulage work not only in Boston, but between Boston and cities within the 30-mile radius. As a result, the company now handles a daily average tonnage of approximately 1500 tons of freight during the busy seasons of the year.

Trucks Increased Business

The additional work thus secured could not have been obtained had it not been for the use of motor equipment in place of the horses. Because of the great ground-covering ability of the motor truck, the company's work is not now confined to the city of Boston, but extends through outlying cities within a 30-mile radius to the northwest and south.

In that area there are many cities which are beehives of industrial manufacturing. In the immediate vicinity of Boston on the north are Somerville, Chelsea, Everett, Malden, Melrose, Saugus, and Lynn on one route, and Medford, Winchester, Wakefield, Lowell, Lawrence, and Haverhill on another route. From Lowell trips are also made across the New Hampshire line to Nashua, Milford and Wilton. To the west there are two important routes, one to Fitchburg by way of Cambridge, Watertown, Lexington, Concord and Groton and to Worcester by the way of Brookline, Dedham, Needham and Farmingham. To the south on several routes are the important manufacturing cities of Brockton, Walpole, Mansfield, Taunton, the Attleboros, Central Falls and Providence. All of these important centers are within reach of Boston when motor truck equipment is used but cannot be served satisfactorily by horses.

Outside Work Gives Increase

It is this work outside of the City of Boston proper which has played an important part in the trebling of the company's business as a result of its truck use.

Because Boston proper does not lend itself to the increased use of trucks along the water front and between the various public and private warehouses on account of the narrow streets and congested vehicular traffic, the company still keeps 120 head of horses which it uses for the close-in city work in the congested business districts.

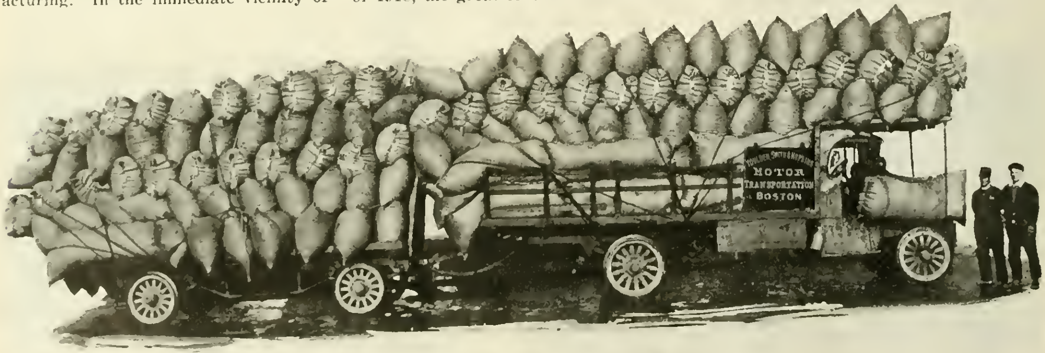
While the company handles a miscellaneous class of goods, perhaps one of the best examples of the work of its motor truck fleet is that of hauling wool. During the latter part of 1917 and all of 1918, the great textile and cloth mills located within an area of 30 miles from Boston found great difficulty in shipping army cloth from their mills to Boston for trans-shipment overseas and in receiving the raw material after it had been delivered to Boston. These difficulties were caused by the railroad congestion in the New England district and by the many embargoes which were laid down over night by the railroads when their equipment became tied up.

Practically during the entire year of 1918 railroad transportation was most uncertain. Where a shipment in ordinary times would have taken a day, it sometimes took 4 or 5 days, with a result that when the mills began to run short of raw material on account of the large war orders they were never certain when the new supply would arrive to prevent shutdowns because of the lack of sufficient raw goods. While express conditions were somewhat better, they were subject to the same railroad delays as freight shipments and the rates for such a bulky material as raw wool were almost prohibitive.

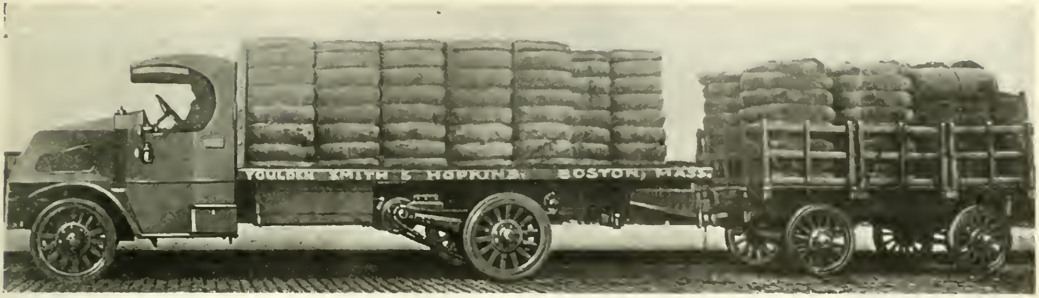
Trucks Only Means Available

Something had to be done to insure the delivery of the raw wool from the Boston docks and railroad terminals to the many cloth mills in the nearby territory and to deliver the finished cloth from the mills to Boston, where it was made into uniforms for the various branches of the military forces or shipped overseas.

The American Woolen Co., which operates over fifty textile mills in various parts of New England and which is said to be the largest wool manufacturing company in the world, appealed to the Youlden, Smith & Hopkins Company to



Here is a neatly-solved problem of carrying a bulky load made up of bags of wool. At first sight it would seem that the bags between the truck and trailer ends must surely fall to the ground. This is not the case, however, since the ropes holding the bags at the extreme rear end of the truck are not visible in the picture, but are in place nevertheless. The total load is made up of 130 bags, weighing 13,000 pounds in all. The combined capacity of the 5-ton Mack truck and the 5-ton Troy trailer is 20,000 pounds.



One of the 5-ton Macks and a 5-ton Troy trailer loaded with a total burden of 20,000 pounds of cotton in bales. This outfit and others of the Youlden, Smith & Hopkins fleet are operated on hauls within a radius of 30 miles of Boston

accept an emergency shipment of raw wool and to carry it from the Boston warehouses of the company to its mills in Lawrence, Mass., a distance of 30 miles by road. Accordingly, a 5-ton Pierce-Arrow truck and a 5-ton Troy trailer were employed. Due to the bulky nature of the wool, which is packed in large bags weighing 100 lb. apiece, it was impossible to carry more than a combined load of 12,000 lb. or 6 tons on the truck and trailer in order to clear the trolley wires and highway bridges.

Initial Trip Great Success

The initial trip was made in such quick time and in such a satisfactory manner that the American Woolen Co. decided to handle all of its wool between Boston and the nearby mills by means of the Youlden, Smith & Hopkins truck equipment. While no figures are available as to the cost of doing the work the American Woolen Co. is authority for the statement that the cost by trucks was less than the cost by rail freight or express. The cost per ton of wool moved was further decreased by reason of the fact that all of the trucks carried return loads on their trips back to Boston from the mills. These loads were made up of finished products which were likewise delivered more quickly than by either rail freight or express.

While the item of actual cost is of course of the utmost importance, it was not the only saving effected by the truck equipment as compared with the rail movement of the goods as freight or express matter.

Handlings Reduced

When shipped by rail from Boston the raw wool would have been loaded at the warehouses, then hauled to the freight depots, unloaded from the horse wagons and loaded onto the freight cars. At the mill end of the route, the goods would have been unloaded again at the railroad terminals, loaded upon wagons and again unloaded at the mills.

By means of the motor truck equipment the wool was loaded directly onto the trucks at the warehouse and moved to the doors of the mill with but one loading and one unloading. During this time the goods were always in the hands of the Youlden, Smith & Hopkins Co., so that it was not necessary to employ tracers to see that the wool kept moving in transit. In addition, there were no claims for damaged goods and a lot of the railroad red tape consisting of making out bills of lading and checking them at the railroad depots at both ends of the route and again at the mills was eliminated.

12 Million Pounds Moved in Year

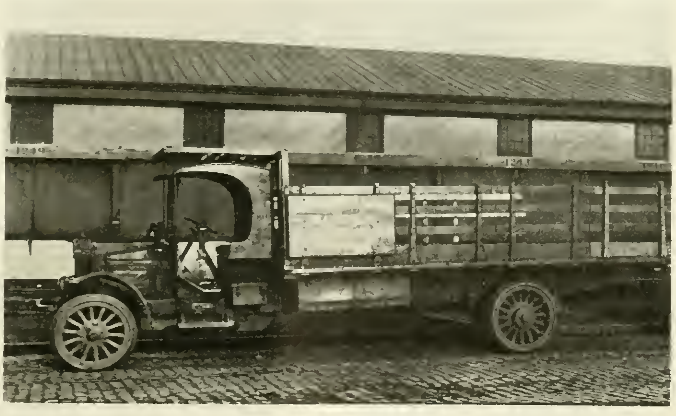
Due to these many advantages of the truck transportation as compared with any method of rail shipment, more than 1,000,000 lb. of wool were moved per month by the trucks of the Youlden, Smith & Hopkins Co., or over 12,000,000 lb. in a year. In addition to this great tonnage, there was almost an equal amount of goods brought back from the mills. These goods were miscellaneous in character, including finished cloth, cloth in process, empty bobbin cases, machinery and practically everything used in the mills.

The trucks used in the work are made up of thirteen 5-tonners and two 2-tonners. The 5-tonners are Macks, Pierce-Arrows and Packards. The two 2-ton units are Pierce-Arrows. The trailers are of the Troy four-wheeled type.

The method of loading the unwieldly bags of wool is well illustrated by the picture of the 5-ton Mack and 5-ton Troy trailer shown at the bottom of the opposite page.

Owing to the fact that the total carrying capacity of the two units of 10 tons could not be carried on account of the resultant height of the load, the Youlden, Smith & Hopkins Company devised a novel type of platform to fit over the top of the usual drivers' cab. This platform is made of heavy slats, supported on posts at the rear directly in back of the rear side of the cab and on two posts in front attached to the truck chassis frame just behind the radiator. By its use ten bags, each weighing 100 lb., or a total of 1000 lb., of additional load may be carried. The total load handled on the truck and trailer, including the 1000 lb. over the driver's cab, amounts to 13,000 lb., so that the addition of the extension platform increased the truck revenue by 1-13, and this amounted to several dollars per trip in each direction.

The trucks are each operated by a driver and one helper. They are garaged in a modern fireproof structure located across Boston harbor in Somerville. The garage has a floor space of 24,000 sq. ft. and is capable of storing fifty trucks.



One of the company's 5-ton Pierce-Arrows. Notice the special framework over the driver's cab. By its use the truck can carry ten extra bags of wool, weighing 1000 lb.

How Fleet Owners May Keep Their Motor Truck Costs in Simple Yet Adequate Manner

Cost Figures on 3½-Ton Wilson Trucks in Use in Detroit Are Shown on the Forms of THE COMMERCIAL VEHICLE Standard System

IN a recent address before the Detroit Transportation Assn., C. E. Stone, Transportation Engineer for the J. C. Wilson Co., Detroit, gave some interesting motor truck cost figures which are given on this and the opposite page. The figures cover the average yearly cost of operation for six 3½-ton Wilson trucks operated in the city of Detroit.

The figures as given have been rearranged on the monthly or yearly résumé sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks so that they are directly comparable with other figures which have been published in THE COMMERCIAL VEHICLE in previous issues.

The figures are given for trucks equipped with stake bodies and engaged in the general trucking business in Detroit. They indicate that the average yearly cost of operation and maintenance per truck is approximately $5,197, as compared with a total initial cost of $3,704.50 including the chassis, less tires and a $350 body.

While it is stated that the trucks average 60 miles a day, this seems rather high for a truck in the general haulage business. It is significant also that no tonnage totals are given, so that it is impossible to calculate the cost per commercial ton-mile.

Daily Cost of $17.32

The figures included, however, enable one to calculate a daily cost of operation of $17.32 and a cost per mile operated of 28.8 cents.

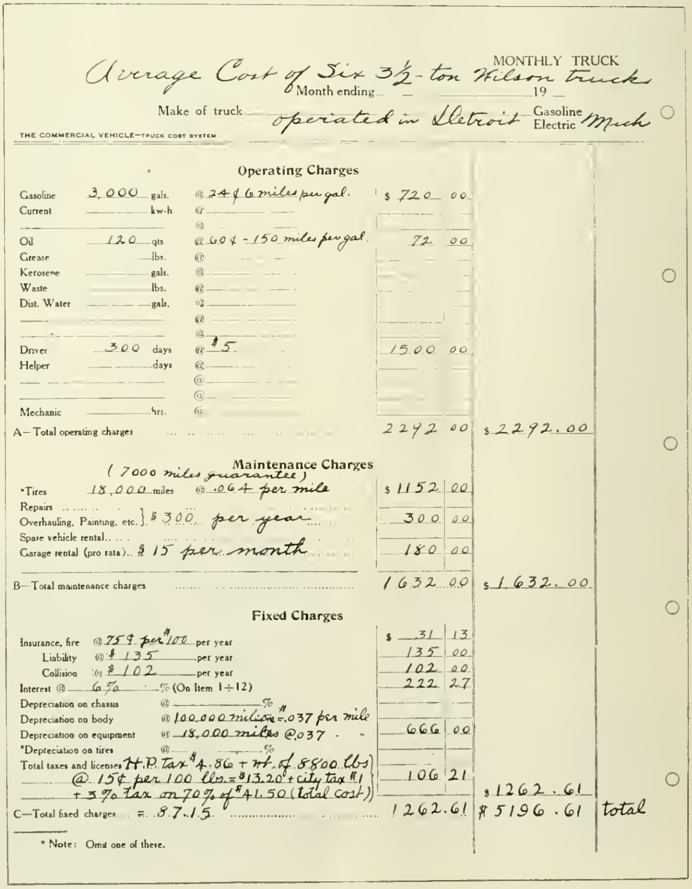
In this connection it must be borne in mind that the daily operation cost of $17.32 includes only those charges which can be made directly to the truck, but none of the other charges which must be made in order to insure a profit on the truck in the haulage business. For instance, the figure of $17.32 per day does not include any charge for getting business by solicitors or advertising; any charge for office overhead, including rent, furniture, stationery, stenography and office help or any superintendence charges.

Double Daily Cost

As expressed many times previously in THE COMMERCIAL VEHICLE, the figure of $17.32 must be roughly doubled in order to take care of idle truck time and all of the other overhead expenses enumerated directly above if the truck owner expects to obtain a revenue of from 10 to 15 per cent on the capital invested.

Too often the truck owner estimates his daily cost of truck operation with the maximum load only to find that in actual practice his truck is only about 33 per cent efficient. Of course, in some work loads can be carried in both directions on each trip day after day, but in the average trucking business this is not possible on account of the variation in the time of shipment for different customers and the variation in the size of the shipments themselves.

Then, again, there are certain costs which must be later divided pro rata over each truck operated when the trucks are in the public haulage business, since the truck owner is then selling transportation as a sole means of his income and is not operating his trucks as an adjunct of his business, as is the case with the ordinary retailer who, first of all, must sell his goods and later deliver them by means of his trucks. Of course, these additional charges vary according



Average Cost of Six 3½-ton Wilson truck MONTHLY TRUCK
Month ending ______ 19__
Make of truck operated in Detroit Mich Gasoline Electric
THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline	3,000 gals.	@ 24¢ 6 miles per gal.	$ 720	00	
Current	kw-h	@			
		@			
Oil	120 qts	@ 60¢ - 150 miles per gal.	72	00	
Grease	lbs.	@			
Kerosene	gals.	@			
Waste	lbs.	@			
Dist. Water	gals.	@			
		@			
		@			
Driver	300 days	@ $5	1500	00	
Helper	days	@			
		@			
		@			
Mechanic	hrs.	@			
A—Total operating charges			2292	00	$ 2292.00

Maintenance Charges

(7000 miles guarantee)

*Tires	18,000 miles	@ .064 per mile	$ 1152	00	
Repairs Overhauling, Painting, etc.	$ 300	per year	300	00	
Spare vehicle rental					
Garage rental (pro rata)	$ 15	per month	180	00	
B—Total maintenance charges			1632	00	$ 1632.00

Fixed Charges

Insurance, fire	@ 75¢ per $100 per year	$ 31	13	
Liability	@ $135 per year	135	00	
Collision	@ $102 per year	102	00	
Interest	@ 6% % (On Item 1÷12)	222	27	
Depreciation on chassis	@ %			
Depreciation on body	@ 100,000 miles = $.037 per mile			
Depreciation on equipment	@ 18,000 miles @ .037	666	00	
*Depreciation on tires	@ %			
Total taxes and licenses	H.P. tax $4.86 + wt. of 8800 lbs @ 15¢ per 100 lbs. = $13.20 + city tax $1 + 3% tax on 70% of $41.50 (total cost)	106	21	$ 1262.61
C—Total fixed charges	= 8.7.1.5	1262.61		$ 5196.61 total

* Note: Omit one of these.

The average yearly cost of operation of six 3½-ton Wilson Trucks employed in the trucking business in Detroit. The date are put down on sheets of The Commercial Vehicle standard cost keeping system for Motor Trucks.

to each particular case and no set figure can be given for any one particular item.

The method of doubling the actual cost of operation to indicate the minimum income which each truck must bring in, in order to insure the owner of a profit of 10 to 15 per cent of his investment, has worked out fairly well in practice. In other words, the owner of the trucks of which the cost figures are given herewith should take in approximately $35 a day for each truck in service. If he does not do this, he is liable to find that he has not made money during the year. Of course, if he can so arrange his business as to carry return loads on the great majority of the truck trips, the profit secured on the basic income rate of $35 per day would be in excess of 15 per cent.

Determining Cost

The cost figures clearly indicate that it is not the initial cost of the truck and its body which determines the highness or lowness of the cost per day operated, since the operating, maintenance and fixed charges are approximately $1,400 in excess of the cost of the truck chassis and body less the cost of the tires.

The big 8 in motor truck operation and maintenance, as described more fully on pages 26, 27 and 28 of this issue, are again borne out. Cost figures given on these two pages indicate that the cost of the driver of $1,500 a year is the largest item, followed in order by the cost of the tires and the cost of gasoline. In place of the cost of overhauling, which in the big 8 was item number 4, in this instance it is the depreciation charge of $666 based on an annual mileage of 18,000 miles with a total life of truck of 100,000 miles. Of course, these various items in the big 8 may vary in their relation to one another according to the particular installation. The sixth, seventh and eighth items in the big 8 list, which are respectively insurance, interest and garage, are the same in the case of the Wilson trucks mentioned herewith, as in the cost of the Pierce-Arrow given on pages 26 and 27.

Necessity of Cost Data Evident

These cost figures indicate to the truck owner, no matter whether he operates only one truck or a fleet of several, that some form of cost data must be kept if he hopes to maintain a profitable business. This is borne out particularly by the fact that in order to make money the average income must be about double the actual operating charge of the truck. It is evident that this minimum income to insure profit cannot be determined until the actual operating and maintenance cost of the truck or trucks being used are calculated closely.

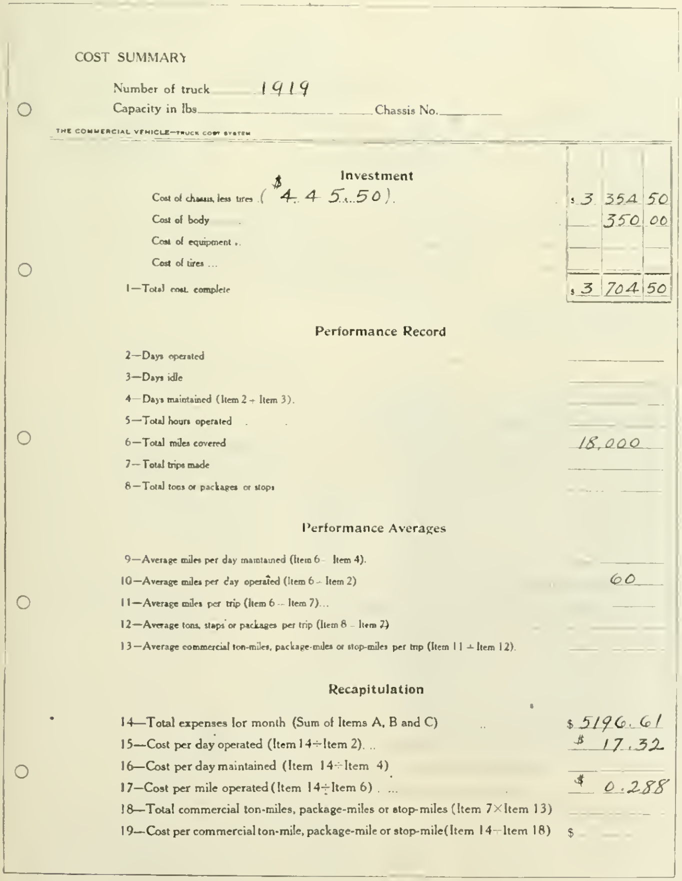
The method of keeping this necessary cost data depends to a great extent upon the individual truck owner. Almost every truck operator imagines that he needs some particular style of cost form or sheet in order to suit the conditions of his own business. This, however, can be shown not to be the case, since the items which can be charged against truck operation and maintenance are well known and few in number.

The Necessary Items

Just what these items are and their method of calculation are very simply shown in the forms of The Commercial Vehicle Standard Cost Keeping System for Motor Trucks reproduced on this and the opposite page.

As seen the operating charges consist of gasoline, oil, grease and kerosene; driver, and helper or mechanic, if any. The maintenance charges are likewise few in number and include tires, repairs, vehicle rental, if any, and a pro-rata charge for garaging. In the fixed charges against a truck are included insurance, consisting of fire, liability for both truck and goods carried, and collision; interest in the investment of 6 per cent per year; depreciation on chassis body and equipment or accessories, and any special taxes or licenses.

These include all of the charges which can be made against the operation of the motor truck. To determine the efficiency of one make of truck as against another in the same class of work in the same city, the knowledge of the items given is sufficient. The other charges of overhead should not be made against the truck so far as its cost of operation is concerned, since the overhead items vary for every particular kind of business and should be included in the cost of doing business and not in the cost of operating the trucks.



COST SUMMARY

Number of truck 1919

Capacity in lbs ______ Chassis No. ______

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires ($4445.50)	$3 354	50
Cost of body	350	00
Cost of equipment		
Cost of tires		
1—Total cost complete	$3 704	50

Performance Record

2—Days operated

3—Days idle

4—Days maintained (Item 2 + Item 3).

5—Total hours operated

6—Total miles covered 18,000

7—Total trips made

8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4).

10—Average miles per day operated (Item 6 ÷ Item 2) 60

11—Average miles per trip (Item 6 ÷ Item 7)...

12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)

13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 × Item 12).

Recapitulation

14—Total expenses for month (Sum of Items A, B and C) $5196.61

15—Cost per day operated (Item 14÷Item 2) $17.32

16—Cost per day maintained (Item 14÷Item 4)

17—Cost per mile operated (Item 14÷Item 6) $0.288

18—Total commercial ton-miles, package-miles or stop-miles (Item 7×Item 13)

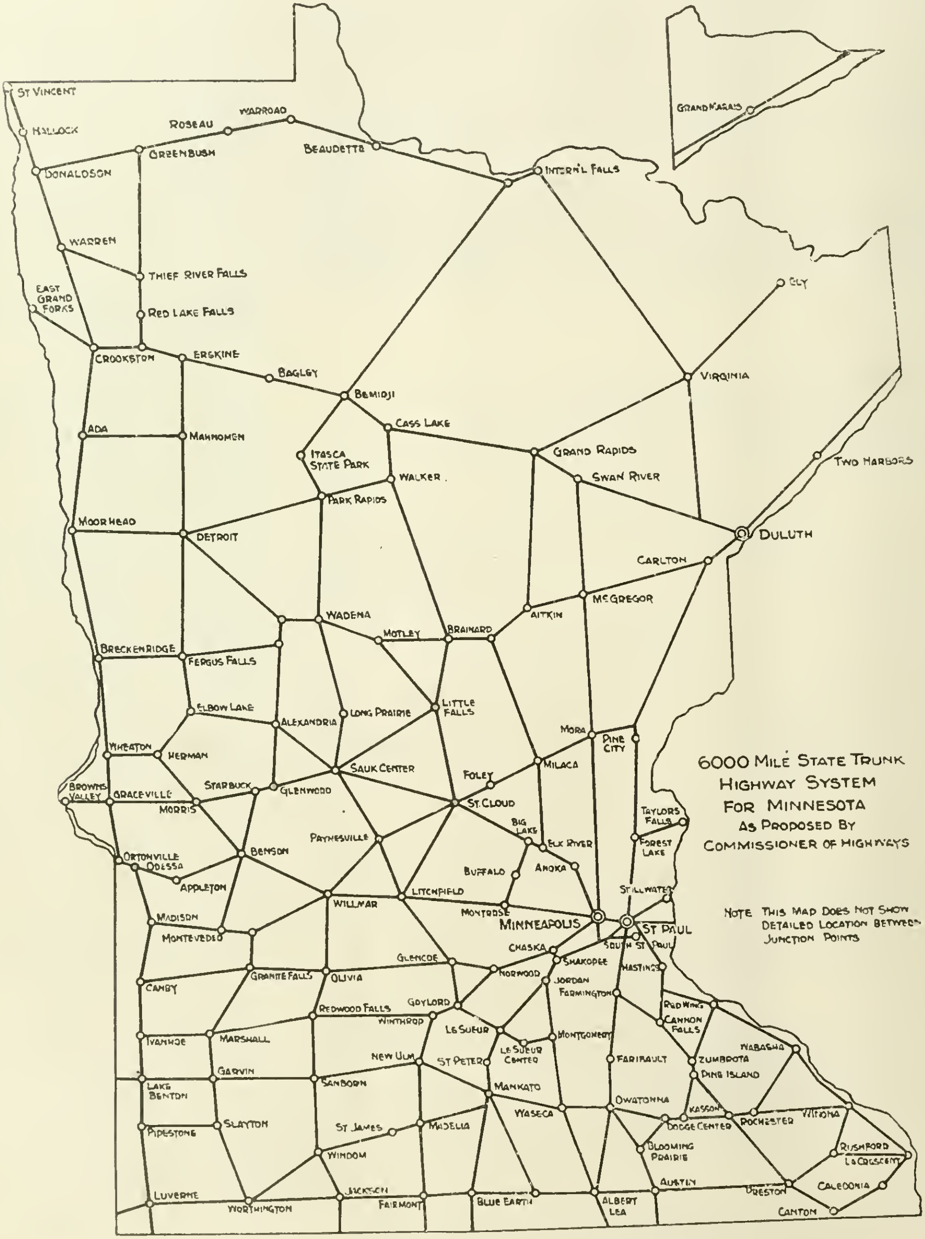
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14÷Item 18) $

In the above sheet and that on the opposite page it is seen that the yearly cost of upkeep is $1400 in excess of the initial cost of the truck and a $350 body, but minus the cost of the tires

NEW TRUCKING COMPANY

DETROIT, April 10—A new motor truck express route has been established between Detroit and Toledo. It is operated by the Violet Express Co., so named because its trucks are painted violet. Trucks leave Detroit each day except Sunday at 7 a. m. and Toledo at 1 p. m. The Toledo terminal will be in charge of Charles D. Keefer, and is located at 1317 North Erie Street. The E.-R. Cartage Co., 620 Seventeenth Street, will care for the Detroit terminal.

Proposed State Highway System for Minnesota



6000 MILE STATE TRUNK
HIGHWAY SYSTEM
FOR MINNESOTA
AS PROPOSED BY
COMMISSIONER OF HIGHWAYS

NOTE THIS MAP DOES NOT SHOW DETAILED LOCATION BETWEEN JUNCTION POINTS

Minnesota's Road Plans Boon to Truck Owners

6,000 Trucks Owned in That State Will Be Provided With Network of Roads Linking Up Important Cities

MINNESOTA has fallen in line with the movement for better highways as a result of the nation-wide appeal for good road construction. Tentative plans for a 6000-mile State trunk highway system have been proposed by C. M. Babcock, Commissioner of Highways in Minnesota. Should these plans go through at the general election in 1920 the truck owner in that State would be benefited to a large extent because the proposed highways would link up all of the important cities. There are over 6000 trucks registered in Minnesota, and as many of these are used by fleet owners, the plans of the Highway Commissioner are bound to be of inestimable value to this class of truck users.

The program provides for the creation of a State trunk highway system of approximately 6000 miles, which is to be constructed and maintained by the State of Minnesota. The tentative lines of the new system are shown on the opposite page, although the locations of the roads are given only with reference to terminal and junction points.

As outlined, about 100 of the most important towns and cities would be connected by good roads. With Duluth, Minneapolis and St. Paul as the three big centers of manufacturing, the plan of the Minnesota highway commissioner has been to connect them by a series of feeders with every county seat and every city of 2000 population or more.

How Money Will Be Raised

A special fund for the carrying on of the work of improving and building these highways will be created if the plans are accepted and the legislature will be authorized to levy a higher license tax on motor vehicles than is now levied, said license to be in lieu of all other taxes on motor vehicles. The income from this source, together with such Federal aid money as may be received and such other receipts as the legislature may authorize, will be applied to the State trunk highway fund.

In order that the State may proceed at once to improve the trunk highway system, the legislature will be authorized to issue bonds of the State of Minnesota in the necessary amount to finance the work. These bonds will be issued from time to time as funds are needed to carry on the work and the bonds will be retired at the expiration of 20 years.

A fourth feature will be contained in an amendment which is to be added to the constitution of the State. This will authorize the State to engage in the work of building highways, a thing it is now prevented from doing by the last part of section 5, of article IX, of the constitution.

As planned, the State highway will link all of the county seats and cities of 2000 or more population by a system of central locations from which feeders will lead to surrounding cities. For instance, Duluth, in the northeastern part of the State, will have three feeders from it leading to the north, west and south. Other centers in the north will be Virginia, Bemidji, Park Rapids, Detroit, and Crookston. St. Cloud has six roads leading out of it and Sauk Center, further west and on one of the St. Cloud feeders, is also connected by six branches of the State highway. Both Minneapolis and St. Paul are connected with these centers by a road leading through Anoka, Elk River, and Big Lake.

How Plans Were Submitted

C. M. Babcock, Commissioner of Highways of Minnesota, in giving out the plans, authorized the following statement:

"The highway department, in submitting these plans to the legislature, with the request that they be submitted to the people for approval as a constitutional amendment, has taken this action after due and careful consideration of all things involved and after many conferences with citizens and business men from all parts of the State.

"While the proposed plans are the best that the department has been able to evolve, I desire to say suggestions for changes or alterations will be gladly received and given most careful consideration.

"If the amendment is approved, the bonds will be sold as the money is needed for construction work. The returns from motor vehicle licenses should be sufficient to take care of the sinking fund and retire the bonds within the 20-year period with little or no assistance from general tax levies."

Fleet owners, though paying a higher license rate, will find that the cost of operation of their trucks will be lowered enough to more than offset the increased rate, according to Mr. Babcock, who figures that a saving of 10 per cent can easily be made by operating over well-improved roads.

The proposed plan for the State Highway System will not disturb the State Road and Bridge fund, known as the 1 mill tax under the Dunn law, and the counties will have four or five times as much money to spend on their county road systems, which will be laterals or feeders to the trunk highways. This is due to the fact that out of every $10 received by the counties for roads and bridges, approximately $8 is being spent on the identical roads which will be included in the new system.

Mr. Babcock declares that he has found a unanimous sentiment in the State for a comprehensive system of hard-surfaced highways and he believes that the proposed legislation will meet with the hearty approval of the people.

Trucks Make Good in Arkansas Lumbering

Down in the lumbering country in Arkansas, motor trucks are fast replacing the mules which have been employed from time almost immemorial. The 2-ton Kissel Freighter model shown above with a Studebaker semi-trailer is owned by the Lena Lumber Co., Benton, Ark., and used to carry sawed lumber from the saw mills to the company's plant. The haul is 15 miles each way and the load carried 5 tons. In this work the truck and trailer have replaced six mules and besides have done the work in a much more satisfactory manner. The closed cab is in great favor with the truck driver and his helper because it protects them in case of rain and from the cold when the removable sides are fitted

Did you ever hear of the owner of a general store in a town of only 2000 population operating a fleet of five delivery trucks? If you did not, the above illustration shows you one. His name is J. E. Callan and he runs the general store in Windsor, Vt. His store is seen in the background with four of his five Overland delivery trucks in front. He is seen at the right seated in a six-cylinder passenger car which the savings made by his trucks have enabled him to buy

Small Town General Store Owner Increases His Business by Fleet of Five Delivery Trucks

Vehicles Used to Handle Customers' Orders and Haul Fresh Meat

THIS story concerns a small-town merchant who effected such a saving by the use of a small fleet of light delivery trucks that he was able to buy a six-cylinder passenger car from their earnings. Located in Windsor, Vt., and serving a population of about 2000, this merchant naturally lacked the facilities that surround the city man for making his business more efficient. Windsor is hardly the location where one would expect to find a fleet of five delivery trucks on the jump every day. Nevertheless, this merchant has built up his business to such an extent by the better service given to his customers, who are now distributed over a much larger area, that he requires these vehicles in constant use.

The merchant is J. E. Callan, who conducts a general provision store in Windsor, handling a full line of groceries and meats. The problems which confront merchants in small towns and in cities have many details in common, so Mr. Callan's solution of his delivery and trucking problems will be of general interest to all truck owners in similar work.

Delivery Radius Doubled

Confronted with a limited zone of delivery operations by horses and wagons, and wishing to procure more customers living within a radius of 6 to 10 miles out in the surrounding country, Callan soon saw that he must solve his problem by dropping the former horse delivery system and establishing a fleet of motor-driven vehicles. Before installing the motor-driven equipment Callan's business was confined solely to customers in Windsor and necessitated the use of only three horses and wagons. He is now using five Overland light delivery vehicles and keeping them busy all of the day.

The better delivery service that he has been able to give his customers has been appreciated so much by them that, were he to fall back to the old system of delivery, he would have to keep at least ten horses and three more drivers to take care of the increased business.

The country customers are given practically as good service as those in town. The trucks start out at 7 o'clock each morning, the drivers taking orders for the day. By 8:30 they are all back at the store, and as fast as the orders are put up the drivers start back on their routes. Each vehicle goes about 6 or 7

Loading two of the Overlands from the side door of the store. All except the special deliveries are made in the morning, the drivers working in the store in the afternoons miles out into the country, one in each direction of the compass.

Afternoons only one truck is used in delivery work, on special orders. The drivers of the other vehicles work in the store putting up goods for early delivery on the order-taking trip next morning. The saving of time by the use of these delivery vehicles gives the merchant more of his employees' time. This is a big saving, for with horse delivery, which would keep the drivers on the wagons all day, he would have to employ more help in the store.

Trucks Carry Fresh Meats

Windsor is located 14 miles away from the abattoirs and jobbers at the White River Junction. This means that in order to save time and to insure better meat this distance must be covered in a minimum of time. With the horse and wagon delivery his meats would not reach him till the following day. Shipped by express, the meat would be a number of hours away from the ice.

Now his Overland delivery trucks are sent to the White River Junction two days a week. The meats are never away from the ice for more than 2 hours. This insures better meat and a big saving in time. The saving in carrying charges is also a big item, for the run down and back takes less than 2 gal. of gasoline for each vehicle.

Callan also effects a big saving in another way. On the run down to White River Junction the trucks take down loads of tallow and bones, which cannot be shipped by freight, as the railroads will not accept this class of goods.

On Saturday afternoons the drivers go over the trucks carefully—oiling, tightening and adjusting anything that needs attention. The vehicles are then locked up in the garage until Monday. This in itself represents a considerable saving over horses, for when the trucks are not in use they have no operating expense and require no care.

Three of the Overlands lined up in front of Callan's store. He has increased his business by the quick truck service rendered, and makes the most of it by featuring it on the signs seen on each of the truck's cab doors

Truck Enables Farmer to Get Better Prices in More Distant Markets

THE greatly increased use of motor trucks in the South and Southwest during 1919 as prophesied by the editor of this magazine as a result of his 6 weeks' trip through that territory last Fall is well illustrated in the case of the Layman Bros. truck, which is illustrated below. The Layman Brothers live in Cave City, Ark., about 150 miles from Little Rock. The two brothers manage a farm in Cave City, and before they purchased the 1-ton Republic truck shown below sold practically all of their farm produce, including green goods, cotton, live chickens and eggs, in the immediate vicinity of Cave City.

Trucks Increase Income

With the truck, however, one of the brothers now makes a trip daily to Batesville, about 30 miles from Cave City, and on the railroad serving Little Rock. Goods hauled to Batesville in this manner are shipped to Little Rock, where they command much higher prices than they would in either Cave City or Batesville.

The operation of the truck has thus increased the income from the farm, and its regularity of operation has also resulted in Layman Bros. being able to secure a contract for hauling the mail between Batesville and Cave City, the latter town being entirely off the railroad and served by no other means of communication except by vehicles over the roads.

As shown in the accompanying illustration, the truck is fitted with an ordinary low-sided flareboard type of body which lends itself to the largest number of uses.

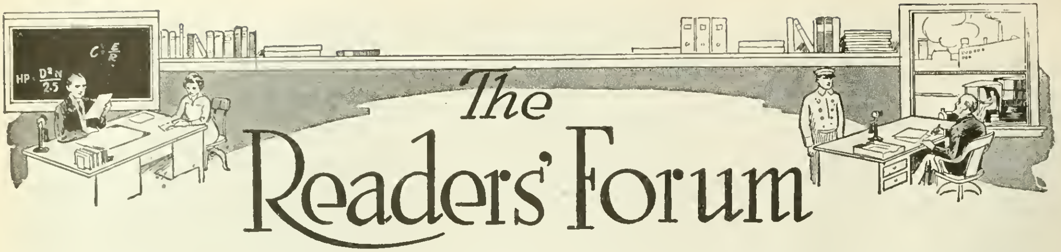
Miscellaneous loads are carried on almost every trip, that shown in the accompanying illustration consisting of four bales of cotton, several crates of live chickens and several bags of first- and second-class mail.

1- to 2-Ton Trucks Most Popular

The 1-ton Republic truck shown in the accompanying illustration is typical of the type of vehicle now being purchased by farmers and retail storemen in the great southern territory. On account of the poor condition of some of the roads and the entire absence of improved highways in the outlying sections surrounding the large centers of population, trucks of between 1 and 2 tons capacity are the most popular. Trucks of over 2 tons capacity are in most cases too heavy for the existing bridges and sometimes too wide for the roads, since the rear wheels are spaced farther apart than the wagon ruts in the road.

The motor truck has come to stay in the South, however, and its increased use will vary directly as the progress made in road development. As the roads become better, the sizes of the trucks will automatically increase, since, other things being equal, larger loads can be carried more economically than smaller ones.

This 1-ton Republic makes daily trips between Cave City and Batesville, Ark., 30 miles away, with miscellaneous loads shipped 100 miles by railroad to Little Rock, where they command higher prices than in the Batesville or Cave City territory



The Readers' Forum

WHITE OIL-HEATING APPARATUS

White and Kinney Companies Turn Out Truck Tank Oil Heaters

To the Editor, COMMERCIAL VEHICLE:

We would like to know if you can advise us where we can obtain the heating apparatus used extensively on White trucks for the purpose of heating oil carried in a tank mounted on the chassis? This equipment is desired by a road contractor for spraying oil, as it is necessary that the oil be kept hot to insure proper application.—A. STAAB, G. A. Schacht Motor Truck Co., Cincinnati, Ohio.

The White company itself manufactures the heating apparatus which is used on White trucks for heating oil carried in the tank body of the truck. Another company which makes similar equipment which is sometimes mounted on White chassis is the Kinney Mfg. Co., Boston, Mass.

WORM DRIVE IN USE SINCE 1912

Four Models Offered in 1912 With Worm Drive—325 on 1919 Market

To the Editor, COMMERCIAL VEHICLE:

Will you tell us in what year the first worm-driven truck was built and what has been the increase by years of this form of drive?—ROLLAN R. LEWIS, East Greenville Garage & Electric Co., East Greenville, Pa.

The worm-drive first appeared in 1912 on four models of American trucks, made by three companies. The trucks using the worm-drive were the Franklin 1-tonner, Blair 1½- and 2½-tonners and the Pierce-Arrow 5-tonner.

The following tabulation shows the increased use of the worm-drive during the years from 1912 to date, showing a steady increase, until to-day there are 325 models of trucks using this form of drive.

Year	No. of models using worm drive
1912	4
1913	8
1914	15
1915	42
1916	90
1917	237
1918	308
1919	325

MAKES OF TRUCK CONVERTERS

List of Thirty-Seven Manufacturers of Converting Devices

To the Editor, COMMERCIAL VEHICLE:

Could you advise where we can get a pamphlet giving the names of companies that manufacture rear ends for trucks and tractors? We are desirous of changing passenger car chassis so that they may be used for trucking by the addition of a rear end.—T. C. GRABOWSKY, Durango, Col.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

We do not know of any pamphlet which is published giving the names of companies which manufacture rear ends or converters for passenger car chassis, but are giving you below a list of companies which manufacture such devices:

All-Car Unit Co., Philadelphia, Pa.
American Truck & Tractor Co., Chicago, Ill.
F. A. Ames Co., Owensboro, Ky.
Auto-Motive Tractor Corp. of America, Kansas City, Mo.
Barber Motor Corp., Brooklyn, N. Y.
Big-A-Auto Tractor Co., Minneapolis, Minn.
Blount Carriage & Buggy Co., Atlanta, Ga.
Burlington Motor Truck Co., Burlington, Wis.
Chas. H. Burman, Oakland, Cal.
Carrier Motor Truck Co., Detroit, Mich.
Commercial Car Unit Co., Philadelphia, Pa.
Curtis Form-A-Tractor Co., Chicago, Ill.
Dearborn Truck Co., Chicago, Ill.
E. & W. Mfg. Co., Milwaukee, Wis.
Globe Machinery & Supply Co., Des Moines, Iowa.
Graham Bros., Evansville, Ind.
Guaranteed Tractors, Chicago, Ill.
Guaranty Motors Co., Cambridge, Mass
Hoover Wagon Co., York, Pa.
International Sales Service Co., New York, N. Y.
Iowa Motor Truck Co., Ottumwa, Iowa.
Jackson Motor Car Co., Boston, Mass.
Kelly Convertible Auto Truck Co., Chicago, Ill.
Knox Motors Co., Springfield, Mass.
Lauton Truck Co., Youngstown, Ohio.
No-Chain Truck Unit Co., St. Louis, Mo.
Partlow-Jenkins Motor Car Co., Indianapolis, Ind.
Phenix Truck Makers, Chicago, Ill.
Rayford Unit Co., Philadelphia, Pa.
Robinson Machine Co., Detroit, Mich.
Royal Machine Co., Cincinnati, Ohio.
Simpson Truck Co., St. Joseph, Mo
Sheet Metal Specialty Co., Goshen, Ind
Staude Mfg. Co., E. G., St. Paul, Minn.
Union Truck Co., New York, N. Y.
Waco Mfg. Co., Kansas City, Mo.
Western Truck Attachment Co., Seattle, Wash.

SPRING CENTERS OF FOUR AXLES

Sizes Given on Models Ox-2, A, C-2 and E of Torbensen Line

To the Editor, COMMERCIAL VEHICLE:

Will you please furnish us with the spring centers or distances from centerline to centerline of the spring pads on the various sizes of Torbensen internal-gear-driven rear axles?—P. A. & P. CORP., New York City.

The following data are available on four Torbensen internal-gear-driven axles:

EUROPEAN PRODUCTION FIGURES

Hard to Get Authentic Information on Belligerent Truck Activities

To the Editor, COMMERCIAL VEHICLE:

Will you please furnish us with information as to the number of trucks produced in England, France, Germany and Italy during the years 1914, 1915, 1916, 1917 and 1918, and also if possible the number of motor trucks exported from the countries mentioned during the same period of time?—F. J. PATCHELL, Federal Exports Co., New York City.

No actual production figures are available from any of the European countries for the period of the war. Similarly, no reliable export figures can be had for the same period.

Certain conditions in the four countries mentioned, however, are known and may be of some value to you. For instance Great Britain at the time of the armistice was turning out approximately 20,000 motor trucks a year. It is estimated that only 10,000 were made in Great Britain during 1917 and a still smaller number in the three preceding years of 1914, 1915 and 1916.

In France motor truck production, with the exception of some artillery tractors turned out by Schneider and Renault, was at a standstill, all of those plants not in the hands of the Germans being turned over to the manufacture of munitions. It is not likely that France turned out more than 5000 trucks in any one of the years from 1914 to 1918 inclusive.

In Italy at the time of the signing of the armistice the country's truck production was close to 40,000 a year. Italy supplied many thousands of trucks to France and the United States and to other of the Allies. During 1914 Italy's truck production was hardly more than 5000 a year.

No definite information is available from Germany. In a review of the truck situation in that country as given in the *Frankfort Zeitung* for Dec. 20, 1918, it is stated that Germany had between 7000 and 8000 trucks in use prior to the war. It is known that army contracts for about 10,000 trucks are still outstanding, and it is estimated that about 10,000 trucks were made a year in Germany and Austria during the 4-year war period.

Axle Model	OX-2	A	C-2	E
Limit of Load Allowed on Spring Pads, in lbs.	2700	4200	7000	13000
Maximum Spring Centers, in inches	40½	39¼	39	41
Minimum Spring Centers, in inches	37	37½	38	42

APPROXIMATE WEIGHT OF TRUCKS

Combined Weight of Truck Bodies and Chassis from 1 to 7 Tons

To the Editor, COMMERCIAL VEHICLE:

Will you let us have the approximate weight of body and chassis of different sized trucks on the American market?—L. MURRAY, New York City.

The approximate weight of the body and chassis of trucks from ¾-ton to 7-ton capacity are given in the following tabulation:

	Chassis Weight, Approximate, lbs.	Body Weight, Approximate, lbs.	Total Weight, Approximate, lbs.
¾-ton .. .	2400	750	3150
1-ton	3000	900	3900
1½-ton	3500	1050	4550
2-ton	4500	1200	5700
3-ton	6000	1500	7500
5-ton	8000	1800	9800
6-ton	8700	1900	10600
7-ton	9400	2000	11400

FIRST TRUCK OPERATED BY STEAM

Winton Gasoline Delivery Truck First Placed on the Market in 1898

To the Editor, COMMERCIAL VEHICLE:

Will you please answer the following questions regarding the early history of the motor truck in the United States:

1—Which is the oldest manufacturer of trucks in the United States?

2—Which is the oldest manufacturer making trucks only?

3—Which is the largest manufacturer of trucks?

4—What manufacturer or manufacturers first produced worm-driven trucks?—O. T. OLLUM, Hart's Garage, Chattanooga, Tenn.

The answers to your questions in the order given are as follows:

1—As you do not specify whether you desire the names of the manufacturers of the first electric, steam or gasoline trucks in the United States, we are giving you herewith the names of the first manufacturers in each class as shown by all available records. The first power road vehicle that is known to have operated on its own power and of which there is authentic knowledge was a huge steam traction engine built in New York City in 1858 to be used in hauling merchandise from the Mississippi River to Colorado. According to Doolittle's *Romance of the Automobile Industry*, the idea originated with Major General Joseph R. Brown, an Indian agent in Minnesota. The engine was designed and built by J. A. Reed, New York City, and after being driven under its own power through the streets of New York was shipped by rail and river steamer to Nebraska City. One of the engine cranks was broken about seven miles out of Nebraska City on the way to Denver. The Civil War and the beginning of construction of the Union Pacific Railroad prevented the making of repairs and ended the venture. In 1915 it was decided in Nebraska City to erect an appropriate monument on the spot from which the truck started on its ill-fated trip toward Denver. The monument bears this inscription:

"Steam wagon, invented and owned by Joseph R. Brown, of Minnesota. Manufactured by John A. Reed of New York. Landed at Nebraska City from Steamer *West Wind*, July 12, 1862. Started for Denver, self-propelled, July 22, 1862. Disabled and abandoned seven miles out."

Another steam truck was brought out between 1867 and 1870 by the Amoskeag Corp., Manchester, N. H. One of the first of these vehicles was hurriedly sent to Boston during the great Boston fire in 1872.

To Charles E. Wood of Chicago seems to belong the credit of being the first American manufacturer to produce business vehicles commercially. The trucks made by the Woods Motor Vehicle Co. in the early 90's were driven by electric motors with a 3½-horsepower output for 5 hours with a 32-cell battery.

The Winton delivery vehicle brought out in 1898 was perhaps the first gasoline commercial vehicle to be produced on a commercial scale in the United States. Eight of these vehicles were under construction in October, 1898. They were, however, more on the order of a converted passenger vehicle than a regular truck model. In the same year the Duryea Motor Wagon Co., Springfield, Mass., brought out a light delivery vehicle with a gasoline engine.

A. L. Riker, pioneer American experimenter with electricity as a motive power for vehicles, brought out an electric delivery truck which he had on exhibition in the electrical show held in Madison Square Garden, New York City, in May, 1898.

In 1900 the first Thorneycroft steam truck built in the United States was turned out from the plant of the Cooke Locomotive Works, Paterson, N. J., and made its trial trip on Tuesday, August 21, 1900. The production of the Thorneycroft steam truck was carried on in 1901 by the Thorneycroft Steam Wagon Co. of America, Paterson, N. J., which turned out ten Thorneycroft vehicles of 3½-ton capacity. The Massachusetts Steam Wagon Co., Boston, Mass., also turned out a steam truck known as the Cunningham in 1901. In the same year the Daimler truck of foreign design was built in small numbers in Long Island City.

2—According to our files the oldest exclusive motor truck company which is still producing is the Martin Truck & Body Co., York, Pa. In 1906 it first offered the Atlas truck to the buying public.

3—The largest truck producing company in America to-day is the Ford Motor Car Co., Detroit, and the second largest is the Republic Motor Truck Co., Alma, Mich.

4—Trucks equipped with worm drives have been on the market since 1912. In that year three companies brought out trucks with this form of drive. These were the Pierce-Arrow Motor Car Co., Buffalo, N. Y., Blair Mfg. Co., Newark, Ohio, and the H. H. Franklin Mfg. Co., Syracuse, N. Y.

HOW TON-MILE COST IS FIGURED

The Commercial Vehicle Has Published Several Items on This Subject

To the Editor, COMMERCIAL VEHICLE:

Kindly give us the formula for figuring the ton-mile cost of truck operation. —C. A. CROSS & CO., INC., Fitchburg, Mass.

The subject of ton-miles and ton-mile cost as applied to motor-truck operation has been covered in several previous issues of THE COMMERCIAL VEHICLE, particularly that of April 15, 1915, in an article entitled "What the Ton-Mile Is and How to Figure It," which states specifically the difference between the absolute and commercial ton-mile as a unit of work done.

The commercial ton-mile must be calculated for each trip which the truck makes. The total ton-mileage of a truck in a day is the sum of the ton-miles made on the number of trips covered in that day. The cost per ton-mile for a day, month or year is the total cost of truck operation for a day, month or year divided by the number of ton-miles made in the corresponding period.

The commercial ton-mile per trip is figured by multiplying the tonnage carried on that trip by the mileage covered on that trip. For instance, if a truck starts out with a 5-ton load and runs 5 miles with a load and then 5 miles back to the starting point empty, the commercial ton-mileage of that trip is 5 tons times 10 miles or 50 ton-miles. If five such trips were made in a day, the total daily ton-mileage would be 5 times 50 or 250 commercial ton-miles. If the total cost of truck operation for that day was $25, the cost per ton-mile would be $25 divided by 250 ton-miles, or 10 cents per ton-mile.

TWELVE MANUFACTURERS OF TURNTABLES

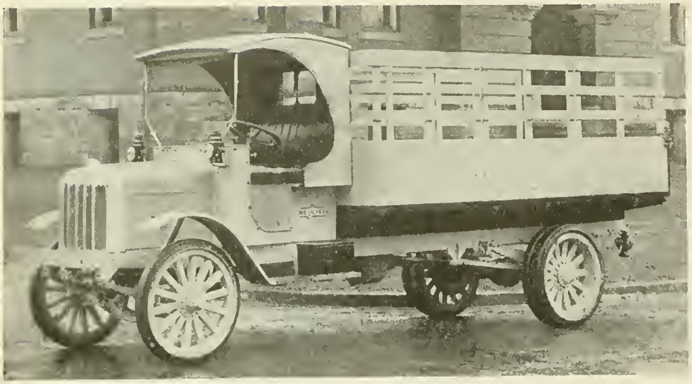
Iowan Wants Names of Builders of 3½-Ton Truck Turntables

To the Editor, COMMERCIAL VEHICLE:

One of our customers is desirous of securing a turntable for 3½-ton trucks under loads. Can you advise us of the names of manufacturers of a device of this nature?—MILO D. HERRON, Dart Truck & Tractor Corp., Waterloo, Iowa.

Below is a list of companies which manufacture turntables, some of which may be suitable for the needs mentioned:

Canton Foundry & Machine Co., Canton, Ohio.
Craig Engineering Co., Los Angeles, Cal.
C. T. Ernst's Sons, Buffalo, N. Y.
Lansing Co., Lansing, Mich.
Link-Belt Co., Chicago, Ill.
Nichols & Bro., George P., Chicago, Ill.
Portland Garage Co., Portland, Me.
Rochester Iron Works, Rochester, N. Y.
G. W. & F. Smith Iron Co., Boston, Mass.
Turner Machine Co. Danbury, Conn.
United Casting Co., Los Angeles, Cal.
Zering Mfg. Co., H., Cincinnati, Ohio.



New Bessemer 2½-ton internal-gear-driven model which replaces the 2-tonner. Note radiator guard and dash protection for drivers

Bessemer Adds 2½- and 4-Ton Models—Drops 2- and 3½-Tonners

BESSEMER SPECIFICATIONS

Capacity, tons	2½
Price	$2,775
Wheelbase, in.	158 or 175
Tires, front	36 x 4
Tires, rear	36 x 4d
Bore, in.	4⅛
Stroke, in.	5¼
N. A. C. C. hp	27.2
Speed, r.p.m	1250
Speed, m.p.h	13
Gear-ratio in high gear	8 to 1
Final drive	Int.-Gear

THE Bessemer Motor Truck Co., Grove City, Pa., is offering a new 2½-ton internal-gear-driven model, a departure from its established series of models. Up to the present time the company has been manufacturing 1-, 1½-, 2- and 3½-ton ratings. Now it is making a change from this series to 1-, 1½-, 2½- and 4-ton capacities. The company claims that each truck in a series should be the same percentage greater in capacity as its predecessor. A comparison of the new line shows a percentage of increase as follows: 50, 66 2/3 and 60 per cent. With the former series the difference in capacities varied from 33 1/3 to 75 per cent.

The 2½-ton job, like the other models, is an assembled product and consists of a Continental "C-2" engine, Borg & Beck clutch, Arvac propeller shaft, Brown-Lipe four-speed transmission, Perfection springs, Automotive Parts Co. fan, Bosch DU-4 ignition, Parish & Bingham frame and a Rayfield LL-3 carbureter. Schwarz wood wheels are standard on the 1-, 1½- and 2½-ton sizes. Metal wheels are optional on the 2½-tonner and standard on the 4-ton size.

The four-cylinder Continental engine, with cylinders cast in block and valves on the right side, is mounted under the hood. Cooling is effected through the use of a cellular radiator with a cast-iron case. The radiator is provided with a guard of bar iron for the core. This guard, which will bend or buckle before cracking the radiator casting, is made up of individual parts, each of which may be removed and straightened. Water circulation is effected by a centrifugal pump. The Rayfield carbureter is fed by gravity from a tank under the seat.

A centrifugal governor is driven from the engine. A Bosch single high-tension magneto with hand spark control is used for ignition. No starter or electric lighting is furnished. The Borg & Beck 12-in. dry plate clutch has Rayhestos facing material and the clutch shaft is carried on two self-aligning S. K. F. bearings. The clutch and brake pedals are both mounted on an extension of the throw-out shaft. The assembling of the pedals directly to the engine with the clutch obviates the necessity of an extra clutch pedal bracket and linkage from the clutch pedal to the clutch shaft.

The Brown-Lipe four-speed selective gearset is placed amidships. The two-piece propeller shaft is fitted with four Arvac metal universal joints and the drive is taken through the radius rods to the Torbensen axle, fitted with an M. & S. differential. Provision is made on these rods for universal action to accommodate unequal compression on the rear springs. The wearing surface at each end of these radius rods is also provided with liquid lubrication through wicks. The radius rod is provided with an eyebolt at the front end which is free to rotate in the front radius rod bracket in order that the radius rod itself may freely adjust itself to any angularity of the axle due to unequal loading or uneven spring action. The thrust of the radius rod against the bracket is cushioned by heavy leather washers, which give a provision for adjustment of the length of the radius rods.

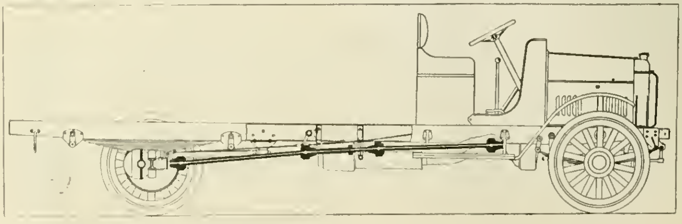
Driving torque is taken through the springs. These are bronze-bushed throughout, 2½ in. wide in front with ten leaves, and 3 in. wide at the rear with thirteen leaves. All spring clips are of 3½-in. nickel steel, heat-treated with a scleroscope reading of 40. These are locked with two hex nuts locked against each other. A similar locking device is used on the spring cross shafts at the rear of the truck. The outer nuts are slotted and cottered.

The rear spring shackles are provided with an oil reservoir in the shape of an annular space between the shackles and the shackle bushing. A lubricator is placed in the top of the bushing barrel for filling, and a wick is situated in the top of the bushing so that as the motion of the truck agitates the oil the wick becomes saturated and so feeds to the wearing surface.

The engine lubrication is by means of a splash-pressure system, the oil being fed by pressure to the three main bearings and then overflowing to the pans.

The hand brakes are internal expanding, while the service brakes are external contracting. The diameter of the hand-brake drum is 17½ in. and that of the service brake 18 in. The widths are 2¼ and 2½ in. respectively. Oil-less bushings are provided on the brake equalizing shaft.

Steering is at the left and gearshift control and braking are in the center. This model can be furnished in two wheelbases, 158, and 175 in. Equipment includes a cab and seat cushion, two side and one rear lamp, tool box and set of tools, fenders and short running board. The dash, of metal construction, is carried around the sides for added protection of the driver, and is thoroughly braced to prevent rattling. The fenders are of 16 gage one-piece pressing. They are supported at the front by a single channel section malleable bracket. At the rear they are bolted to the metal running board. The running board is extra heavy, being of 12-gage metal.



Section view, showing inclined position of transmission, resulting in practically a straight line drive. No angles exceed 2½ degrees

New Corbitt 3½-tonner with metal wheels

Corbitt 3½- and 5-Ton Models Now Have Four-Speed Gearsets

CORBITT SPECIFICATIONS

Capacity, tons	3½
Price	$4,000
Wheelbase, in.	168
Tires, front	36 x 5
Tires, rear	36 x 5d
Bore, in.	4½
Stroke, in.	5½
N. A. C. C. hp	32.4
Speed, r.p.m	1200
Speed, m.p.h	13
Gear ratio in high gear	8.75 to 1
Final drive	Top Worm

THE Corbitt Motor Truck Co., Henderson, N. C., has made a number of changes in its 3½- and 5-ton models. These use the Sheldon top-worm-driven axle as before, but differ from their predecessors in that each has a Brown-Lipe four-speed gearset instead of a Cotta three-speed type. Though the standard wheelbase in both models is 168 in., other sizes are optional. On the 3½-tonner the optional wheelbases are 120 and 190 in. and on the 5-tonner 156, 178 and 195 in. A larger engine, a Continental Model T, has been installed in the 5-ton model. Instead of a 4½ by 6 in. power plant developing 32.4 hp. the company is now using a 5¼ by 5¾-in. engine developing 44.1 hp. The price of the larger model is now $4,750 instead of $4,500.

Other changes in the 3½-ton model include the use of Smith metal wheels with hollow spokes instead of wooden; a rolled channel flexible frame instead of the rigid type; a G. & O. radiator instead of a Rome-Turney, and a Brown-Lipe clutch instead of a Hele-Shaw. The clutch facing material is Raybestos.

The four-cylinder engine is mounted under the hood and the cylinders are cast in pairs. The valves are placed at the left. Cooling is effected through a vertical finned tube radiator with fins on the front of the cast-iron case instead of on the top. The water circulation is taken care of by a centrifugal pump. The Stromberg carbureter is fed by vacuum from a tank under the seat. A Pierce centrifugal governor, driven from the engine, is used. Ignition is by means of an Eisemann single high-tension magneto with hand control.

The 3½-ton model employs a unit-power plant, consisting of the engine; a multiple dry-disk clutch; a four-speed selective gearset; the propeller shaft and Sheldon worm-driven axle.

Equipment includes cab with curtains, two side and two headlights, a rear light, a horn, front fenders and a complete set of tools. Solid tires are mounted on the front and dual solids on the rear wheels.

Keystone Starts Out with 2-Tonner

Active Production in May

KEYSTONE SPECIFICATIONS

Capacity, tons	2
Price	$1795
Wheelbase, in.	138
Tires, front	32 x 4
Tires, rear	32 x 5
Bore, in.	4
Stroke, in.	4½
N. A. C. C. hp	25.6
Speed, r.p.m.	—
Speed m.p.h.	—
Gear ratio in high gear	7.8 to 1
Final drive	Int. Gear

THE Keystone Motor Truck Corp., Philadelphia, a newcomer in the commercial vehicle field, has started out with a 2-ton internal-gear-driven model. The only model built was exhibited at the recent Philadelphia truck show. A new factory is being fitted up at Sixteenth Street and Glenwood Avenue, Philadelphia, and it is planned to have the truck in production some time in May.

The truck is an assembled product, consisting of a North American four-cylinder engine, Simms magneto, Stromberg carbureter, McCord radiator, Borg & Beck clutch, Covert gearset, Russel internal-gear axle, Timken front axle and Ditweiler steering gear.

The cylinders are cast in pairs with valves placed on the right. Cooling is effected through the use of a horizontal finned-tube radiator with a cast-iron case. The water is circulated by a thermo-syphon system. Fuel is fed by gravity from a tank under the seat and ignition is by means of a Simms single high-tension magneto with the spark advance operated by hand. The clutch is of the multiple-dry-disk type with Raybestos facing material. The three-speed selective gearset is a unit with the engine. Propulsion and driving torque are both taken through the rear springs on the Hotchkiss principle.

Keystone's first truck model, a 2-tonner

Lowry Brings Out New Truck Body With Flexible Top

Dreadnaught Hub Odometer — Powell Muffler — Bilt-Rite Drill and Valve Grinder — B. & D. Air Compressor

THE Lowry Top and Body Co., Philadelphia, specializing in the manufacture of tops and bodies, will soon go into quantity production of its newly patented "Red Star" bodies, especially applicable to the large, covered type of trucks or van used for intercity hauling. The company has moved from Thirty-ninth and Walnut streets to a new factory at Gaul and Adams streets.

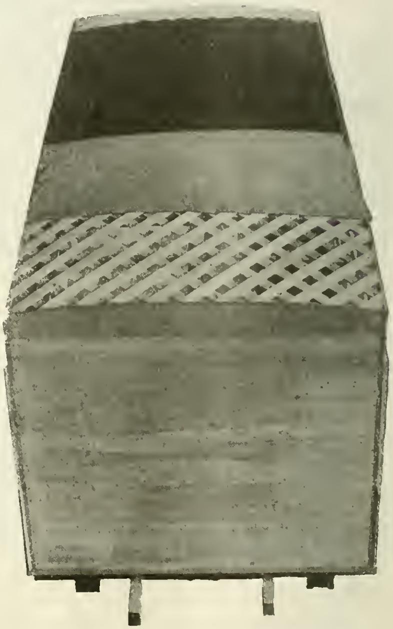
The patent covers a non-leakable roof, top construction known as "outside structural member," the general under-construction and the tailgate. The non-leakable roof construction varies widely from the usual method of the bodymaker. There are no nails or screws in the latticed roof, except where they are attached to the side rails of the body, and the lattice being allowed to weave freely in motion. The vibration, then, of the body, which goes upward from the understructure, exhausts itself in this lattice slat so as to relieve the strain on the entire body.

The roof is covered with a piece of shoddy felt ⅛ in. thick, to keep the slats from chafing the canvas cover stretched over the felt. There are then no nails or screw-holes to let in water from the top.

The outside structural members are heavy oak posts mortised into the sill and notched at the cross-sections. They are ironed from top to bottom with a strap-bolt which goes through the sill. The main feature of this side construction is an angle-iron, which runs along underneath the sill, the cross-bars being notched to take this iron. A metal strip runs along on top of the sill and a bolt goes through the metal, the sill and the angle-iron, which is hammered over the nut inside of the angles. This stiffens the sill from one end of the body to the other. Four angle-irons fasten at four points, keeping the cross-bar, runners and body in such a position that they never get out of true, that is, out of right angles.

A heavy piece of angle-iron is on top of the tail-gate, as a protection thereto. It is rabetted into the top board of the gate, so that the gate's hinges can come up flush and be riveted through the angle-iron. This prevents the vertical leg of the angle-iron from buckling.

As long as this leg does not buckle, the horizontal, or upper, leg of the angle-iron cannot buckle either, and will withstand an enormous strain. In fact, it is asserted by the designers that the links of the chain will break long before the tail-gate can belly, or sag. The main contention of the designers for excellence of the tail-gate patent is the lock and link with groove and hole in the ends of the angle-iron for supporting the gate. The chain will support the gate within any position in the radius of half a circle, thereby eliminating several yards of cumbersome chain and several chain staples across the gate. All bolts and nuts are on the outside, so they can be tightened.



Stages in the construction of the Lowry flexible top. The fore portion is the lattice foundation, the next is shoddy felt ⅛ in. thick, and the next canvas

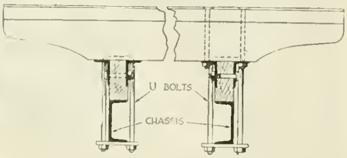
Dreadnaught Hub Odometer

A HUB ODOMETER, the Dreadnaught, with an automatic drive has been brought out by the American Taximeter Co., New York. The company has planned to obviate certain difficulties of fitting on hub odometers by devising this new drive. Instead of connecting the recording mechanism to the axle by a pin the Dreadnaught is provided with a stout steel finger which engages in the castellations the axle nut. This finger is held firmly in place by means of a heavy, flat spring, firmly riveted to the base of the recording mechanism.

This eliminates all fitting, the odometer going on like a hub cap, the driving finger snaps into its place in the nut, and is held there by the stout spring. To care for those axles which are fitted with flat nuts, a special slotted nut is supplied.

There are no spiral springs in the Dreadnaught odometer, which is guaranteed for the life of the truck against seepage of grease or damage from collision. The figures on the mileage record keep in one position, making it easy to read.

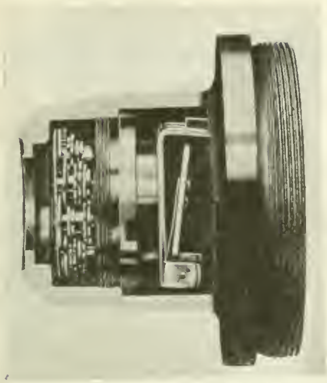
A special model has been developed for Fords. This can be attached by removing the old hub cap and screwing the



Left—Underconstruction of Lowry truck body showing cross bars. All nuts are accessible from the outside

Center—Method of fastening body to the chassis with U-bolts

Right—The tail gate has a lock and link with groove and hole in the ends of the angle iron for supporting the gate



Dreadnaught Hub Odometer

Dreadnaught on securely in its place.

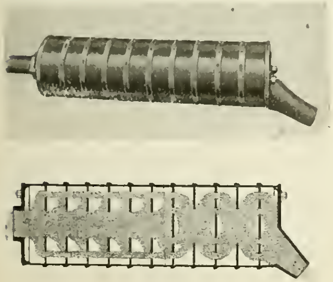
The price of this new hub odometer is $20, and that of a special model for Ford, Vim and Maxwell trucks is $15.

Powell Muffler

THE Powell Muffler & Timer Co., Utica, N. Y., is manufacturing mufflers especially adaptable for motor trucks. The accompanying illustrations show one of the 5-in. type of mufflers used on the White Class AA army trucks.

This muffler is an assembly of steel stampings, numbering ten. Each drum is made like a brake drum, with a shoulder on each section. Each is driven tight over the bottom of the next drum, making a gas-tight joint. For tractor use the mufflers are built up with five or six of these sections, made from 20, 18 and 16 gage steel respectively for the 5, 6 and 6¾-in. diameter sizes. The end heads are made from malleable iron, and the tie rods, two or three in number, from special bolt stock.

The exhaust in going through the muffler has no small holes or slots to become carbonized and there are no abrupt turns. The exhaust gases are allowed to go half way through the muffler and to expand before they reach any turns. The smallest holes used in the muffler are 19/32 in. in diameter and the smallest number used on any one plate is twenty-seven.



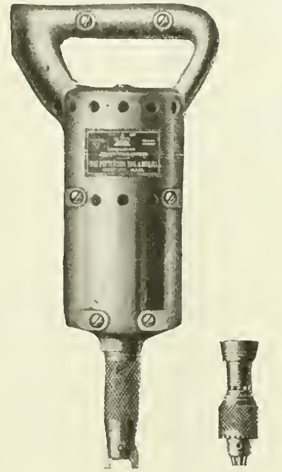
Powell Muffler

The weight of the 5-in. muffler is 10 lb., the largest type weighing from 18 to 25 lb.

Bilt-Rite Drill and Valve Grinder

A COMBINATION electric drill and valve grinder is being manufactured by the Patterson Engineering & Mfg. Co., Worcester, Mass. The company is also manufacturing an electric drill and a valve grinder embodying the same features as the larger combination type.

The combination drill and valve grinder has a 1½ hp. motor for 110 to 130 d.c. or a.c. current or universal, with an oscillating spindle for valve grinding and a special rotary attachment for drilling. A change from one operation to the other is accomplished by taking out only one screw from the chuck. Holes up to ¼ in. can be drilled.



Bilt-Rite Electric Drill and Grinder

A button switch in the handle, convenient to the finger, starts or stops the machine. The spindles run in a ball thrust bearing and the gearing system is packed in grease. Oil holes are placed so that the motor, oscillator and drill shaft bearings can be lubricated.

All of the gears are heat treated and are mounted on a steel shaft with bronze bearings. No gear has less than thirteen teeth. The motor pinion is forced on and keyed to the motor shaft. The removal of the screws holding the split casing together exposes the whole interior and facilitates repairs and replacements.

The equipment includes a socket plug, one 8-ft. cord, one attachment plug, a cut-out switch between the slip plug and the motor, a grinder chuck, a drill chuck and three drivers to fit the grinder chuck for all cars except Buicks and Franklins. The company also furnishes a valve spring of a tension sufficient to allow a wide margin of safety in grinding as far as pressure is concerned. Special chucks for Buicks and Franklins cost $1 additional.

B. & D. Lectroflater

The combination type is 13 in. long and weighs 6 lb. The portable electric drill is 11 in. long and weighs 4¾ lb., while the electric valve grinder is 13 in. long and 5½ lb. in weight.

New Black & Decker Air Compressor

THE Black & Decker Mfg. Co., Baltimore, Md., has announced a new Lectroflater outfit consisting of ½ hp. Black & Decker electric air compressor, having a capacity of 2 cu. ft. of free air per minute, together with a cylindrical pressed steel reservoir 14 by 30 in., mounted on three wheels and provided with a handle so that the whole can be wheeled about as circumstances require. The reservoir holds sufficient air at one filling to inflate five average tires from flat to full pressure or ten tires from 40 to 80 lb.

This outfit is complete with switch, electric cable, attachment plug, pressure gage, safety valve, 25 ft. of hose, tire connector and all piping and wiring, ready to run as soon as uncrated.

The compressor unit itself is the standard Black & Decker No. 2. The motor develops a full ½ hp. and operates at will on alternating current 60 cycles or less and direct current. The compactness of the unit is accomplished by enclosing the motor, gear train and compressor in one housing. The motor and compressor are cooled by forced circulation of air through this common housing and can be run continuously without overheating. Motor, gears and compressor, including cylinder walls and piston, are grease lubricated by capillarity. Current consumption is 1/10 of 1 cent per tire. The outfit complete lists at $195.

The Black & Decker Lectroflater operates at a cost of one-tenth of 1 cent per tire for electric current. The company also makes a hand Lectroflater. This outfit consists of the compressor unit complete with switch, 15 ft. of duplex electric cable, separable attachment plug, large pressure gage, and 20 ft. of hose and tire connector.

New Unloading Chute Suggested at Kansas City

(*Continued from page* 11)

off by the city's surveyors, and at that time there was no other means available to get to the unloading chute and it had to be abandoned. Then the cattle ordinarily delivered at that gate had to be unloaded at the gate near the corner of the yard at Genesee and Twelfth Streets, as shown on the map of the yards on page 6, and where no better facilities were provided than at the Stock Exchange Building courtyard.

Hog Sheds Far from Main Yards

After the serious fire at the stockyards in the fall of 1917, the hog sheds had to be moved to the north yards, quite a distance from the main stockyards. The unloading chute, as shown in the illustration on page 11, is level with the truck body and permits of an easy unloading of the hogs brought into market and of the loading of stockers taken out for fattening on the nearby farms. The only trouble with the arrangement is that there is not more than one unloading gate. While one truck is being loaded or unloaded, all of the rest have to wait in line and move up to the unloading chute in order.

Before criticizing the Stockyards company for the bad conditions which have existed at the yards, it must be taken into account that the closing of the street leading to the Twelfth Street gate and which effectively blocked that gate as a means of ingress and egress, was due to conditions entirely beyond its control. Similarly, the great amount of construction work which had to be carried on inside of the main yard proper to provide the facilities destroyed by fire in October, 1917, had to be completed on account of the greater volume of livestock arriving by rail as compared with the drive-ins, before the drive-in facilities could be given the consideration warranted.

The Recommendations Made

After a 3-day study of the present conditions as enumerated above, the concrete recommendations as printed on page 5 were made as a means of bettering the truck loading and unloading facilities, and E. C. Senter, general manager of the Stockyards company, stated that all of the recommendations will be carried out, if possible, before the rush season sets in during October, 1919.

Going into the recommendations in detail, it was suggested that the loading and unloading of cattle and of hogs be segregated in order to give the greatest speed in the work and to relieve vehicular congestion.

As to the type of unloading gate or chute to be provided, it was suggested that a plain platform to which the trucks may back up be built instead of any of the swinging types. These latter are always liable to get out of order and cause delay. Besides, a considerable amount of labor is always required on the part of the truck driver or the man attending the gate to swing the movable part of the platform around to a position in back of the truck. There is still another disadvantage inherent in the swinging type of device, in that a longer length of roadway in front of the unloading chute is required when the vehicles run parallel to the gate than when the trucks back up to the gate. This is especially so when more than one unloading gate is provided.

The solution of the problem seems to be in making use of a plain platform with fixed gates, and to make this platform so ruggedly that careless drivers damage their own trucks instead of the platform when they do not exhibit ordinary care in backing up. Provided there is sufficient maneuvering space in front of the unloading gate, there is no excuse for truck drivers being careless in the backing-up operation.

Plan of Unloading Means

A very definite scheme of loading and unloading platform was recommended. This is shown on page 8, and is patterned after the type of gate in use at the stockyards in South Omaha, Neb. It differs, however, from the Omaha plan in that it provides for unloading four trucks at the same time, whereas the Omaha layout provides for unloading only three of the four trucks which may back up to the platform without mixing the stock unloaded from one truck with that of any of the other three. The entire length of the platform to unload four trucks is only 35 to 40 ft., whereas it would require from 75 to 100 ft. to unload the same number of trucks if a swinging form of gate was provided and the truck run up parallel instead of perpendicular to the unloading edge.

At first Mr. Senter was of the opinion that the provision of a washstand and of a box for the disposal of manure were problems which the truckmen hauling cattle to and from the market should solve instead of the Stockyards company. It was suggested that, as many of the truckmen had expressed a willingness to help pay for the maintenance of such facilities, some plan might be worked out agreeable both to the truckmen and the Stockyards management.

It was found that the manure could be disposed of along with that collected from the stockyard pens and alleys, provided the Stockyards company could arrange for the transportation of it from the place where dumped to the freight cars on which it is shipped out of the yards. The difficulty of determining the pro-rata charges for such facilities between 100 or more truckmen, some of whom drive to the yards every day and others who drive once a week, clearly showed the complications which would ensue if any such plans were adopted. Mr. Senter was finally of the opinion that the best way out of the difficulty was for him to provide a large manure box directly adjacent to a washing platform and to remove the refuse once or twice a week by the small horse carts now used for the same purpose in other parts of the yards.

Location of Unloading Platform

The washstand is not a difficult facility to provide since all that is necessary is a supply of water, a length of hose and means for draining the water used into the nearest sewer. Mr. Senter was also of the opinion that such a facility could be and would be provided eventually by his company.

As soon as the new four-story hog house is completed, all of the hogs except those driven out to be fattened up on the nearby farms will have to be driven from the point of receipt to the hog house. It was therefore essential that the unloading platform be placed as near the hog house as possible, and it was finally decided to locate it at one end of the present hog shed in the north yard from where the hogs could be driven a distance of only 750 ft. down through a double alleyway passing under the railroad tracks to the hog house.

An unused railway car loading platform will be torn out to provide a runway at least 50 ft. wide from one of the city streets to the unloading platform. This extremely wide street or areaway will provide sufficient space to unload all of the hogs which are liable to be driven into the yards for an indefinite period.

With the four-gate unloading platform suggested, at least 2000 hogs can be unloaded a day, for this was already done through a similar platform at the Omaha stockyards. As the total number of hogs driven into the Kansas City stockyards last year was only 96,337, it is seen that the total maximum loading and unloading capacity of 2000 hogs a day, or 600,000 for a 300-day year, is ample to meet all possible requirements. The layout of the unloading platform, the areaway leading to it, the washstand and manure box are clearly shown in the illustrations at the top of page 8.

The Birth of a Wheel is the unique title of an interesting booklet just published by the Clark Equipment Co., Buchanan, Mich., manufacturers of disc steel wheels and internal gear axles. It shows photographically the successive steps in the evolution of a disc steel wheel. Copies will be mailed on request.

The COMMERCIAL VEHICLE
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
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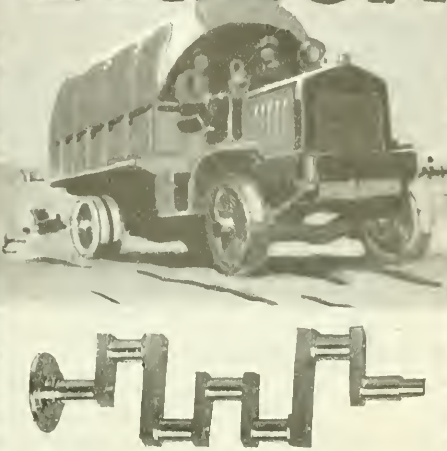
WYMAN GORDON



A SMOOTH RUNNING MOTOR

is essential for the 1919 Truck.

Many things enter into the accomplishment of this, but all efforts will be fruitless unless the crankshaft is of proper design and quality.

Wyman-Gordon Crankshafts are properly designed and their quality insures the minimum of wear on pins and bearings.

Our Engineering and Metallurgical Departments are at your service.

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Designed to carry the paying load at the lowest possible cost

THE motor of the Autocar is placed under the seat to do away with excessive overhang—to distribute the load evenly over all four wheels.

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And the shorter wheel-base thus achieved gives the Autocar its extraordinary ease of handling, even in narrow streets and cramped quarters, where motor truck operation would seem impossible.

The fact that half the Autocars sold are repeat orders from the 7000 Autocar users is convincing proof of Autocar performance.

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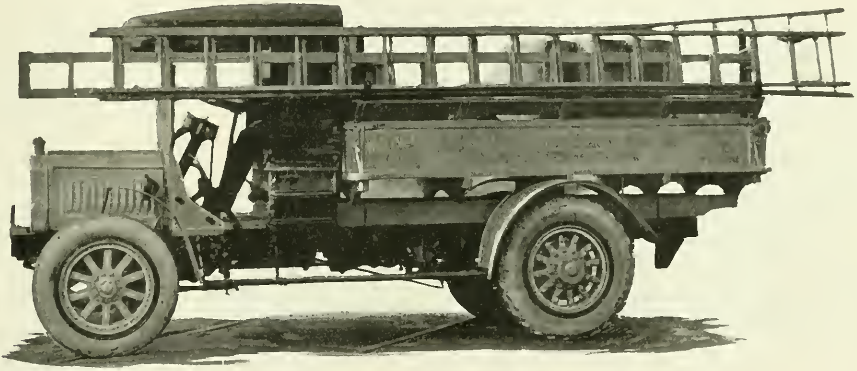
Chassis
$2050

Autocar

The Commercial Vehicle
Read by Business Men
Vol. XX May 1, 1919 No. 7

Building a New Business by the Speed and Reliability of Truck Service



One of the Cleveland-Akron Bag Co.'s 2-ton Packards mounted on 40 by 8 pneumatics all around. It is loaded with roofing material and the equipment, such as ladders, required in actually placing the roofing in place

Fleet of Seventy-Eight Vehicles Delivers Awnings and Roofing Material Direct from Maker to User

THIS is a story of how a concern, already engaged in one business, built up another new, lucrative business exclusively by the use of motor trucks and then started still a third business by the service which only trucks could render. The two new businesses which have been built up solely by the use of trucks are now fully as important as the original business of the company and just as remunerative and profitable.

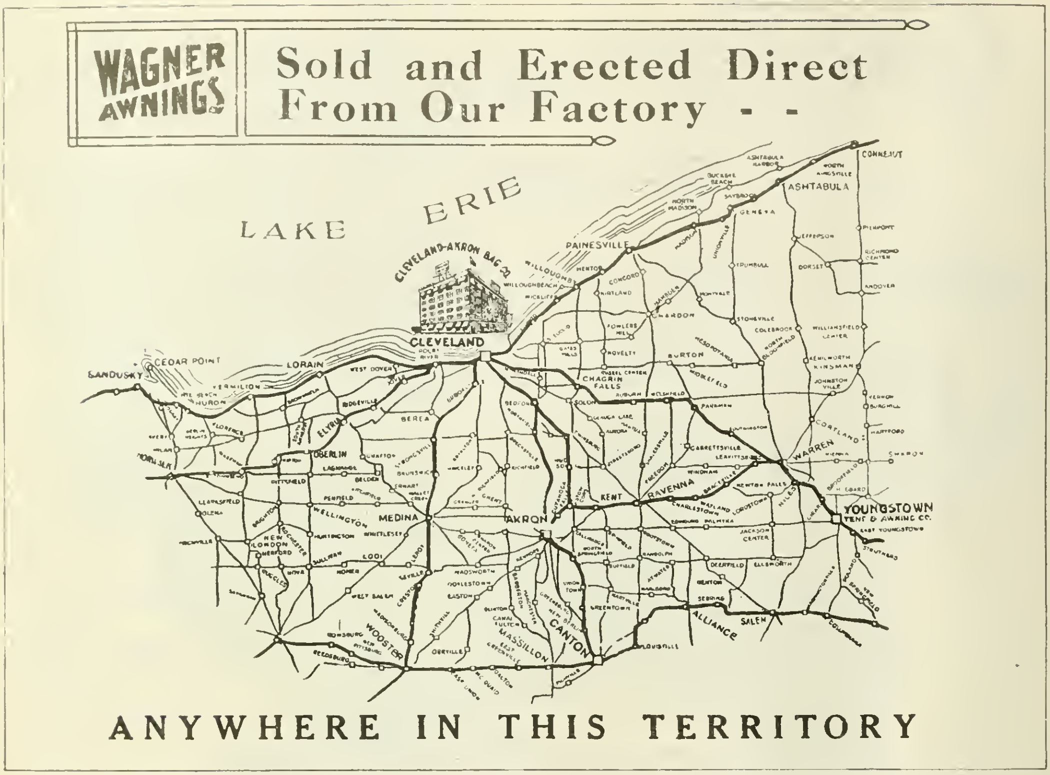
Service, the quick and reliable service rendered by trucks and their ability to carry out the factory-to-consumer idea, so well worked out by grocery and notion companies in the mail order business, has been responsible for the successful formation of the two new classes of work now performed by the company mentioned. That company is the Cleveland-Akron Bag Co., Cleveland, Ohio. Its slogan is, From Factory to Consumer, and it is one of the first to put this slogan into effect in the awning and roofing business. It will make, deliver and put up awnings or deliver and put on roofing material anywhere within an area of 500 square miles within the populous territory south of Cleveland, as far east as Youngstown, as far south as Canton and as far west as Norwalk.

Freight Delays Eliminated

Before the company entered the awning business, it manufactured bags of all kinds. Awnings, being made of somewhat of the same material as bags, enabled the company to, first of all, begin supplying awnings in the City of Cleveland. Becoming well known for its awnings in Cleveland and immediate vicinity, it was not long before requests were received from nearby towns for awnings, canvas, tents and bunting, such as is used during public celebrations of all kinds.

It was one thing to sell awnings and like material and quite another thing to put them up. Accordingly, the company had to look for some means of getting the sold goods delivered to the places where it had to be put up or used. Railroads and interurban electrics were slow and none too reliable. First the material had to be shipped and acknowledgment of its receipt by the purchaser had to be received by the Cleveland company before it could dispatch its men to put up the awnings, tents or other equipment. This was both a slow and expensive process so that the company turned to motor trucks as the only means of simultaneously delivering the goods and of getting the men on the job to do the work.

The quick and efficient service rendered by the company's trucks in Cleveland and the immediate vicinity soon resulted in such an increase in the company's business in the outlying territory that in 1917 the Akron Tent & Awning Co. was taken over and a year later the Youngstown Tent & Awning Co. was



A sample of the Cleveland-Akron Bag Co.'s advertising matter, showing the 500 square miles of territory in which its trucks deliver awnings and roofing material and carry specially-trained men to erect the awnings and apply the roofing. While the bulk of the company's truck fleet operates out of Cleveland, distributing stations and small garages are maintained in Akron and Youngstown to serve the territory immediately adjacent to those cities

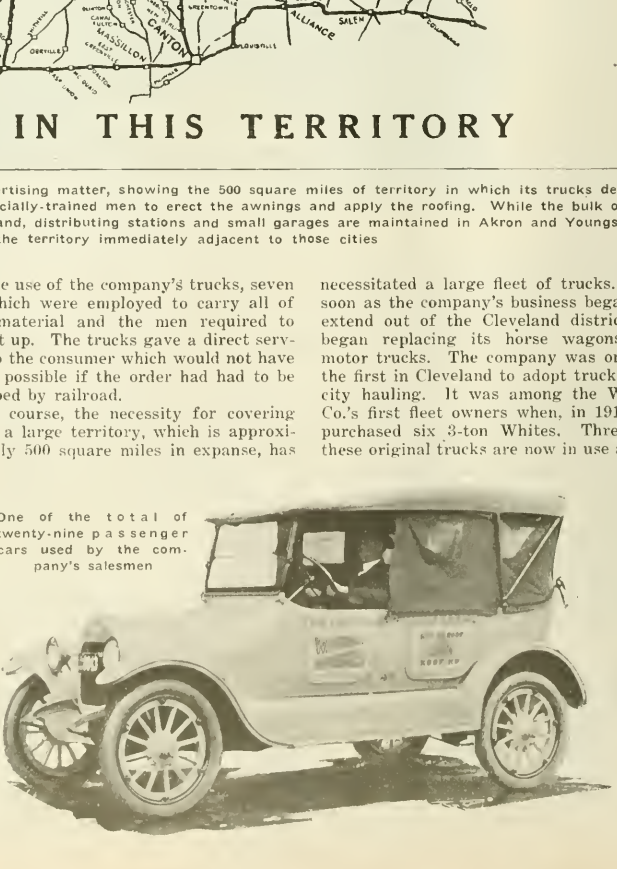
added to the list of properties of the parent Cleveland concern.

Branches at Akron and Youngstown

These two new companies were made distributing factories or stations for the home factory in Cleveland. Youngstown is approximately 70 miles southeast of Cleveland, and Akron almost 40 miles due south. From the Cleveland office, the company's trucks serve all the territory along the Lake Erie shore to the eastward through Painesville, Geneva, Ashtabula and Conneaut, about 60 miles, and to the westward through Lorain and Sandusky, approximately the same distance as Ashtabula, but in the opposite direction. Other points in Ohio, south of Cleveland, are served from either the Akron or Youngstown branches.

While the great bulk of the company's business lies in the Ohio territory bounded by Conneaut and Youngstown on the east, Canton on the south and Sandusky on the west, direct truck service is rendered on occasion even outside of the State of Ohio. For instance, last summer a request came from Erie, Pa., for tents, canvas, flags and bunting for that city's annual fair. Quick action or service was needed and it was given only by the use of the company's trucks, seven of which were employed to carry all of the material and the men required to put it up. The trucks gave a direct service to the consumer which would not have been possible if the order had had to be shipped by railroad.

Of course, the necessity for covering such a large territory, which is approximately 500 square miles in expanse, has necessitated a large fleet of trucks. As soon as the company's business began to extend out of the Cleveland district, it began replacing its horse wagons by motor trucks. The company was one of the first in Cleveland to adopt trucks for city hauling. It was among the White Co.'s first fleet owners when, in 1910, it purchased six 3-ton Whites. Three of these original trucks are now in use after


One of the total of twenty-nine passenger cars used by the company's salesmen

9 years of service and are now giving the same satisfaction as when first purchased.

The Fleet Make-Up

The company's present fleet of motor vehicles is made up of forty-nine trucks and twenty-nine passenger cars, or a total of seventy-eight vehicles. The trucks are made up of Whites, Packards, Pierce-Arrows and one Nash 2-tonner. There are thirty-nine Whites, seven Packards and two Pierce-Arrows. The White fleet consists of eight ¾-tonners, twenty-five 1½-tonners; two 3-ton models and four 5-ton sizes. In the Packard outfit are five 2-ton models, one 3-ton unit and one 6-tonner. The two Pierce-Arrows are of 2-ton capacity.

The passenger cars are used by the company's salesmen to reach the out-of-the-way places where business is to be secured. The passenger car fleet consists of two Ford roadsters and nine five-passenger models; two Buick roadsters and seven touring cars and nine Dodge Bros. five-passenger models.

While this large fleet was originally purchased to take care of the company's own delivery work in Cleveland and the delivery of awning products in the territory previously outlined, they are now employed to carry roofing material which is sold, delivered and actually put in place in the same manner as that in which the awnings are set up.

Roofing Satisfaction Guaranteed

The Cleveland-Akron Bag Co. manufactures its own roofing material and takes contracts not only for the roofing material, but for the delivery of the goods on the job and its actual application to the building. In this way, it guarantees its customers a more satisfactory service, since the entire work is done under one authority and by men who are best fitted to handle the company's own products and see that they are applied properly. In cases where the roofing material is bought from one concern and then put on by men from another, the latter is ofttimes likely to claim that the roofing material was imperfect in cases where the customer is dissatisfied after the work has been completed. This is not possible in the case of the Cleveland-Akron company because it guarantees both its product and the workmanship in applying it. Also the customer has only one concern to do business with. In this work, the trucks are operated in exactly the same manner as in the awning business, men being sent along with the trucks to put on the roofing material carried.

The Cleveland-Akron company not only gives its trucks full credit for building up its awning business and of permitting it to enter the roofing business on a large scale, but also sells its material and application work solely on the basis of the better service which the trucks enable it to give its customers. Two of the forms of advertising used are given herewith on the top of page 8 and at the bottom of page 9. On page 8 it will be noticed that the company sells its product principally on the service which its trucks and passenger cars render. It points out that after the company's salesman has called on the customer and taken measurements for awning or roofing material, the order will go through its factory just the same as if it had been taken right in the City of Cleveland. It then points out that after the order has been secured, one of the company's trucks will reach the customer's house with a regular awning or roofing crew and erect the awning or put on the roofing material immediately. Such service eliminates all delays which might occur if the material had to be shipped by railroad and the Cleveland-Akron company had to have definite knowledge that the material was on the ground before sending out a crew of trained operators.

One of the 1½-ton Whites loaded with bales of burlap to be delivered to Painesville, Ohio, about 29 miles from Cleveland. Note the extra tool box on the runningboard and the cab curtains furnished

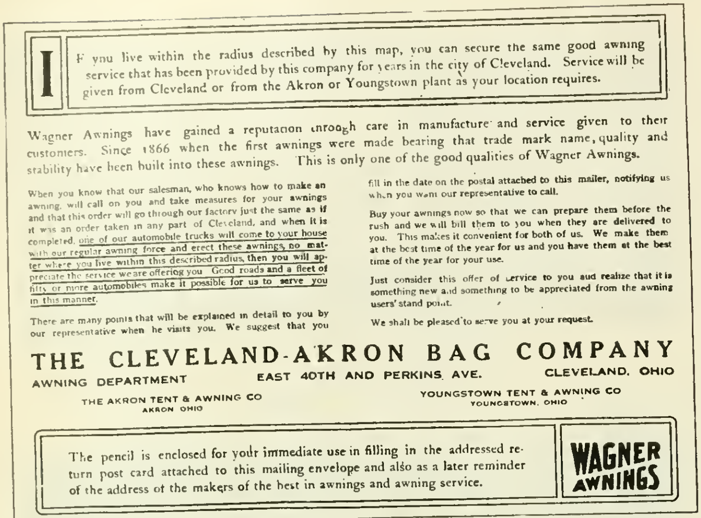
A 3-ton Packard with a load of raw materials picked up at one of the Cleveland freight houses and to be delivered at the Cleveland-Akron Bag Co.'s plant in the same city. Note the type of removable side stake units on the body and the cab curtains

Own Garage Maintained

The company maintains its own garage, painting plant and repair shop in Cleveland and the building is one of the finest equipped in the entire city. While an attempt is made by the company to so route its trucks that they will be able to get back to the Cleveland garage every night, this cannot always be done on account of the very large territory served and to the fact that different routes are continually being covered. As a result, it was found wise to provide two small garages in connection with the company's branches at Youngstown and Akron. Each of the garages at the two latter towns can house two trucks at a time. When the amount of business to be served from either Youngstown or Akron requires the employment of more than two trucks each, the extra vehicles are garaged in public garages in Youngstown or Akron or at the points where the awning or roofing work is being done.

Trucks Inspected Nightly

In the Cleveland garage, the trucks and passenger cars are inspected thoroughly each night so that small adjustments and repairs found necessary may be attended to before they have become serious and resulted in other damage and breakage costing several times as much to repair as if the trouble were taken in hand as soon as discovered. However, practically all of the trucks and passenger cars are given a thorough overhauling once a year. This work is usually done during the winter months, when the awning and roofing business is at its slackest period. After the repair work has been done, each of the truck and passenger cars is newly painted and made ready for the business season, usually starting about the middle of March.



IF you live within the radius described by this map, you can secure the same good awning service that has been provided by this company for years in the city of Cleveland. Service will be given from Cleveland or from the Akron or Youngstown plant as your location requires.

Wagner Awnings have gained a reputation through care in manufacture and service given to their customers. Since 1866 when the first awnings were made bearing that trade mark name, quality and stability have been built into these awnings. This is only one of the good qualities of Wagner Awnings.

When you know that our salesman, who knows how to make an awning, will call on you and take measures for your awnings and that this order will go through our factory just the same as if it was an order taken in any part of Cleveland, and when it is completed, one of our automobile trucks will come to your house with our regular awning force and erect these awnings, no matter where you live within this described radius, then you will appreciate the service we are offering you. Good roads and a fleet of fifty or more automobiles make it possible for us to serve you in this manner.

There are many points that will be explained in detail to you by our representative when he visits you. We suggest that you fill in the date on the postal attached to this mailer, notifying us when you want our representative to call.

Buy your awnings now so that we can prepare them before the rush and we will bill them to you when they are delivered to you. This makes it convenient for both of us. We make them at the best time of the year for us and you have them at the best time of the year for your use.

Just consider this offer of service to you and realize that it is something new and something to be appreciated from the awning users' stand point.

We shall be pleased to serve you at your request.

THE CLEVELAND-AKRON BAG COMPANY
AWNING DEPARTMENT EAST 40TH AND PERKINS AVE. CLEVELAND, OHIO
THE AKRON TENT & AWNING CO
AKRON OHIO
YOUNGSTOWN TENT & AWNING CO
YOUNGSTOWN, OHIO

The pencil is enclosed for your immediate use in filling in the addressed return post card attached to this mailing envelope and also as a later reminder of the address of the makers of the best in awnings and awning service.

WAGNER AWNINGS

Another piece of the Cleveland-Akron Bag Co.'s sales literature in which the quick and reliable truck service is featured as one of the most important sales arguments. Read the underlined type

Aside from the advertising value of the service which the company's trucks render, the company believes in securing the greatest amount of advertising value and has adopted the plan of painting all of its vehicles, including trucks and passenger cars, in the same color. Each of the company's vehicles is painted a distinctive gray with gold leaf lettering so that when a pedestrian sees a truck of that color with gold lettering he may almost take it for granted that it is one of the Cleveland-Akron company's fleet. As a result, the trucks have become almost as well known throughout the territory surrounding Cleveland as the city from which they are operated.

Awning and roofing salesmen cover the entire territory in which deliveries are made in Ford or Buick roadsters or touring cars. Each man has his particular route mapped out for him daily or weekly, so that maximum efficiency may be obtained. When a request comes into the Cleveland office for an estimate on awning or roofing material, the salesman is immediately sent out on the job with his Ford or Buick or as soon after the order is received as it is possible for the company to notify the salesman in case he is out of Cleveland on a trip of 2 or 3 days' duration. The salesman reaches the prospect, finds his needs, gives him an estimate on the cost of doing the work and then sends the order into the home office.

Trucks Render Quick Service

The well-known gray truck then enters the stage to play its important part in the link of service to the customer. When the truck is sent out it is carefully routed for the trip so that more than one customer may be served by that crew of men going along with it if it is possible to do so. The truck runs directly to the customer's house, factory or to the point where the material is to be set up. The final destination makes no difference, for the entire equipment is on the truck and a crew of men ready to go to work, finish the job and hurry on to the next customer or back to the factory, as the case may be.

Under ordinary conditions, the drivers of the trucks do not assist in putting up awnings or applying roofing material, as a crew of two specially-trained men go with the truck for that particular purpose. In some cases, however, where a job must be done speedily, the driver may assist to the best of his ability.

Salesman Trained in School

The work of the special setting-up crew sent with the truck is further aided and delays eliminated by the fact that all of the company's salesmen must go through a special salesmen's training school maintained by the company at its Cleveland plant before they are sent out on the road to work. As a result, when they reach a prospective customer, they are well qualified to calculate the amount of material necessary and estimate on the cost of doing the work. The school is for salesmen only, the drivers being trained under the supervision of the motor truck superintendent of the company at the time when they are hired.

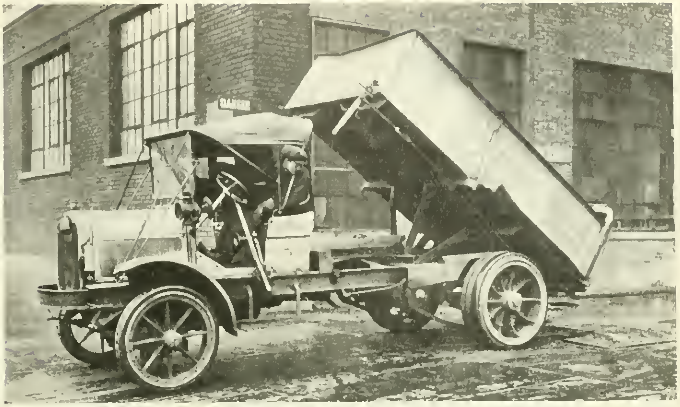
Trained Drivers Reduce Maintenance Cost

In the early days soon after the company had purchased its first trucks it experienced considerable trouble in the maintenance and operation of the vehicles. This trouble was due partly to inexperienced drivers, to untrained mechanics and to some extent to a lack of mechanical perfection in the trucks themselves. All of these difficulties have been overcome by now, however, and a very efficient organization of drivers and mechanics welded together, with a result that very few of the trucks have to be laid up for repairs when they are required for work during the busy season. While all trucks, of course, need a certain amount of repairs and adjustments just like any other form of machinery, this work is done during the slack season in the winter months. Once overhauled thoroughly, it is only seldom that any of the trucks have to be taken into the shop for anything more than minor adjustments.

Pneumatics Undergoing Tests

On account of the great radius of delivery served and on account of the necessity of covering a large mileage from either Cleveland or from the two stations at Akron or Youngstown, the company during the past year has experimented with pneumatics instead of using solid tires on its trucks of 2-ton capacity. On the White 1½-tonners 38 by 7 pneumatics are used in the rear. On the Packard and Pierce-Arrow 2-ton models, 40 by 8 pneumatics are employed both front and rear. While the use of pneumatic tires on trucks of 2-ton capacity has not been carried on sufficiently long to enable the company to arrive at

A Pierce-Arrow 2-tonner fitted with 40 by 8 pneumatics in the rear and equipped with electric headlights any definite comparison between the cost of solid or pneumatic equipment, the pneumatics have enabled the vehicles to cover considerably more mileage daily. It also seems probable that the repair costs on the trucks fitted with pneumatics will be less than was the case when they were operated entirely on solids. The pneumatics have not been used long enough to give any definite line on the cost per mile operated. It is expected, however, that the cost will be greater than with solids, but that the excess charge for tires will be more than offset by the increased daily mileage and by a greater freedom from repairs.


A White 5-tonner equipped with a dump body and employed to haul coal from various Cleveland railroad sidings to the Cleveland-Akron Bag Co.'s plant. This truck gives service to the company instead of its customers

White 5-Tonners Carry Coal

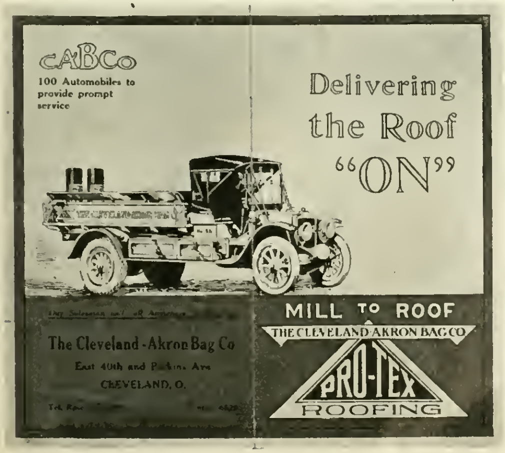
Aside from the use of the company's trucks in the awning and roofing business, several of the 5-ton Whites are provided with dump bodies and used to haul coal from the company's private railroad sidings to the factory. The haul is from 1 to 2 miles, depending on the location of the switch or siding onto which the coal cars are placed.

In this work, too, the trucks have rendered an efficient service, although this time to the company itself instead of to its customers. By employing its own trucks in the coal haulage work, the company is assured of getting the coal to its plant when it wants it, provided the cars have been placed on the switches. Before its own trucks were used in that work, the company on several occasions ran very short of coal because one of the coal dealers did not have a sufficient number of trucks to serve all its customers with equal facility.

All of the trucks up to those of 2-ton capacity are fitted with an express type of body with inclined flareboards, as that type of body has been found most suitable for both the awning and roofing work. The body is not provided with any permanent top, tarpaulins being used to cover the load in stormy weather. Due to the fact that a crew of two men is generally sent out with each truck, specially wide cabs have been provided to seat three men. Furthermore, all of the cabs have been provided with removable storm curtains to protect the driver and the working crew during the winter months while the trucks are in operation. Some of the largest trucks are fitted with built-in windshields and furnished with side curtains that completely enclose the driver and the working crew in the same manner as on the smaller vehicles.

Electric Lights on 2-Tonners

As will be noted in the illustration of the 2-ton Pierce-Arrow mounted on pneumatic tires at the bottom of page 8, the use of pneumatics has permitted the fitting of electric instead of oil headlights. On account of the fact that a large number of the trucks are out after dark by reason of having to cover such a large territory, the employment of suitable lights has been found necessary and electric searchlights mounted on one side of the built-in windshield have been provided on some of the 3- and 5-ton trucks. A Packard 3-tonner with such a searchlight is shown on page 7.


CABCo

100 Automobiles to provide prompt service

Delivering the Roof "ON"

[illegible]

The Cleveland-Akron Bag Co

East 40th and P[illegible] Ave

CLEVELAND, O.

Tel. [illegible]

MILL TO ROOF

THE CLEVELAND-AKRON BAG CO.

PRO-TEX

ROOFING

Another piece of advertising or sales matter in which the service of the motor truck in delivering the roofing material and in carrying the men to put it in place is the main selling argument

Aside from all of the work previously mentioned as being done by the company's trucks, there is still another service which they perform, and that is the haulage of raw products from the various freight stations in Cleveland to the company's plant, where they are turned into manufactured articles ready to be sold to the company's customers. The trucks generally used in that work are provided with a platform body furnished with removable side stake panels which may be taken out for quick loading and unloading.

A good example of the equipment carried on the trucks used in the awning and roofing work may be had from the illustration of the 2-ton Packard mounted on pneumatic tires all around and shown on page 5. Ladders, which are a necessary adjunct in most roofing and awning work, are carried directly over the body flareboards on one side and held in place by straps around two special posts erected at the front and rear end of the body on one side. The ladders are almost as long as the complete overall length of the chassis and body and therefore extend forward of the truck windshield along the side of the cab to a point almost even with the front truck bumpers.

CLEAN BAY STATE LICENSES

BOSTON, MASS., April 16—Motor truck drivers who have been in the habit of allowing their number plates to be covered with dirt and not be legible, and who are also not paying attention to the headlight law, are in for a surprise at the hands of the Massachusetts Highway Commission. Last week inspectors were sent out on the roads and a number of drivers were put in court and fined for one or both of these practices. And their names were taken and a warning given that if caught again they will lose their licenses. It is not at all uncommon to see trucks driving after dark in many places with no lights at all, or only the two small ones. And on many vehicles the number plate cannot be seen because of its position.

Maintaining Overland Haul Prices

FROM many quarters come complaints that motor truck operators engaged in overland haulage are cutting prices. This habit has grown up as a result of intensified efforts to obtain return loads on every trip possible. Of course, every truck owner engaged in overland haulage work should carry return loads—but at a fair price—and not a ridiculously low figure merely to make the earning on the return run more than nothing.

While at first thought, it might seem wise for a truck owner to accept a return load at half or one-quarter of the price for carrying the outbound load, this course will in the long run be very detrimental to that truck operator and to every other covering the same territory.

Once a shipper receives a cut rate, he will demand the same rate from all the truckmen with whom he is doing business. This will result in continued arguments as to the reasonableness of any price given, no matter whether the price quoted insures the truck owner of his reasonable profit or not. When this condition exists, it will be difficult for all truck owners in the work to get a fair price to insure their staying in business.

One argument which the truck owner can present with telling effect when a shipper wants a cut rate simply because the truckman happens to be returning to his home city is to cite the case of the railroads or express companies. Does any railroad give a cut rate on goods moving from one city to another simply because it has an empty freight car going in the same direction? Or does any express company give a cut rate on a package delivered from one part of a city to another, simply because it has a wagon or motor truck going in the same general direction? Why, then, should a motor truck operator, who sells nothing but transportation as a business, be asked to give a cut rate simply because he would otherwise return home empty?

Pneumatics May Revolutionize Truck Design

THE great increase in the use of giant pneumatic tires on trucks of 2 tons capacity and over may eventually result in a complete revolution in the design of truck chassis intended to be employed with such tires instead of solids. It seems apparent that a great reduction in weight can be secured due to the better cushioning effect of pneumatics as compared with solids. Up to the present time, little has been done along this line. When a truck owner wants to use pneumatics instead of solids, the truck maker generally furnishes the identical chassis as ordinarily fitted with solids and tells the owner that he will be able to secure greater speeds with the same degree of safety as when solids are used. It will not be long before the truck owner will be dissatisfied with such a method and demand a real pneumatic-tired chassis.

The results of the experiments in running large pneumatic-tired trucks overland between Akron and Boston for two years seem to indicate that an ordinary 3-ton chassis designed for use with solid tires can safely carry 5 tons when mounted on pneumatics. After further investigation, it is even possible that several hundred additional pounds may be shaved off the 3-ton chassis weight when used to carry 5 tons on pneumatics. It is also evident that engines of greater power must be installed in order to permit the greater speeds made possible by the use of pneumatics to be secured.

Value of Stockyard Unloading Facilities

THE value of proper stockyard loading and unloading facilities is not so much a benefit to the stockyards company installing them as it is to the truckmen hauling to and from those yards. Intelligently-worked out loading and unloading platforms once installed at one yard will be copied by other yards.

This will result in better conditions all around and permit the truckmen to deliver and take away more stock and thereby increase their earning capacity. While there is a comparatively small number of stockyards, there are several thousand truckmen hauling to those yards and it is these truckmen who will benefit most.

Trucks Increased Output of Nevada Ore Mines

Soldiers at Front Did No Nobler Work Than Truck Drivers

ONE of the largest deposits of manganese ore yet located in the United States is about 17 miles from Las Vegas, Nev. The Government was sorely in need of manganese during the war and the motor truck helped to overcome almost insurmountable difficulties of transportation in order that these mines could be worked. Were it not for the trucks keeping the mines in contact with freight cars always waiting at Las Vegas, the ore deposit would have been no more valuable to this country in war time than it was to the enemy. But the trucks did the job, a fleet of twelve and trailers being employed constantly, as the mines are operated incessantly, and if the War Industries Committee cared to investigate further the question of truck utility, a visit to Las Vegas certainly would be impressive.

The ore deposit was discovered last year and operation of the mines began in November. About 200 tons of ore are now removed daily and before long this supply will be more than doubled. Las Vegas is a desert town and it is necessary to work three shifts of men. Consequently, labor difficulties are added to those of transportation. During daylight hours it is excessively hot above ground and at night it is chilling cold. The road between the mines and the railroad is terrible and soldiers at the front did no nobler work than did these desert truck drivers.

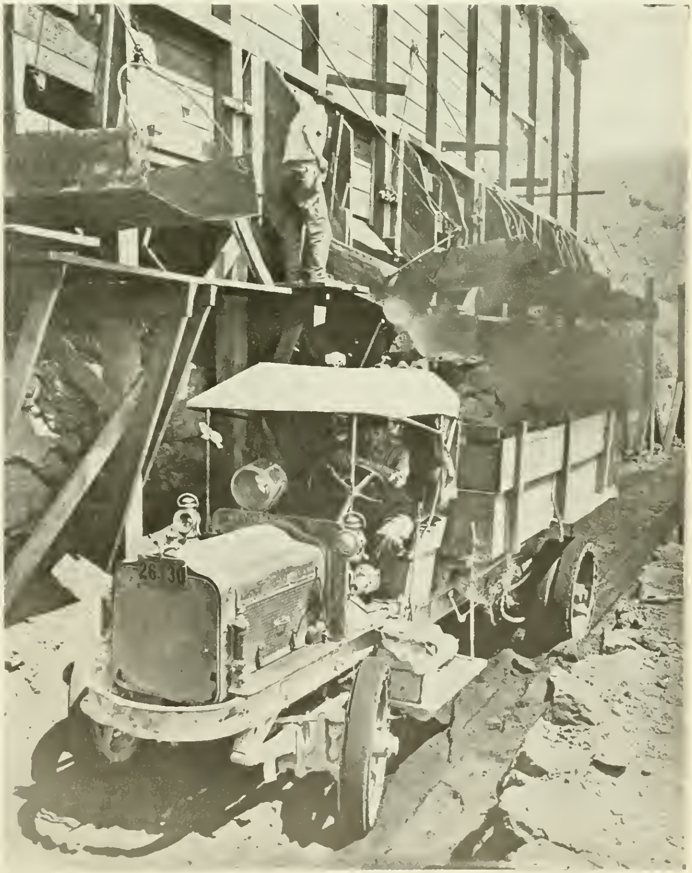
Manganese ore is oily and almost as black as coal. It attracts and absorbs heat so that when the trucks reach the cars after the trip from the mines the vehicles and their loads are hot to the touch. In winter, water in a pail set on the desert sand will be covered with a coating of ice, but if set on a block of manganese the water becomes tepid. Laborers handling the ore become so begrimed they are almost unrecognizable. They demand a high scale of wages and get it, as the country must have the manganese to harden and toughen iron and steel, and during the war the hardest and toughest iron and steel possible to obtain were needed as they never were before.

Now that the war is over, the mines have not been abandoned, since manganese ore is still required for various forms of steel used in industrial as well as war work. Neither have the trucks been taken off their task, for during the time of war stress they proved conclusively to be the only means of speeding up the mine production. Notwithstanding the rigors of the service, the trucks performed admirably well. Their efficiency was increased by rapid loading and unloading. At the mine end giant overhead hoppers, such as are generally used by contractors in excavation work, were employed and fitted with chutes by means of which the ore was directly loaded into the truck bodies by gravity. One of the hoppers and a truck in the act of being loaded are shown in the illustration on this page.

It may be seen that the ore is received from the mines in large chunks, which makes necessary the use of sideboards on top of the regular truck body in order to enable it to carry its full rated capacity load. The excessively hot weather during the mid-day hours on the run across the desert to Las Vegas made it necessary for each of the truck drivers to provide himself with some form of top in order to shade him from the direct rays of the sun. The passenger car type of top was employed in most cases, as shown in the accompanying illustration.

Due to the fact that the trucks were operated day and night during the height of the war work, each of the trucks was furnished with a large searchlight mounted on the dash to illuminate the unlighted road across the desert and thereby prevent disastrous collisions.

While the drivers of this ore fleet of trucks did not have to dodge bursting German shells, as did some of our Motor Transport Corps drivers abroad, they did just as noble a work as the men overseas. The ore truck drivers were begrimed from head to foot and were subject to the most radical changes in temperature, from the sweltering heat of the noon-day hours to the shivering cold of the average Nevada night.



One of the big 5-ton Whites being loaded with the hot manganese ore direct from overhead hoppers, out on the desert, 17 miles from Las Vegas, Nev.

More Millions Voted for 1919 Roads

2 Millions of New Construction Ordered in Pennsylvania

WASHINGTON, D. C., April 23—Funds to the amount of $266,750,000 are available for use between now and 1921 for State roads, according to reports from the Department of Labor. For the present fiscal year there is available $77,600,000, but this amount obtainable from the Federal Government for 1919 is small compared with the appropriations involved in plans now being carried forward in all parts of the country since projects in eighteen states total $755,000,000. These figures give promise of great industrial expansion.

For the week ended April 12 the State of Pennsylvania alone ordered highway construction totaling $2,034,378, according to reports received by the Bureau of Public Roads. This is the largest amount of road work contracted for in any 1 week by any state and is regarded as an indication of the great amount of highway construction that is anticipated in the next few years. The Federal Government under the Federal Aid Road Act will pay $911,407 of the Pennsylvania contracts. A bond issue of $50,000,000 for road building was recently authorized in Pennsylvania.

Great Britain will spend about the same amount that Pennsylvania has decided to use in road building, about $50,000,000. There is much opposition to the English Government plan to create a new ministry which will have charge of all systems of communication in the country—roads, railways and canals—because it is feared that the minister-elect, Sir Eric Geddes, who has been identified with railways, will discriminate in their favor. The scheme of laying 2000 miles of light railways called agrails, also is not in favor, as it is believed that this system will be detrimental to the motor transport service.

In view of the attitude of Englishmen, who confidently look forward to such rapid development of the motor-transport service that freighting will become much cheaper than it is under present conditions, it is pointed out that the United States should seriously look toward the future when railway freight transportation will be largely supplemented by the use of the great number of trucks.

MICHIGAN MAY RAISE TRUCK FEES

LANSING, MICH., April 19—Truck fees in the State of Michigan may be boosted by the State Legislature from 15 to 25 cents per 100 pounds on all trucks in addition to an increased tax on truck horsepower of from 15 to 25 cents.

The license increase is embodied in a substitute measure for the Evans bill. The original Evans bill would have required all county treasurers to be sub-agents for the Secretary of State, but it is claimed in many counties that sub-agents are unnecessary. As amended, the license law gives the Secretary of State right to send his employees into the counties to handle the license work.

In addition to an increase in the license cost of trucks, a straight tax of 50 cents per 100 pounds is provided for all trailers. It is estimated that the revenue from the increased tax will amount to approximately $800,000 per year. The bill, it is said, will meet with little opposition in the House and Senate.

PROPOSE TRUCK AND TRACTOR LEGISLATION IN NEBRASKA

OMAHA, NEB., April 25—Two bills passed by the session of the Nebraska Legislature, just closed, will have an important bearing upon the use of motor trucks and tractors in this state.

House Bill No. 85 provides that no truck or tractor shall be sold in Nebraska until a sample model has been tested by three competent engineers of the State University at Lincoln, who shall report to the State Railway Commission. The commission will compare this report with the specifications and claims of the manufacturer or agent as set forth in advertisements or sales arguments, and shall deny permit for sale if these specifications or claims shall be found to be false in any way.

The ruling of the Railway Commission shall apply only to the particular make of vehicle under consideration, and not to the whole line or any other product of the company which manufactures other vehicles which do meet specifications and claims.

The commission is also given power to deny sales permit for any truck or tractor on complaint of any two bona fide customers, properly substantiated that an adequate service station, with full supply of parts, is not maintained within the state. The law becomes effective July 15.

The second bill, Senate File No. 86, declares the sale, trade or disposition of any truck or tractor void unless the necessary supplies and repairs are carried at some point within the state, being very similar to the first measure. It differs in voiding the sale after consummation as against forbidding sale beforehand. This law is effective July 18.

Coming Events

May 21........	New York City, Monthly Meeting of Motor Truck. Assn. of America, Automobile Club of America, 247 West 54th Street.
May 10-17.....	Bristol, Va.-Tenn., Great Southern Automotive Show.
May 20-24.....	Quebec, Can., Good Roads Congress.
Sept. 22-24....	Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue Stratford Hotel.
May 1-3.......	Bloomington, Ill., Truck and Tractor Show, Court House Square.

720 Bodies Favor the Townsend Measure

Create Highway Commission to Control Road Building

WASHINGTON, D. C., April 18—More than 720 organizations in the United States have endorsed the Townsend bill which provides for a Federal highway commission to control highways and highway construction, according to the report of the Highway Industries Assn. The organizations include:

393 commercial organizations;
27 national trade organizations;
31 state trade organizations;
72 rotary clubs;
37 state and county good roads organizations;
62 travelers' associations;
75 united commercial travelers;
12 kiwanis clubs;
10 transcontinental highway associations.

Of these 238 have been appointed good roads committees to co-operate with the Highway Industries Assn. Committees are being appointed by the balance.

The Highways Industries Assn. has received 365 acceptances of membership for the Federal highway council which is being formed to co-ordinate the efforts for the national highway development. Sixty-four state highway commissioners and engineers, representing forty states, and 301 prominent men, have signified their intention to aid.

REO TRUCKS FOR CANADIAN M. P.

LANSING, April 24—Seven Reo motor trucks will go into the Canadian wilderness, having been purchased for the Canadian Mounted Police. The machines are to be used in carrying supplies to isolated outposts.

TRUCKS AS RAIL FEEDERS

WASHINGTON, D. C., April 28—Congressman John J. Esch of Wisconsin, who is slated to be chairman of the Committee on Interstate and Foreign Commerce when Congress next convenes, is strongly in favor of motor truck lines as feeders to the railroads. As a result he expects to take the matter up with the Committee on Interstate and Foreign Commerce when it next convenes. At this time the question of what will be done with the railroads will be discussed. Mr. Esch believes that the motor truck route might be treated, when established and when the population and volume of traffic warrant, just as feeders or short line railroads are treated, giving the motor truck line a division of the through rate, also applying the through bill of lading to traffic originating on the motor truck route to be transported by trunk line to destination or applying it in reverse order on traffic originating on trunk lines to be delivered to destination on the truck line.

Will Build Highway to Honor Pershing

Dept. of Labor Has Taken Charge of the Work

WASHINGTON, D. C., April 18—The Department of Labor plans to construct a highway to be known as the Pershing Highway across the continent from New York to San Francisco, touching various places connected with the life of the commander of the American Expeditionary Forces. A temporary association has been formed for this purpose, and it is believed all the states will co-operate. A preliminary meeting was held in Lincoln, Neb.

The approval of Congress will be necessary, and appropriations must be made by Congress. Nearly 800 road projects have been approved in various states, and $21,000,000 is now available for state roads, according to the Federal Road Aid Act by which the Government allows the individual states as large an amount as the states themselves appropriate for road construction.

Nebraska has taken the lead in the Pershing idea and also has thirteen road projects of 388 miles that have been approved at a cost of $809,401.43, of which $320,206.66 will be from the Federal funds. New York State has received Federal approval for thirteen projects of 61 miles at a cost of $1,201,850, and California has had approved six projects covering 96 miles at a cost of $1,290,613.84.

NEW ST. LOUIS TRUCK LINE

ST. LOUIS, MO., April 12—A new motor truck delivery service has been established between St. Louis, St. Charles, St. Peters and O'Fallon, Mo., known as the St. Louis, St. Charles, St. Peters and O'Fallon Express Co. The officers of the company are E. F. Humphrey and L. B. White, who have been previously in a similar business.

Plans are being prepared by the company to open a general garage in O'Fallon, the terminus of the line, and to arrange for return loads along the different routes between the points mentioned.

TRUCKS FOR CANADIAN FARMERS

WINNIPEG, MAN., April 20—The rapidly growing motor truck market of Western Canada is receiving the attention of practically all the important motor truck factories. New firms to handle motor trucks exclusively are opening their doors in Winnipeg and others are planning entry, while many of the old-established passenger car firms which in the past confined their efforts to cars are now adding motor trucks. It would therefore look as though exclusive truck dealers will spring up in Winnipeg as automobile dealers sprang up a year or two ago. Most of the established distributers here handle trucks of the same make as their passenger cars, and manufacturers' representatives find it no easy matter to link up with a going concern that has had experience in truck salesmanship and distribution. With the amount of work promised on Manitoba market roads this summer the farmer will be more than ever interested in motor trucks for hauling farm products, and the project of Rural Motor Transports, Ltd., if carried out with success this summer—which seems quite probable—will serve better than any other agency possible to convince farmers that motor haulage is not only feasible, but profitable.

TRUCKS DELIVER MAIL

ST. LOUIS, MO., April 22—Truck delivery of mail between St. Louis, Mo., and East St. Louis, Ill., is now in progress, coming about as a result of suggestions made to the Postmaster General at Washington by Colin M. Selph, Postmaster at St. Louis. The new motor delivery of the mail eliminates the delay hitherto encountered in rail delivery through the slow movement of trains in the local switching district.

The trucks make six trips daily between the two cties. Mail arriving at East St. Louis from the east by rail is loaded upon trucks and immediately dispatched to St. Louis. Mail arriving in St. Louis from western points is similarly delivered to East St. Louis.

MAY USE FILMS FOR HIGHWAY DEVELOPMENT

WASHINGTON, April 16—Motion pictures will be used extensively in the United States by the Government through the Visual Instruction Section of the Department of the Interior to further highways construction, highways safety and other matters of national interest. The National Automobile Chamber of Commerce has been requested to secure films from the manufacturers and furnish them to the Department of the Interior for this work. Lists of the films on hand will be compiled in the near future. Distribution of the films, it is expected, will be made through various university extension divisions and other organizations, such as boards of education in the various states and communities. Films will be distributed free by the Government. Motion picture machines are to be purchased by the individual community, which may, if necessary, arrange series of benefit programs in order to raise necessary funds.

TRUCK ASSN. FOR TORONTO

TORONTO, ONT., April 20—A meeting of truck owners will be held very shortly in Toronto. Many truck owners will, it is expected, be present at the meeting and it is the intention at this gathering to discuss ways and means of forming an association to safeguard the rights of truck owners and operators in the city of Toronto and outlying districts. If it is decided to go ahead with this proposition, officers will be elected and a strong combination formed.

Deadlock Over Mass. Truck Fees

Road Commissioners, Owners and Dealers Cannot Agree

BOSTON, MASS., April 26—There is a deadlock over the fees for motor trucks which the Highway Commission is trying to have put through here. The conference between the representatives of the motor organizations and the legislative committee with the Highway Commission could not reach a decision, and another talk will be held. The motor dealers favor doubling the fees, the Highway Commission wants more, and the truck owners are against any raise. Some of the dealers are against a raise, too, so that all is not unanimous among the different bodies.

MICH. PASSES GOOD ROADS BILL

DETROIT, April 21—The state highway department is preparing to spend from $3,000,000 to $5,000,000 this year on roads. The favorable vote on the $50,000,000 good roads issue has given the legislature new lease of life. To carry out the good roads program it will be necessary to call an extra session after May 7. Attorney General Groesbeck has held the road bill may be introduced now and left in abeyance until all restrictions in the state constitution have been complied with. Jackson County supervisors have voted to issue and sell $500,000 worth of good road bonds this year, same to be disposed of at once. The program calls for the construction of 57.95 miles of gravel roads at between a cost of $200,000 and $250,000. The remainder of the program will be outlined later.

REO USES TRUCK LINES

LANSING, MICH., April 18—Reo is about to establish a truck line between Lansing and Muskegon, 105 miles, for quick delivery service on castings. While the roads in some sections of this route are rather poor, the company will use heavy trucks, owing to the bulkiness of the material and the body room offered by the larger type of truck.

That company has been forced to prove much that has been claimed by the highway transportation committee of the National Council of Defense relative to the motor truck as an economical solution of the short haul express. Owing to a shortage of malleable castings the company has been compelled to establish its own motor express between this city and Albion.

Minute data covering everything from oil, tire and other depreciation, to gas, drivers' wages, etc., are being kept by the transportation officials, and a saving of $17 a trip has been shown. Each truck is of the speed-wagon type, carrying an average load of 2650 lb. The distance to Albion is 41 miles. Two trips are made daily, a round trip consuming 4 hr. 15 min.

Transport Committee Is Reorganized

Five Government Departments Represented in New Body

WASHINGTON, April 11 — The Highways Transport Committee of the Council of National Defense has been reorganized so as to include direct representation from the Office of Public Roads, of the Department of Agriculture, the Bureau of Markets of the Department of Agriculture, the Post Office Department and the Department of Commerce. The committee as reorganized comprises:

John S. Cravens of the Council of National Defense, chairman;

James I. Blakslee, Fourth Assistant Postmaster General;

J. M. Goodell, consulting engineer, Office of Public Roads;

James H. Collins, investigator in Market Survey, Bureau of Markets;

R. S. MacElwee, second assistant chief, Bureau Foreign and Domestic Commerce;

Charles W. Reid, executive secretary;

G. B. Clarkson.

The committee will be assisted by the Highways Transport Committee Advisory Board, comprising:

William Phelps Eno of Washington, D. C.;

Prof. Arthur H. Blanchard of New York;

C. A. Musselman of Philadelphia;

Raymond Beck of Akron, Ohio;

John T. Stockton of Chicago.

Special co-operation and attention is going to be given to the short haul problem as connected with the United States Railroad Administration and rural motor express as related to interurban electric line and waterways traffic.

PENN. FURTHERS FARMERS' TRUCK EXPRESS

PHILADELPHIA, PA., April 24—Farmers' meetings are being held in the Pennsylvania district, also portions of Delaware, Maryland and New Jersey, to arouse interest in and show the advantages of the farm-to-table plan of delivery of the National Post Office Department. The most recent meeting was in Middletown, Del., at which E. F. Roberson, rural motor agent, and Mark J. Mullin, assistant superintendent of mails in Philadelphia, spoke, presenting arguments showing how the use of the parcel post system will add to the farmer's profits. Commission men are reported to have made incursions into this territory to head off the Government's plans. Mr. Mullin is endeavoring to have the farmers pledge their coming crops to the patrons of the rural parcel post system and this has started propaganda from the commission men to offset it.

Debates are encouraged at the farmers' meetings. The farmers will be asked to furnish a list of products that will be available during the summer and, as near as possible, the quantities. A list of such farmers as pledge their crops to the parcel post system will be compiled and supplied to consumers. In this way, and aided by the Government motor trucks, the Government hopes to adjust the difficult problem of distribution for the betterment of conditions for both farmer and consumer. Philadelphia commission men, instead of opposing the plan, are co-operating, but the commission men outside of Philadelphia and in adjoining states seem to view the plan as hostile to their interests.

SEIBERLING HEADS COMMITTEE

AKRON, OHIO, April 28—F. A. Seiberling, president of the Goodyear Tire & Rubber Co. and of the Lincoln Highway Assn., has accepted the chairmanship of the new highways committee of the Chamber of Commerce of the United States.

GOODYEAR SCHOOL FOR TIRE REPAIRS

AKRON, OHIO, April 28—The Goodyear Tire & Rubber Co. is conducting a tire repair school to train men individually in this class of work. The 2-week course includes vulcanizing and instruction on the makeup of tires and tubes.

ANOTHER TRUCK FLEET FOR L. I.

NEW YORK CITY, April 28—Long Island farmers are now being served by the Long Island Rural Motor Express Co., which is running eight Day-Elder trucks over three routes, known as the South Shore Route, the North Shore Route and the Suburban Route. For the past 6 weeks that company has been transporting flowers from the greenhouses on the south shore to the wholesale flower district of New York City. It is also handling ducks from towns along the shore and expects to be equally busy during the oyster and garden produce seasons. Business is expected to increase by the middle of summer so as to warrant the running of a fleet of from eighteen to twenty trucks.

When summer arrives there will be considerable business in hauling ice cream and other supplies to the summer resorts on the north and south shores. J. Kent Warden, president and general manager of the company, states that the 3-ton truck with a 2½-ton trailer is the most profitable size unit for operation.

PENN. GOOD ROADS ASSURED

HARRISBURG, PA., April 26—Governor Sproul has signed the bill enabling the state to issue the $50,000,000 in bonds for the improvement of Pennsylvania's highways, authorized at the election last fall. The Governor is authorized to borrow the money as needed, the bonds to bear 4½ per cent interest and not to run more than 30 years. They are to be sold to the highest bidder, the proceeds to go into the state bond road fund.

1,403 Trucks Exported During February

An Increase of 496 Over January, Valued at $4,270,542

	Trucks	Value
1918		
February	766	$1,917,638
1919		
January	907	2,375,584
February	1,403	4,270,542

WASHINGTON, D. C., April 28—February truck exports numbered 1403. These were valued at $4,270,542, as compared with 907 trucks exported in January, valued at $2,375,584, a gain in value of $1,894,958 and an increase of 496 in number. February truck exports in 1918 numbered only 766 and were valued at $1,962,797.

Though the February truck exports are practically double those of January, the distribution is far from satisfactory, in the sense that many countries capable of buying motor trucks from the American companies, countries which have industries needing up-to-date road transport, are not purchasing regularly.

For the time being our exports to the United Kingdom are in bad shape, due, doubtless, to the embargo which is in force. It is not anticipated, however, that the present restrictions will be maintained for any considerable time and there is ample evidence that there is a strong demand for our trucks in Great Britain.

PHILA. TRUCK ASSN. OUTING

PHILADELPHIA, PA., April 26—The Motor Truck Assn. of Philadelphia will hold its annual outing on June 21 at Kugler's Mohican Club, with the Philadelphia Automobile Trade Assn., the Automobile Accessories Business Assn. and the Camden Automobile Trade Assn.

TRUCK EXPRESS FOR TYRONE

TYRONE, PA., April 24—Business men of Tyrone are planning the establishment of a motor express route, having Tyrone as the terminal and covering the country en route to Huntingdon and State College. The rail route over this tract is long and slow, and from 3 to 4 days are consumed in the actual delivery of freight and express by steam line.

With a motor express as planned deliveries can be made from Tyrone to any point on the route in less than half a day. The elimination of the Tyrone Transfer Co. has made the local freight movement to points east of Tyrone toward Huntingdon one of the slowest in the state, although the distance is only 20 miles. With the motor route established, persons from outlying points would be daily shoppers in Tyrone, and the business interests of this place fully appreciate what it would mean in increased profits.

TRANSPORT IN PRODUCTION

MT. PLEASANT, MICH., April 16—With 500 orders for trucks on its books, the Transport Motor Truck Co. has commenced production.

S. A. E. Summer Meeting at Ottawa Beach

1000 Expected to Attend—To Be Held June 23 to 27

NEW YORK, April 19—The summer meeting of the Society of Automotive Engineers will be held at Ottawa Beach, an exclusive summer resort on the east shore of Lake Michigan, 6 miles from Holland. The society has secured the exclusive use of the Ottawa Beach Hotel and cottages for June 23-27. Accommodation will approximate 1000 members and guests. The standards meeting will be held Monday, June 23. In the evening the annual business meeting will take place and Tuesday, Wednesday, Thursday and Friday professional sessions will occupy the program. Two half days will be given to recreation and sports.

The rule which barred women from attending the session the last 2 years during the war has been waived, and members will have an opportunity of taking their families and combining vacation with the summer meeting.

TWO-WAY LOADS FOR NEBRASKA MOTOR TRUCKS

OMAHA, NEB., April 27—A Ship-by-Truck Bureau has been established here by the Omaha branch of the Firestone Tire & Rubber Co. The company will take up the work of promoting truck freighting within a radius of 50 miles which the Omaha Chamber of Commerce abandoned when a return loads bureau proved unprofitable to the agent.

W. B. Alexander, manager for the Firestone branch here, will take charge of the work. His territory covers Nebraska, South Dakota, western Iowa, Wyoming and Colorado. At present virtually all trucking in Nebraska is on the one-way haul plan, and is handled by individuals. The new venture is called the establishment of a clearing house for all information regarding truck routes, shippers and schedules.

FOUR BEARING COMPANIES CONSOLIDATE

NEW YORK CITY, April 17—The S.-K.F. Administrative Co., which was formed in May, 1917, to consolidate the interests of the S.K.F. Ball Bearing Co. and the Hess-Bright Mfg. Co., has been consolidated with the Atlas Steel Ball Co. and the Hubbard Machine Co., into a new company to be known as S.K.F. Industries, Inc. The Atlas company has for some time been controlled by the S.K.F. Company.

PHILADELPHIA TRUCK PARADE

PHILADELPHIA, PA., April 26—Two hundred motor trucks, representing manufacturers and business houses, made a special "ship by motor truck" parade through the central part of the city as a demonstration in the campaign to that end. The trucks ranged from fast delivery vehicles of ½-ton capacity to 7-ton army motor trucks. The procession was headed by the Navy Yard band. Each of the cars was decorated with Victory Loan posters, slogans, American flags and bunting in the national colors.

United States army, navy and marine corps transportation services were represented in the parade, which was in divisions, each manufacturer having a separate section. Two large trucks of the Firestone Tire & Rubber Co., of Akron, Ohio, just in from Washington, participated.

MOTOR VEHICLE DEPT. FOR PA.

HARRISBURG, PA., April 16—A department of motor vehicles is provided for by a bill introduced into the senate by Senator Dix of Philadelphia. The measure provides for a commissioner at $5,000 a year and a deputy commissioner at $4,000. It would permit the establishment of branches in Philadelphia, Pittsburgh, Erie, Scranton and such other cities as the commissioner may deem advisable. These branches would be in charge of an agent with a force of employees found adequate to conduct the business of the department. The agent would be paid by fees, with a minimum limit of $2,000 a year. The bill also provides for a chief inspector and a corps of inspectors. License fees for passenger cars would remain the same as at present, but fees for trucks would be increased. Car speed is regulated.

KANSAS CITY CO-OPERATIVE DELIVERY

KANSAS CITY, MO., April 16—The Merchants' Delivery Co., organized by twenty merchants operating millinery, ladies' wear, men's furnishing, clothing and specialty stores, has established a service whereby merchandise will be delivered to various parts of the city at a standard rate for the members of the company. The city has been divided into zones.

For deliveries in zone 1, which covers about 4 miles from the retail district, the rate is 12 cents per package.

Deliveries in zone 2, which covers all territory outside of zone 1 and within the city limits, a charge of 15 cents per package is made.

For deliveries outside the city within a 7-mile radius the standard rate is 30 cents.

Instead of the merchants paying in cash or by check they purchase stamps of 12, 15 and 30-cent values. These are attached to the packages as they are prepared for delivery. The stockholders are former patrons of the Burgher Package Delivery Co. of the same city, which went into bankruptcy recently. James Burgher, formerly proprietor of the delivery company, is the manager of the co-operative concern. The Merchants' company is operating ten light delivery Ford trucks, two 1-ton Fords and two ½-ton Dodge trucks.

Trucks to Carry Fresh Bread to Farmers

Also Plan to Carry Farmers' Wash to City and Back

PHILADELPHIA, Pa., April 19—Well satisfield with the operation of the motor truck parcel post system from farm to consumer in the vicinity of Philadelphia, Fourth Assistant Postmaster General James Blakslee is investigating, with a view of using the motor trucks owned by the Government to send out bread and laundry from Philadelphia to the upstate distributing centers of produce and to farmers. Fresh bread, for instance, would be delivered in Lancaster and vicinity in time for the evening meal. Many farmers would be glad to patronize the Philadelphia laundries. The finished work could be delivered in good time and the cost is only 1 cent a pound on all classes of goods handled by the Government trucks. This would greatly aid in solving the return loads problem for the Government-owned trucks.

WAR DEPARTMENT EXPLOSIVES FOR NEW ROADS

WASHINGTON, April 18 All surplus TNT and other explosives owned by the War Department and which can be used for building highways and other similar works have been turned over to the Department of the Interior. A portion of the explosives will be used for clearing lands if the soldiers' settlement bill is passed by the next Congress to allow farm lands for honorably discharged soldiers.

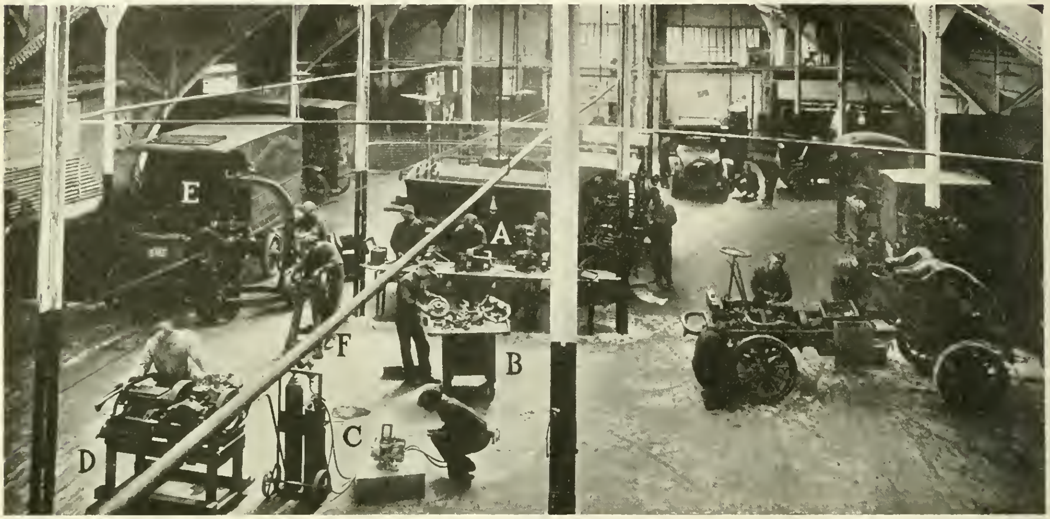
NEW RADIATOR SERVICE

DETROIT, April 21—The United Motors Service Co., Inc., will shortly take over all service work in conection with the Harrison Radiator Co. The Harrison Co., while a member of the United Motors organization for some time, has not been included in the United Motors Service work. The United Motors operates 11 service branches in all sections of the country.

TRUCKS AND AIRPLANES TO CO-OPERATE

WABASH, IND., April 16—In order to expedite the shipment of repair parts and other unusual service demands to distributers and service stations in all parts of the United States, as well as to users of Service trucks who are engaged in overland haulage, the Service Motor Truck Co. has made arrangements to make such shipments by airplane. J. P. Porter will be chief pilot, and his assistants will be Harold C. Brooks and V. P. Hollingsworth. Oscar Bricker is in charge of the hangars and landing field. A 44-acre field has been prepared exclusively for landing and the construction of hangars has been completed. Model J-N-4 Curtiss airplanes will be used.

How Fleet Owners Can Cut Costs of Garage and Service Maintenance



Portable Devices in Repairshop Save Time, Money and Energy

All work is done near the truck instead of in separate parts of the garage. A is a working bench occupying space in between two columns that would otherwise be wasted. B is a portable workbench which holds all of the necessary tools and parts for a unit repair job. C shows how the welding outfit is carried. D is a stand for holding the engine and gearset. E shows the method of lifting out engines by means of a crane and a pair of tongs which fit into the port holes of the engine; and F is a small stand to hold the crankcase during repairs

THE motor truck fleet owner operating more than five trucks and maintaining them himself can obtain many good money-saving ideas from the truck manufacturer's service station serving the small fleet owner. In the case of the owner of one or two trucks, the truck manufacturer's service station in most cases will enable him to maintain his trucks at a lower cost per year on account of the elimination of the necessary equipment and overhead necessary should he attempt to do the work himself.

The difference in the cost of doing the work himself and of having it done by a service station lessens as the number of trucks maintained increases. As the owner's fleet gets to be over five trucks in number, he can usually maintain them cheaper himself than by having the work done outside, unless the service station happens to be in close proximity to his own place of business or garage.

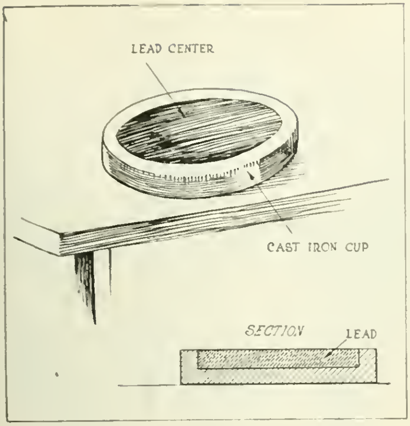
Methods Used in Truck Service Station

The truck service station built up on the sole idea of giving efficient service must necessarily employ methods which will enable such service to be done economically. One such service station is that of the Autocar Sales & Service Co., New York City. The methods of performing service work by that company are described herewith and are of value to the Autocar fleet owner and to other fleet owners who may apply the same ideas to the solution of their own maintenance problems.

Important to Cut Labor Costs

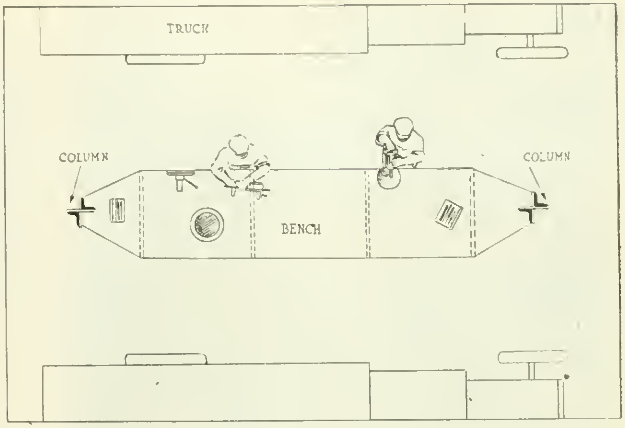
In all truck maintenance work, the item of labor is a very important one, so that the fleet owner should attempt to reduce the cost of labor in every way possible. In the case of the Autocar service station, whose methods are described here, this is accomplished by the use of various portable devices of all kinds for moving tools and engine parts from the trucks to the benches where the work is done and back again from the benches to the truck. The cleaning of truck parts is also quite a problem, but one which has been satisfactorily solved in the Autocar service station. Then again, considerable labor can be saved in filling lubricating tanks by some mechanical means to lift the barrels off the floor. It is also very important to prevent the spilling of oil during the barrel-emptying operation. Both of these conditions have been well met by a device described on the following pages.

In the average garage, the problem of utilizing every



Save the Bench—Hammer on Lead

Wear and tear on wooden benches is eliminated by the use of this device during any pounding or hammering work. It consists of a cast-iron disc hollowed out in the center to form a cup to hold lead. All hammering is done on the lead center



A Neat Way to Save Floor Space

This bench is located between columns and not only occupies space that would otherwise be wasted but saves time and energy by bringing the repairman nearer to the trucks

bit of floor space is also important and has been well worked out by the Autocar company as shown in one of the accompanying illustrations. In engine repair work that company has also devised a portable grinding device for truing up the crankshaft bearings.

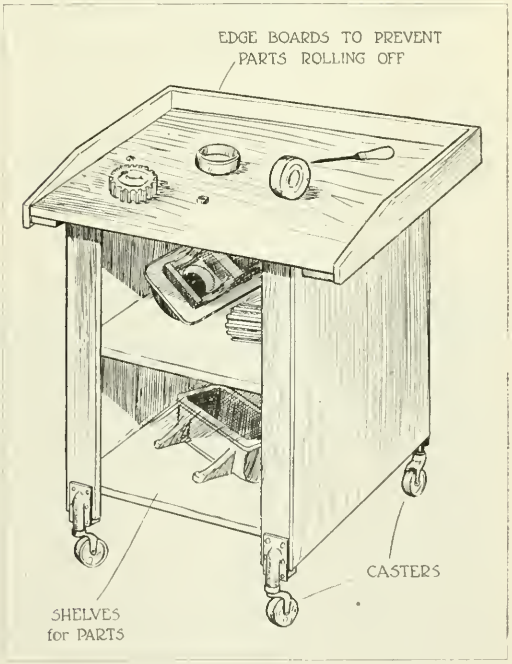
The time and labor-saving features of portable devices used in garage maintenance are becoming more and more apparent each day to the small as well as the large fleet owner. At the New York Autocar service station, where much overhauling is done, as well as installation of new parts, this work has been simplified by the use of portable devices that can be quickly rolled around to each individual piece of work. For instance, a truck comes in to be equipped with a new gearset. Instead of wasting time and labor in going back and forth between the truck and the spare parts department for the needed part, the repairman rolls the portable repair bench up to the parts department, collects everything that is needed for the work, rolls the bench back to the truck and remains there until the work is finished.

Portable Parts Bench

This bench is mounted on four swivel-castor wheels and is large enough to carry the needed parts for most any installation. It is 4 ft. square on the top and about 3 ft. square in a supporting compartment underneath. The compartment is made in two divisions, and holds tools, parts, etc.

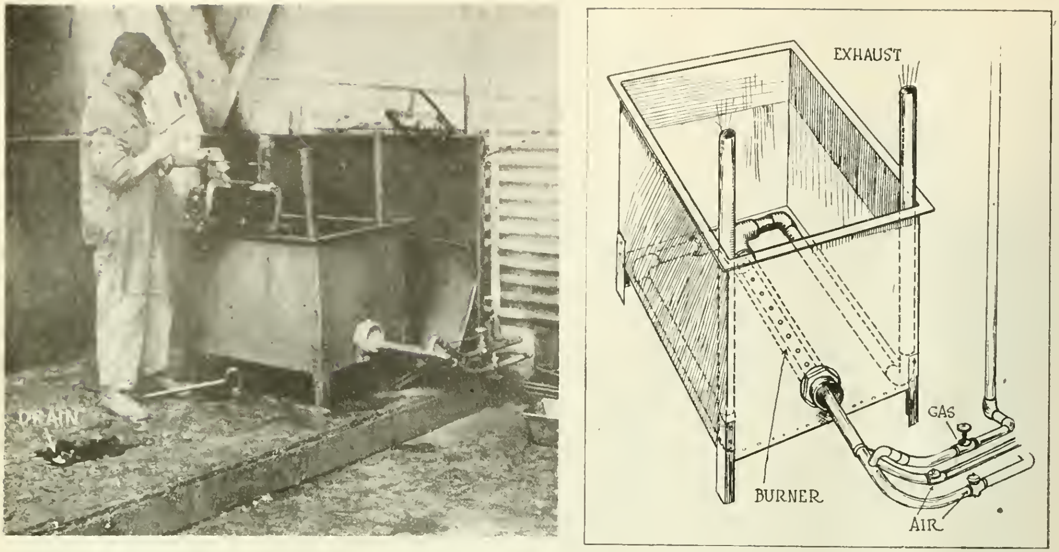
All welding work is done near the truck by means of a portable two-wheeled truck which carries two oxygen tanks. As a result, no time is wasted in carrying the part to any special department set aside for this work. This department may be down on some other floor or may be far enough away to cause much inconvenience in carrying the parts.

Following out this idea of saving steps for the repair-


EDGE BOARDS TO PREVENT PARTS ROLLING OFF
CASTERS
SHELVES for PARTS

Valuable Time Saved by This Portable Bench

Instead of running back and forth for parts and tools during a parts repair, everything needed is carried on this bench. It can be moved around to each individual job



Parts Dropped Into This Vat Are Washed in Ten Minutes

All oil and mud collection will come off the parts when put in a boiling mixture of 60 gal. of water and 16 lb. of soda. The mixture is heated by a gas burner of the Bunsen burner type. This method of cleaning is most economical, as one filling of the tank will last 1 week

man and keeping him steadily on the job without being interrupted by needless trips back and forth between the truck and the parts department, the Autocar company has devised a plan whereby engines can be quickly taken out and repaired and new ones installed in their places while the trucks are in the repair shop. Of course, this plan is more applicable to a service station where a number of engines are always on hand for installation, but the device used in the lifting out of the engine and the portable stands for mounting the engine are of much value to medium or large fleet owners who do their own repair work.

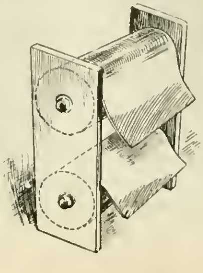
At the Autocar company's service station when a truck comes in for a new engine or to have it repaired, a small crane is rolled up to the vehicle, the chain pulley is lowered to the engine, and, by means of two pairs of tongs, similar to ice tongs, it is lifted and swung onto a portable stand. These tongs fit into port holes on either side of the cylinders and are bolted to either end of a 2-ft. steel bar which is held at its center on the chain pulley by means of a hook. The stand is mounted on four swivel-castor wheels and is large enough to hold both the engine and the gearset. The construction of the stand is somewhat similar to an ordinary table, but of heavier material. The space under the upper floorboard of the stand is open so that spare parts or tools can be carried on another platform or compartment below. The lower division supports the four legs of the engine table. After the engine is taken out of the truck and mounted on the stand, the cylinders can be taken off, etc., with a minimum of effort, on account of the accessibility of the tools.

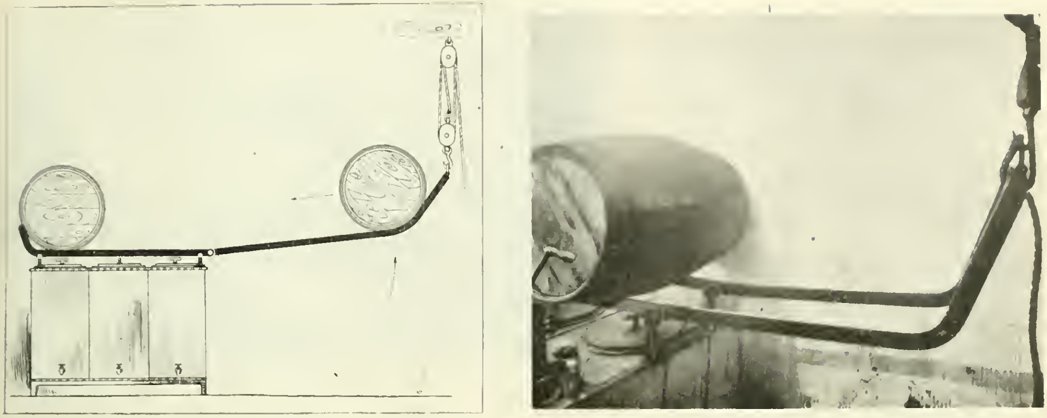
Should work be centered on the crankcase alone, a special portable stand has been built which will conveniently hold that part. This stand consists of two wooden horses with a flat top wide enough to hold the crankcase. The four legs are braced at the bottom by four cross beams.

With the exception of carrying truck parts to be cleaned or washed to and from the tank, no effort is needed in the washing process. Such parts as the brakes, crankcase, etc., which require much time in cleaning by hand, are thoroughly washed in from 10 to 15 minutes in the tank devised by the Autocar company. By mixing 60 gal. of water and 16 lb. of soda and boiling this mixture, it is found that all oil and mud collection on the parts will come off in the above time. This method costs little, as one filling of the tank will last for one week. The water is heated by a gas burner of the Bunsen burner type, running through a pipe at the bottom of the tank. The heat is regulated on the outside by means of two air-lines and the gas-pipe cocks. In order to get a proper mixture of air and gas, one stream of air mixes with the gas before the other is used, the pipes being arranged so that one air-line comes first, the gas pipe next and the second air-line last. The air and gas are properly mixed by the time they reach the entrance to

Emery Paper Always Accessible

This stand is small enough to be placed conveniently on the garage floor. It consists of the two uprights and two rollers upon which the emery paper is mounted





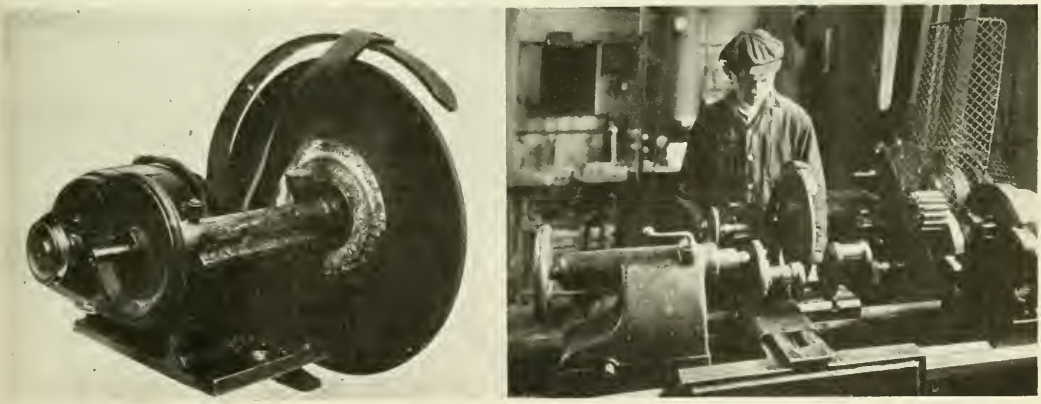
No Lifting of Oil Barrels by This Method of Filling Tanks

The oil barrels are rolled onto the track when lowered to the floor. The track is curved at the floor end so that it will set flat to enable easy mounting of the barrel. It is pivoted at the edge of the tank. When the track is raised by block and pulley, the barrel is set in motion, rolling down over the tank tops by gravity

the tank, where the burner is lighted. The burner pipe is perforated and runs through another pipe, 5 in. in diameter. The perforations allow the heat to escape through to the larger pipe and heat the surrounding water. The fumes escape through a T at the end of the 5-in. pipe and flow through two pipes at either end of it. These pipes double back in the tank and run the length of the tank on either side. From these pipes the fumes run through two vertical pipes leading up through the cleaning solution to the top of the tank on either side. The heat from these pipes also helps in bringing the water to the proper temperature.

Little effort is needed in filling the oil tanks. The barrels are rolled onto a track which is lowered to the floor by means of a block and pulley. The track or cradle is curved at the floor end to sit flat on the floor so that the barrel may be rolled onto it. It is pivoted at the edge of the oil tank where it is supported. When the track is lifted, momentum is given the barrel on the curved end of the track and it rolls of its own accord down and over the tank tops. The track extends over four tanks and is curved at the other end to retard the barrel's momentum after leaving the floor end. Each tank has a large opening under the barrel so that no oil is wasted by splashing when being emptied.

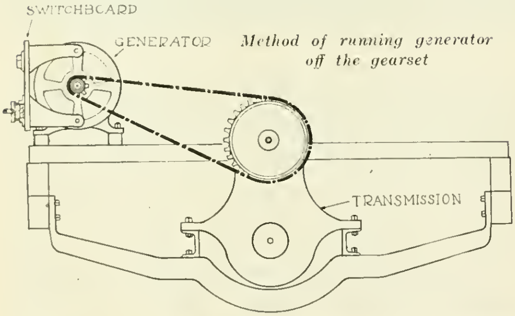
In order to save space and to avoid accident to the men when working, the Autocar company has put its repair benches out in the middle of the floor between the steel girder columns. This not only saves space by allowing the trucks to be backed nearer the walls, but



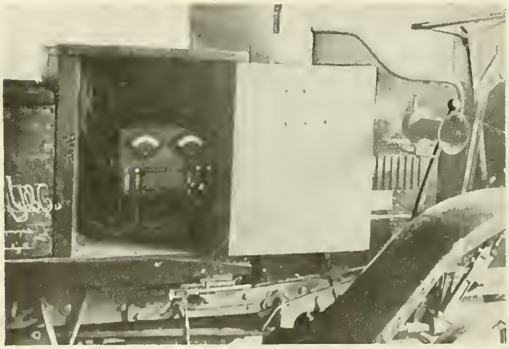
Truing Up of Bearings by Hand Obviated by Portable Grinder

A carborundum wheel has been mounted with an electric motor in such a way as to permit of its being put in contact with the crankshaft bearings. The whole device is portable and can be installed on any lathe. It is mounted on a movable carriage on a lathe and can be moved forward, backward or sideways avoids accidents to the benches and men when the trucks are being located. With the present arrangement, space that would otherwise be wasted on account of it not being wide enough for a truck to occupy is being used to advantage for repair benches placed under more favorable lighting conditions. The benches are about 3 ft. wide and large enough to be used for regular repair work. As arranged, the bench location allows work to be done on trucks on either side. Another innovation that saves wear and tear on the benches is a cast-iron disc, sunk in the middle to form a pocket to hold lead. All hammering is done on this device instead of on the bench proper.

Instead of truing up the crankshaft bearings by hand, a carborundum wheel has been mounted with an electric motor in such a way as to permit of its being put in contact with the crankshaft bearings. The whol device is portable and can be installed in any lathe. As illustrated on page 17, the device is mounted on a movable carriage on a lathe and can be moved forward, backward or sideways. A 110-volt motor of 1.5 hp. is used. Its speed is 1500 r.p.m. The device weighs 90 lb.

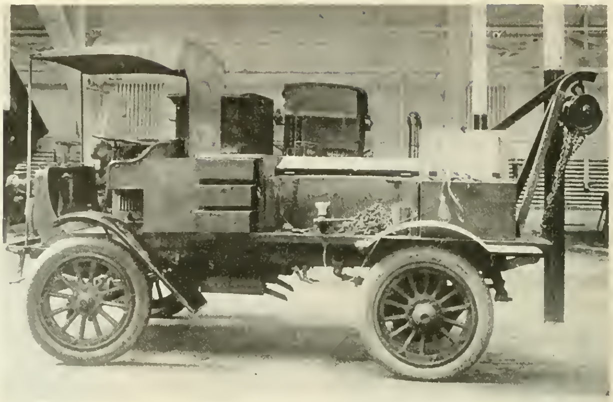


Method of running generator off the gearset



Generator Gives Extra Lighting for Night Work

This electrical outfit is mounted back of the driver's seat of the Autocar repair truck and is large enough to supply power for twelve lights. It is driven off the gearset and operated by the driver by means of a convenient lever on the side of the truck. Electric lighting is available on both sides of the truck, the sockets being attached under the middle part of the truck body



Traveling Repairshop Solves Service Problems

This truck is equipped to take care of most any roadside repair. A damaged vehicle with a full load of perishable goods must be quickly repaired so as to enable delivery of its load. With the use of one of these repair trucks, a damaged vehicle may be repaired on the spot, either through the installation of new parts or engine, or it may be lifted on to the crane and hauled back to the garage. Space has been set aside in the truck to carry a complete set of tools, vise, towing chain, nuts, bolts and small parts

Large fleet owners operating their trucks over long hauls may gain a few suggestions for better roadside repair service by the method worked out by the Autocar company through the use of its repair trucks. These trucks are, in short, traveling repair shops which are sent out from the service station to answer calls for help from truck drivers whose vehicles have been damaged or have been put out of commission otherwise.

Autocar Service Truck

The Autocar service truck is equipped to take care of most any roadside repair. This equipment includes a full set of tools, towing chains, winch, crane, small parts, vise, nuts, screws, bolts, tires and tubes. It is also equipped with a generator which runs off the gearset. This generator is large enough for twelve lights and is used mainly for roadside work at night.

With the use of one of these repair trucks, a damaged vehicle may be repaired on the spot, through the installation of new parts or engine, or by being lifted on to the crane and hauled back to the garage when the trouble is such as a broken axle, etc. The crane also comes in handy for engine installation on the road.

The winch is useful in pulling out ditched trucks. It is hand-operated and located in the forward part of the truck in back of the cab. Space has been set aside for a repair bench. This is on the left side of the truck and holds the vise. Three drawers holding small parts, screws and bolts are conveniently placed on one side of the repair bench and the tools in a compartment on the other side.

Countrywide Investigation Shows Great Value of Motor Trucks to the American Farmer

Are Less Than Half as Expensive as Horses—Open Up More Distant Markets Where Better Prices Prevail

THE motor truck is fast becoming the main reliance of the farmer for moving crops to the markets in parts of the United States where roads are in fairly good shape. This fact is strikingly brought out by an investigation recently conducted by Frank Andrews of the Bureau of Crop Estimates. According to the results of the investigation, it is twice as cheap to move wheat or corn to market by motor truck than by wagon and only about one-third as expensive to move cotton by truck as compared with horse wagons. The estimated cost for hauling in wagons from farms to shipping points averaged in 1918 about 30 cents per ton per mile for wheat, 33 cents for corn, and 48 cents for cotton; for hauling in motor trucks the averages are 15 cents for wheat or corn, and 18 cents per ton-mile for cotton.

While most of the hauling from farms is done by the farmers themselves, these estimated costs are based largely upon the usual charges in the various counties for hiring team and wagon or for motor truck, by the day.

Truck Prices Drop

In 1906 a similar inquiry showed an average for wagons of 19 cents per ton per mile for hauling corn or wheat and 27 cents for cotton. In 1918, wagon costs were naturally higher since prices and wages have increased, but motor truck costs are much lower in 1918 than even the wagon costs of 1906, due to greater efficiency of the motor truck.

Motor truck hauls in 1918 from farm to shipping point averaged 11.3 miles, while wagon hauls averaged 9 miles; and a motor truck made 3.4 round trips per day over its longer route of 11.3 miles, while wagons made 1.2 round trips per day over the 9-mile distance.

The farmers in a majority of cases are not using the large trucks, but the small ones whose nominal capacity is usually 1 to 2 tons. In a number of counties throughout the country the trucks used for hauling are made-over passenger cars. In some cases light wagons are attached as trailers to passenger cars and produce taken to the market in that way. In North Dakota and California, as well as other states, tractors, each drawing several trailers, are used for hauling grain.

Truck Loads Larger

For the United States as a whole, the average wagon load of wheat was 56 bushels in 1918, while the motor truck load averaged 84 bushels. For cotton hauled in bales, the wagon load of 1918 averaged 3.6 bales and the motor truck load 6.6 bales. The wagon loads of 1906 were not far different in size from those of 1918. The average load of corn on the ear, as it is generally hauled from the farm, averaged in 1918, also in 1906, 39 bushels to the wagon load, while the motor truck load of 1918 averaged 58 bushels.

In 1915, a similar inquiry was made as to load, and the results showed that wheat averaged about 54 bushels, corn 40 bushels, and cotton about three bales to the wagon load. The length of haul asked in the 1915 inquiry was not the distance from farm to shipping point but from farm to market, and equaled 6.5 miles or about 3.2 miles less than the haul to shipping point in 1906 and 2.5 miles less than the haul to shipping point in 1918. The length of haul is only partly dependent upon the distance of the farm from the nearest town; a more distant town frequently offers a better market or shipping point.

Of the 1473 county reports which were received, 898 mentioned motor trucks being used in hauling from farms to shipping points. In a large majority of these counties, motor truck service was just coming into use in hauling products from the farm. There were many more reports of the use for light traffic, such as poultry, eggs and vegetables, than for hauling grain. A few reports, scattered from Delaware to the Pacific Coast, mentioned the great importance of the light motor truck service in delivering perishable fruits to shipping points. At least two of the reports claimed the truck to be a necessity in their localities to fruit growing on a commercial scale, on account of the long time required for wagon trips and the scarcity of farm labor. In many states, including those in the north and south central section, hogs were hauled preferably in motor trucks on account of the relatively small amount of shrinkage compared to hauling in wagons. Some counties reported hogs hauled exclusively in motor trucks.

Many Poor Roads

The condition of the roads was responsible for many complaints from truck users. However, this has been overcome in a majority of cases by the use of pneumatic tires, giving better traction. In Florida, where a large quantity of celery, lettuce, cabbage, tomatoes,

Here is a Nash 1-tonner mounted on 36 x 6 Goodyear pneumatics. It is owned by Mack Bros. of Kissimmee, Fla., where it is used to haul fruit from the Florida orchards to the nearest railroad sidings, where the fruit is loaded directly into the cars and warehousing avoided. The use of the giant pneumatics enables the truck to run continuously at the rate of 25 miles an hour, even when under full load

The old and the new in hauling green goods to the large city markets from the neighboring truck gardens. The motor truck is a Winther four-wheel-driven vehicle, which is being loaded in the field, from which it can pull out without difficulty. It will carry two or three times that of the horse wagon shown and travel at four and five times the speed, thereby delivering from eight to fifteen times the tonnage

peppers, etc., are raised by individual growers over a widely scattered territory, the farms in most cases are on drained swamp land or muck land. In rainy weather the soil is soft and mucky, and as a result, traction with anything but pneumatic tires, is practically impossible. In that state there are a number of fleet owners who contract with these food growers to do their hauling from the fields to the packing houses for shipment. A market gardeners' association in Rhode Island is said to be operating a few trucks with trailers and to carry produce to the city markets at a cost averaging only 10 cents per ton-mile. Frequent mention is made in the report that in the East trucks do a regular freighting business, charging the farmers for the service. One Tennessee farmer reported having paid a truck to haul a load of fifteen hogs to market a distance of 10 miles, and the trip was made in the evening after supper.

Trucks for rural express service are common out in the West. Between Denver and Evergreen, Col., there is a rural express motor truck which carries milk and other food products to the markets. Out in California in sections far from the railroads, trucks are used for carrying mail. This mail includes parcel post, such as bags of flour, package goods, etc. There is a truck running from Redding to Cedarville, Cal., 52 miles over the mountains, which makes the round trip at a total cost of $25 in 11 hrs. It has taken the place of an eight-horse team which took 7 days to make the round trip at a cost of $14 a day, or $98 in all.

Tractors Gaining

Tractors with trailers are in more or less frequent use in various states, including North Dakota and California. One Illinois man reports using ten trailers drawn by one tractor and moving 1000 bushels of wheat at a time.

The great variety of local transport conditions in the United States is illustrated in some notes from these county reporters. One man gives an average of 15 miles as the longest distance hauled for any considerable number of farmers, but explains that the haul is to the Cumberland River, which in his county is navigable only 5 months of the year; for the other 7 months the haul is 40 miles to a railroad. In Matthews County, Va., few trucks are used; but, since the county is indented by several navigable waterways, motor boats and sail boats are used by the farmers to a considerable extent.

One reported in western Oregon says that neither roads nor motor vehicles are to be found within 20 miles of his home; produce is carried on pack mules, over difficult trails, to a landing on Rogue River. The heavy hauling in Mecosta County, Mich., as in some other northern counties in the United States, is often postponed until snow comes; then sleds are used.

However, the foregoing reports are due to lack of road development and are not indicative of the development of the farmer's use of motor trucks where roads permit. A significant phase of this new development is the growth of regular freight service, by which farmers can hire their produce taken by motor trucks directly from the farm to a distant market, and thus avoid both the wagon haul and the shipment by railroad or boat.

Four Methods of Hauling

As previously pointed out in THE COMMERCIAL VEHICLE, the increased use of motor trucks by farmers throughout the United States may be divided into four classes. In the first place, there is the ① farmer who owns his own truck and who finds work for it to do around the farm during the periods when it is not hauling produce to the nearby markets or returning with goods consumed on the farm.

Next there is the co-operatively-owned ② truck which has not proven eminently satisfactory except in a very few cases. One of these is the Farmers' Co-opera-

In the sandy country of Florida the large pneumatic tire is giving very satisfactory service. The truck shown above is a 2-ton Republic equipped with 37 x 5 Goodyear pneumatics in front and 40 x 8's in the rear. It is used to haul celery, lettuce, cabbage, tomatoes, peppers, etc., from farms in the vicinity of Palmetto, Fla., to the nearby packing houses for shipment tive Co. of Hartford County, Inc., which operates between Bel Air and nearby points and Baltimore, Md

③ By far the greatest amount of farm haulage done at the present time is by means of trucks owned by persons engaged solely in the transportation business, such as the local teamsters or moving van men. In previous years several of these types of men could be found in almost every small village. Years ago they used horses exclusively, but with the great mileage-covering ability of the motor truck they are fast replacing the horses by motor vehicles. Many of these men have found the work of farmer haulage so profitable that they have established permanent lines, running over certain routes at regular scheduled periods.

Rural Motor Truck Service

④ The last and fourth method by which the average farmer can make use of the motor truck to get his products to nearby markets and to bring back goods purchased in the city and used on the farms, is by means of Uncle Sam's rural parcel post motor truck service. As told on pages 20 and 21 of THE COMMERCIAL VEHICLE for January 1, 1919, there were at that time thirty-one main trunk line parcel post routes in operation, covering 3,781 miles of road and involving a daily travel of 7,563 miles. At that time there were 104 trucks in the parcel post service operated by a personnel of 108 men. Since then the Post Office Department has secured from the War Department options on over 12,000 surplus military trucks which will be put into the service gradually as new routes are opened up.

Buying a Farm Truck

While the individually-owned truck gives the farmer perhaps the best service, it does not always give the cheapest service, unless the farmer has sufficient work for it to do. Before a farmer decides to purchase his own truck he should first of all determine how much work he has for his truck to do. He should know how many tons or loads it must carry in a week or a year and how many trips it will have to make in a week or a year to carry the determined tonnage, and how many miles it must cover in doing that work. He must also consider the kinds and varieties of the loads to be carried in order to determine the best type of body to apply on the truck chassis. The question of load frequencies is also important.

Must Determine Garaging of Truck

He must also determine how he will garage the truck and whether the driver or the mechanic from the local service station will make the repairs. Furthermore, as pointed out in the report of the Bureau of Crop Estimates, given previously, it is very important that the farmer consider the roads over which his truck must run, for, other things being equal, the roads are the limiting factor in truck operation. He must also bear in mind that provided the roads are available, the movement of goods in large units is more economical than in small units. He must, therefore, consider whether the roads will permit the use of the large unit for the major portion of the year.

After all of these factors have been given due consideration, it is well for the prospective farmer truck owner to forget the truck for a moment and realize that he is not buying a truck at all but that he is really buying transportation in which the truck is merely a means to the end and not the end itself. The deciding factor in the purchase of transportation is the cost per unit hauled over the longest period of years. This fact points out the important consideration that the first cost of the truck is relatively unimportant. It is the longevity of the truck, its freedom from repairs and costly lay-ups which count in the long run.

This is further brought up by the fact that in the great majority of cases, the yearly cost of operation is equal to or greater than the initial cost of the truck, its body and accessories. An analysis of truck costs will show, as pointed out in THE COMMERCIAL VEHICLE for April 15, 1919, that there are eight major items in the cost of truck operation. These items hold good no matter what size or type of truck is used and no matter in what class

(*Continued on page 31*)

Comparative Costs of Farm Haulage by Motor Trucks and Horse Wagons

Item	Distance	Round Trips per Day	Load			Cost of Hauling per Ton per Mile		
			Corn[1]	Wheat	Cotton	Corn	Wheat	Cotton
	Miles	*Number*	*Bu.*	*Bu.*	*Bales*	*Cents*	*Cents*	*Cents*
United States:								
Motor trucks, 1918	11.3	3.4	58	84	6.6	15	15	18
Wagons, 1918	9.0	1.2	39	56	3.6	33	30	48
Wagons, 1906	9.7	1.2	39	55	3.4	19	19	27
Geographic division[2]								
New England:								
Motor trucks, 1918	10.0	4.5	62	60		11	14	
Wagons, 1918	7.2	1.8	38	45		39	38	
Wagons, 1906	7.2	1.7	...	...		...	...	
Middle Atlantic:								
Motor trucks, 1918	12.2	3.4	69	78		14	14	
Wagons, 1918	7.6	1.6	39	47		39	38	
Wagons, 1906	6.5	1.7	41	48		24	26	
South Atlantic:								
Motor trucks, 1918	9.8	4.0	45	57	6.0	19	18	20
Wagons, 1918	8.4	1.4	29	36	3.5	41	39	48
Wagons, 1906	9.9	1.2	35	42	3.1	28	24	27
North Central, east:								
Motor trucks, 1918	9.3	4.8	64	90		11	9	
Wagons, 1918	6.3	2.0	41	54		29	26	
Wagons, 1906	7.0	1.8	40	48		16	18	
North Central, west:								
Motor trucks, 1918	10.1	3.8	54	81		18	14	
Wagons, 1918	7.9	1.5	42	5		33	29	
Wagons, 1906	8.7	1.4	39	52		17	16	
South Central, east:								
Motor trucks, 1918	12.9	3.2	[illegible]	86	7.6	12	10	13
Wagons, 1918	10.4	1.0	26	38	3.2	45	36	52
Wagons, 1906	11.1	1.0	29	37	3.0	24	23	31
South Central, west:								
Motor trucks, 1918	13.0	2.9	57	72	6.7	17	15	20
Wagons, 1918	10.9	1.0	26	46	3.8	49	32	47
Wagons, 1906	12.	.9	29	[illegible]	3.8	22	21	26
Rocky Mountain:								
Motor trucks, 1918	21.0	1.2	18	70		36	29	
Wagons, 1918	20.2	.4	46	66		52	42	
Wagons, 1906	16.8	.7	[illegible]	60		16	20	
Pacific:								
Motor trucks, 1918	[illegible]	2.9	74	105		20	17	
Wagons, 1918	11.2	1.4	71	67		23	22	
Wagons, 1906	11.5	1.1	45	76		28	21	

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[1] Not shelled.

[2] The geographic divisions are—New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut; Middle Atlantic: New York, New Jersey, Pennsylvania; South Atlantic: Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida; North Central, east of the Mississippi River: Ohio, Indiana, Illinois, Michigan, Wisconsin; North Central, west of the Mississippi River: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas; South Central, east of the Mississippi River: Kentucky, Tennessee, Alabama, Mississippi; South Central, west of the Mississippi River: Louisiana, Texas, Oklahoma, Arkansas; Rocky Mountain: Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho; Pacific: Washington, Oregon, California.

One of the Big 8 in Truck Operation

THE DRIVER

A Short Story of How the Timken-Detroit Axle Company Increased Its Truck Loads, Increased the Actual Working Time and Decreased the Cost

THERE are 8 big items in the cost of truck operation, and the greatest of these is that of the driver, as told on pages 26 and 27 of April 15, 1919, issue of THE COMMERCIAL VEHICLE. It is therefore of the utmost importance that every fleet owner do everything in his power to make his drivers more productive if he wishes to lower his cost of truck transportation.

There are many methods designed to make the truck driver more productive. A closed cab, which enables the driver to keep warm in the coldest winter weather and which protects him from rain and snow during storms, is one method of keeping up the morale of the truck driver. A man who is warm and comfortable will do much more work than a man who is cold and disagreeable. He will not only do more work, but do it better and at the same time take better care of his truck.

Self-Starters Save Money

Then there is the self-starter, which unfortunately has not yet been developed to the point where it has become standard equipment on trucks of 2 tons capacity and over when mounted on solid tires. There is no question as to the great savings which can be effected by the self-starter, and there is no reason why all trucks, just like passenger cars, should not be fitted with some means of starting the engine mechanically. In fact, there is a greater need for self-starters on trucks to-day than there is on passenger cars, since the average truck is in use during a larger percentage of the day and is continually starting and stopping in traffic or while picking up or delivering its loads.

The self-starter makes the driver more productive in two ways: First, it enables him to cut down his gasoline consumption, and second, it enables him to do more and better work. The self-starter which will stand up and give continuous service on solid-tired trucks operating over rough roads will enable the gasoline consumption to be reduced by making it possible for the driver to shut off his engine each time his truck is not in motion for periods over 2 or 3 minutes long. The problem of cranking a motor twenty-five or fifty times a day or even 100 times a day, as would be the case in package delivery if the engine was stopped at every delivery, becomes a serious one, because it is liable to sap the physical vitality of the driver.

Sapping the Driver's Strength

With a low vitality, the driver is much more liable to be careless in his operation of the truck and to take more chances than he would if he were not tired. Aside from these benefits of the self-starter, it enables the driver to accomplish more work with his truck. Every time the driver has to get down off the seat to crank the engine he consumes 2 or 3 minutes' time before he can again get back on the seat and drive his truck off. At an average length of time of 3 minutes to start the engine and get back on the seat, it is evident that the driver would only have to crank his engine ten times a day in order to consume a valuable ½ hour of time. With the truck worth $3 an hour, this one simple operation repeated ten times throughout the day would thus be equivalent to $1.50 worth of truck time. This amount would be lost to the truck owner. With the self-starter, however, it could be saved and the time added to the possible actual moving time of the truck in which more work could be accomplished either by moving a larger load in any given period or of covering a greater mileage during the same period.

The Bonus System

Aside from the benefits of the closed cab and the engine self-starter, many bonus systems have been worked out by truck owners to increase the driver's productivity. In the determination of a truck driver's bonus system, there are certain fundamental considerations which must be taken into account, and it is the purpose of this article to point out these fundamental principles and to show how they have been worked out in one instance by George W. Veale, Director, Department of Standards, Timken-Detroit Axle Co., Detroit, and applied to the operation of the motor trucks of that company.

First of all, it is evident that no one bonus system can be applied to different sizes of trucks engaged in entirely different classes of work. If an owner operates different sizes of trucks in entirely different classes of work, he must divide up the work classifications and determine upon a basis for each class of work. The necessity for different bases seems patent, since it is obvious that the same basis could not be applied to 5-ton trucks hauling bulk material such as sand and stone and to light ¾-ton trucks delivering packages.

The Ton-Mile Cost Basis

After the various work classifications have been determined, the next step is to determine upon what basis the system shall be founded. If the system is designed to give a greater truck efficiency or to reduce the unit cost per ton moved, the commercial ton-mile is perhaps the best unit to adopt. The commercial ton-mile may be defined as being obtained by multiplying the tonnage hauled on any trip by the mileage of that trip. In this case the trip is the unit for which the ton-mileage must be secured. If more than one trip is made per day, the ton-mileage of that day is equal to the summation of the ton-mileage of the trips made during that day. This method of obtaining the ton-mileage is cited particularly at this time because commercial ton-mileage cannot be obtained by simply multiplying the total daily mileage of truck by the total tons hauled during the day, since this multiplication does not take into account the empty mileage of the truck.

The commercial ton-mile is far more preferable than the absolute ton-mile, which is the moving of a mass of 1-ton over a distance of 1 mile. This latter unit is analogous to the foot-pound, which may be defined as the movement of a mass of 1 pound to a vertical distance of 1 foot. While the absolute ton-mile is perhaps the more accurate engineering gage for the work done, it is most difficult to determine when loads are picked up or delivered piecemeal.

Drawbacks of Absolute Ton-Mile

Under those conditions considerable calculation is necessary to determine the absolute ton-mileage. Take, for example, the case of a 5-ton truck which starts out on a trip with 5 tons of goods. Suppose it runs 2 miles and then delivers 2 tons. The absolute ton-mileage to that point would be 5 tons × 2 miles = 10. If it then runs 5 miles and delivers 2 tons, the absolute ton-mileage for that portion of the trip between the first and second delivery would be 5 tons — 2 tons or 3 tons × 5 miles = 15. If it then runs another 5 miles and delivers the final 1 ton still on the truck, the absolute ton-mileage of that portion of the trip would be 1 ton × 5 miles = 5. If it then runs back empty for the 15 miles to the starting point, the ton-mileage on that portion of the trip would be 0 tons × 15 miles = 0, and the total ton-mileage of the complete trip 10 + 15 + 5 + 0 = 30 absolute ton-miles. As the number of deliveries increases it is evident that the calculations necessary to determine the absolute ton-mileage becomes more and more complicated.

The Commercial Ton-Mileage

Contrast this method with that of determining the commercial ton-mileage for the case just cited, and the ease of figuring the commercial ton-mileage will at once become evident. In the case just cited, the commercial ton-mileage would be 5 tons × 30 miles = 150 ton-miles. It is seen that only one operation is necessary to determine the commercial ton-mileage for any trip, and this is the multiplication of the tonnage hauled on that trip by the mileage covered on the trip. As long as the commercial ton-mile is taken as the basis for the bonus system, the operation of one truck may be directly compared with that of another truck in the same class of work.

What Items to Include

The next step in determining the driver's bonus system for truck efficiency is to be certain that only such items are included as are under the driver's control. It is evident that it is not practicable to use the total cost of truck operation to determine the driver's efficiency where the total cost per day or month includes taxes, interest on investment, overhead charges, depreciation, licenses, etc. These items are in most cases generally calculated on a yearly basis which makes the monthly or daily charge the same under all conditions regardless of the good or poor performance of the truck. If such items are included in the standard determined upon for the bonus plan, they are likely to have an undue influence and in some cases to make the plan entirely ineffective.

The items for which the driver is responsible to a large extent and which should therefore be included in the total cost used in the bonus system are as follows:

1—Miles traveled.
2—Pounds of tons carried.
3—Time consumed.
4—Wages of driver and helper, if any.
5—Tire expense.
6—Maintenance and repair expense.
7—Cost of gasoline, oil, grease and waste.
8—Time in service.
9—Time waiting for loading and unloading.

While several of these items are only contributory to the determination of the final cost, they have some effect upon it and should therefore be considered. The various items should be recorded on daily record sheets for each truck. The records thus obtained should be summarized for some given period by individual trucks and then transformed into a monthly statement containing the following information on each of the trucks operating under the system to be installed:

1—Name of truck.
2—Capacity of truck.
3—Gallons of gasoline used.
4—Gallons of cylinder oil used.
5—Gallons of transmission oil used.
6—Gallons of anti-freeze solution used.
7—Cost of waste and kerosene.
8—Cost of repairs, material and labor.
9—Operating labor.
10—Total expense.
11—Number of hours operated.
12—Number of hours idle.
13—Number of hours out of service.
14—Total hours.
15—Per cent of operating time.
16—Number of trips.
17—Average hours per trip.
18—Total miles.
19—Average miles per trip.
20—Total load in pounds or tons.
21—Average load per trip in tons.
22—Commercial ton-miles per trip.
23—Total ton-miles.
24—Hours per ton-mile.
25—Miles per gallon of gasoline.
26—Gallons of gasoline per ton-mile.
27—Total expense per ton-mile.

After these data have been obtained for the trucks over a sufficient period of time, a standard may be determined after average conditions have been calculated. Since weather conditions greatly affect the efficient operation of motor trucks, it is advisable to secure data for at least 6 months' or a year's operation of the truck in order to give really average results for both good and bad weather. If this is not done, it will be necessary to establish a winter as well as a summer standard.

The Standard Selected

In the case of the Timken-Detroit Axle Co., an average or standard cost per ton-mile was established and then a maximum cost per ton-mile slightly in excess of the standard cost ton-mile. The drivers and helpers employed were then offered a bonus of 50 per cent of the savings they could effect between the standard cost per ton-mile and the maximum cost per ton-mile. The efficiency of the truck performance was then determined easily by dividing the standard cost per ton-mile by the actual cost per ton-mile.

This may best be explained perhaps by an example as follows:

a—Standard cost per ton-mile = $0.05
b—Maximum cost per ton-mile = 0.075
C—Operator's actual cost per ton-mile = 0.06
d—Total ton-miles made = 1800

The driver's bonus is then determined by the formula:

$$\frac{b-c}{2} \times d = \text{Driver's bonus}$$

In the case just given the bonus would work out as follows:

$$\frac{.075-.06}{2} \times 1800 = \$13.50$$

The efficiency of operation would then be represented by:

$$\frac{a}{c} = \frac{5}{6} = 83.33 \text{ per cent}$$

While the bonus of $13.50 may appear as rather high for an efficiency of only 83.33 per cent, the Timken company found that the high reward encourages a high accomplishment as compared with unstandardized conditions and no efficiency reward for bonus system.

The Timken company found after applying this method for a period of 15 months that it has resulted in a general all around higher efficiency. Increased loads have been carried; trucks have been operated for a higher percentage of the possible working time and decreased costs have resulted.

The actual accomplishment of the bonus system with several trucks working in a similar class of delivery is shown in the table given below. The data cover the number of trucks, the percentage of gain in ton-miles per month and the percentage of the decrease in cost per ton-mile.

Trucks, No.	Ton-Miles Per Month Per Cent Gain	Cost Per Ton-Mile Per Cent Decrease
1	46.7	24 8
2	104.0	43.3
3	99.9	64.7
4	1.0 loss	31.0

The above table shows the concrete benefits of the bonus system as installed and operated by the Timken-Detroit company. Other concerns intending to work out a similar system must bear in mind that they must determine their standard cost per ton-mile and their maximum cost per ton-mile from the particular conditions under which their own trucks are operated. With the good roads in the vicinity of Detroit and with very few grades, it is entirely possible that the low standard cost per ton-mile of the Timken-Detroit company may be exceeded by the average concern in other parts of the country where roads are not so level and not in such good shape.

It is to be noticed that truck Number 2 increased its ton-mileage 104 per cent, or slightly more than doubled the number of ton-miles secured before the bonus system was put into effect. This increase checks fairly well with the decreased cost per ton-mile of 50 per cent, since the truck performed about double the work for the same cost. The results indicate the great possibilities of the driver's bonus system if properly worked out.

Employment of Trucks in Transfer and Storage Work Enables Peak Loads to Be Handled

With Trucks Much Business Can Be Accepted Which with Horses Would Have to Be Declined—Easy Method of Business Expansion

IT pays to own motor trucks in the transfer and storage business, for when increased business is secured the great work ability of the truck enables the company to handle the business in a much more satisfactory manner than could be done were horses used exclusively. When the peak load comes the motor truck's superiority over the horse becomes more pronounced. It can be run the ordinary 10 hours a day, or 15 hours if necessary, without having to be laid up to rest on the day following.

It is one thing to make these statements of facts and yet another to prove them. But one instance of the proof is given herewith, as determined by the use of trucks owned by the Morrow Transfer & Storage Co., Atlanta, Ga. The Morrow company does not use trucks exclusively, nor is it a newcomer in the field of truck operation. It still employs over 150 head of horses to handle the great bulk of the merchandise haulage from the Atlanta railroad terminals to the various plants and stores in the city. In addition, it operates twenty motor trucks, the first of which was bought over 10 years ago. This long use of motor trucks employed in the company's work in conjunction with horses gives it a very wide experience and a consequent knowledge of the benefits of truck operation in certain classes of work.

The Morrow company also maintains a large warehouse having 125,000 sq. ft. of floor space, approximately 40 per cent of which is given over to the storage of merchandise and the remaining 60 per cent to the storage of household goods.

The haulage work of the Morrow company may be divided up under three general headings, as follows: 1—Haulage to and from the railroad terminals. 2—Household goods moving in Atlanta and to suburban points within 100 miles of the city. 3—Special haulage work done as the occasion arises or by contract over a period of months or years.

The company's 150 head of horses are used almost exclusively in the railroad terminal works, provided the goods picked up at the railroad depots are to be delivered in downtown Atlanta, where the street congestion is fairly acute and where the greater speed possibilities of the motor truck cannot be realized. There is also considerable congestion at the various railroad terminals which holds up the vehicles to such an extent that the lost time of trucks used in such work is considerable. Accordingly, trucks are not used for the haulage from the terminals unless the loads are specially large and must be delivered to points five or more miles away.

Kind of Haulage Done

Trucks are used almost exclusively for the moving of household goods except for small loads to be transferred for short distances in the city proper. Up to the present time overland haulage, as it is known along the eastern seaboard in the vicinity of Philadelphia, New York and other New England points, and in Ohio as between Cleveland and Akron, has not been developed in Atlanta or the surrounding territory. However, there have been many cases in which the Morrow company has moved loads of household goods from Atlanta to Athens, about 60 miles away, and even to Macon, about 95 miles away. Of course, for hauls of this length it was impossible to use anything else but trucks, and the haulage could not have been secured unless the company had owned trucks capable of doing the work.

A 30-Ton Load

Special haulage done by the Morrow company is of a very miscellaneous nature. For instance, one of the company's 3½-ton trucks and a special trailer hauled a 30-ton monument from one of the railroad depots in Atlanta to a cemetery, 3½ miles away. The load consisted of three pieces, including the base for the monument, which weighed 5 tons, and two parts of the monument itself, which together weighed 25 tons. The base was mounted on the truck body, and the monument, which was approximately 22 ft. long by 4 ft. wide, was mounted on the special trailer. Due to the great weight of the trailer and its load, it was impossible for the truck, also fully loaded, to start it. Accordingly, an additional truck was employed in front of the tractor-truck to start the load.

The Morrow company still owns and operates the original truck which was purchased 10 years ago. It is a 1½-ton chain-driven Selden, which has given such good service that the bulk of the company's present fleet is made up of Seldens. While the number of horses operated by the Morrow company has not been decreased, additional trucks have been purchased to take care of the company's increased business and to provide for the hauls of greater length than were attempted in the days when horses were employed exclusively.

The Make-Up of the Fleet

The company's fleet of trucks is now made up of twenty vehicles. Fifteen of these are Seldens, two of 3¼ tons capacity; four of 2 tons, seven of 1½ tons and two 1-tonners. The company also owns a 2-ton Gramm-Bernstein, a 2-ton Republic, a 1½-ton Federal and a ½-ton truck made by converting an old Chalmers passenger car for commercial use. Two of the 1½-ton Seldens were delivered late in 1918.

It was this truck fleet which enabled

Two of the Morrow 1½-ton trucks, that at the left being a Selden and that at the right a chain-driven Federal bought several years ago. The Federal has a semi-van body with canvas sides the Morrow company to obtain its share of the increased business which was done in Atlanta, and, for that matter, throughout the entire State of Georgia, during the early part of 1918 as a result of the war and the great preparations which our Government made to the common cause. The South was more prosperous during the latter part of 1917 and the greater part of 1918 than at any time since the Civil War. While this was due in some part to good crops and to the high price prevailing for cotton, it was also due to the location in the South of the majority of the cantonments, training schools, rifle ranges, hospitals and similar war projects. In this development Atlanta is a very good example, for it had in close proximity to it, in addition to Fort McPherson established many years ago, a large cantonment, a remount camp, a quartermaster supply depot, a medical supply depot, a base hospital, an officers' training camp, a large aviation school, four recruiting stations and a vast machine shop for the repair of engines of all kinds, shoes, clothing and other articles for all camps in the Southeast.

Much Government Haulage

The location of these great military establishments in close proximity to Atlanta resulted in a tremendous boom in business of all kinds.

All of this made for increased business, and increased business meant an increased amount of haulage between Atlanta and the locations of the various army posts. It was because of the fact that the Morrow company already had a good sized fleet of trucks in operation that it was able to accept considerable of this new business and still take care of the regular work which it had performed in years past. Without motor trucks the acceptance of the new work would have been impossible, since there was a great necessity for speed in delivery in practically all of the Government work.

The company's fleet of motor trucks is maintained on a plot of land some distance from the company's warehouse, in a less-developed part of the city. The horse stable is also located on the same grounds and a special garage has been put up for making the necessary truck repairs. This garage and its method of layout are shown in the illustration on this page. Some of the company's trucks are garaged overnight in the garage building when there are few if any of the trucks in for repairs. The great bulk of the fleet is garaged under a shed built along one side of the garage structure. There the trucks are protected from the elements to some degree and at a very small expense. A large door other than the main entrance leading to the street has been cut in one side of the garage building so that trucks may be run out of the garage into the shed without having to go out on the street. Some of the trucks are garaged at night on the main floor of the company's warehouse.

Company Has Own Garage

The garage is approximately 150 ft. long and 30 ft. wide, and is provided with a workbench along one side and bins for tools and spare parts on the other. In the rear of the building on one side are set up a lathe and drill press and several small tools, including an emery wheel, etc., all driven by belting from power derived from a small electric motor set up on the floor. The trucks undergoing repairs are placed one in back of the other along the center of the floor, where the workmen have easy access to the bench on one side and to the spare part bins on the other. The garage is fairly well lighted by a row of windows along one of the long sides and by two large skylights in the roof.

The Morrow garage, showing the workbench along the wall on the right and the spare part and tool bins on the left. A lathe, drill-press and other small tools are seen at the rear. Good light is secured from windows above the workbench and from two large skylights

Four mechanics are employed to keep the fleet of trucks in repair. There is one boss mechanic, one second mechanic and two helpers. These men maintain the twenty trucks and, in addition, ten passenger cars owned by the members of the Morrow firm or used by the salesmen of the company in getting new business and overseeing the work being done.

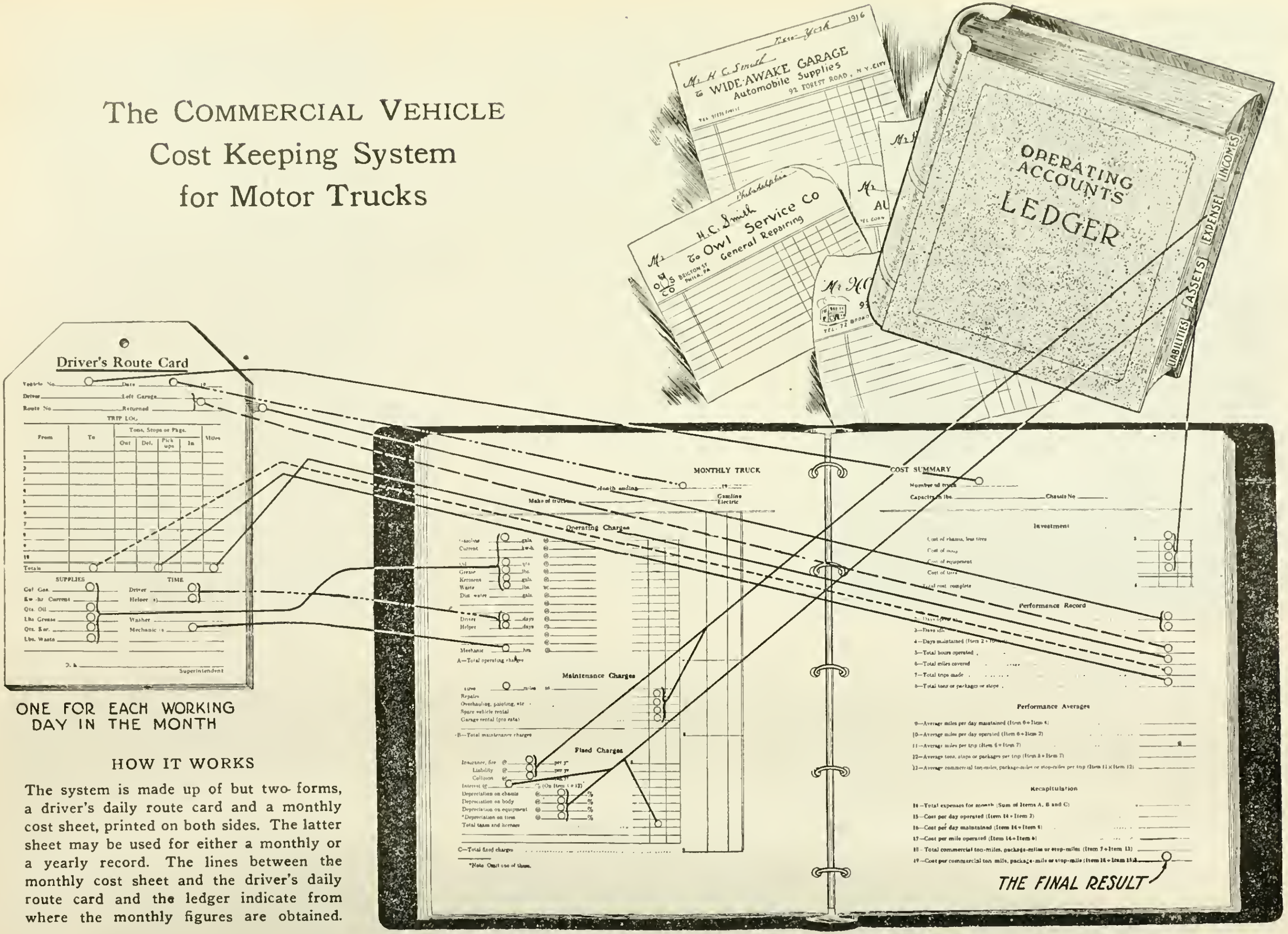
The trucks are not brought into the garage at any certain specified periods for overhauling. Instead, they are looked over fairly minutely each night so that any necessary adjustments or minor repairs may be made before the work to be done has grown into major proportions. The two mechanics and their helpers do the great majority of the truck repair work, such as taking down the engine, reboring cylinders, rebabbitting bearings, etc. Considerable welding is also done in the garage, a portable oxy-acetylene outfit being provided for work of such nature. The 10-year-old Selden has been practically rebuilt during the time of its service with the Morrow company. As soon as the repairs on a truck become too frequent to obtain continuous service from the truck, it is taken into the shop and practically rebuilt. In this work all of the rivets are cut out and new rivets driven in order to insure an overhaul which is thorough in every respect. The thoroughness of the rebuilding has been found necessary on account of the great vibration and wracking to which trucks used on the downtown section of Atlanta are subjected because of the large area of cobblestone streets which are kept in none too good repair.

3½-Tonners the Most Economical

The largest size of truck owned by the Morrow company is a 3½-tonner. That size of truck seems small as compared with the tonnage of trucks engaged in the transfer and storage work in other cities. It has been found to be the most economical size for the Morrow company, however, since the great majority of its loads can be carried on a 3½-ton truck. Again, the roads outside of the city proper are not the most modern in every respect and do not permit of the continuous use throughout the year of large 5- or 7½-ton trucks.

Most of the Morrow trucks are fitted with stake bodies, some of which have fixed side panels with two removable side stakes between the two panels on each side. That type of body has been found most suitable for a great majority of the company's work. Goods carried in such bodies and which may be damaged by rain or snow are protected by throwing a tarpaulin over the load. Several of the company's trucks are fitted with semi-van bodies similar to that shown in the illustration at the bottom of the opposite page, which has a removable canvas side, suitably reinforced. All of the trucks are operated by colored drivers, who are paid from $2.50 to $2.95 a day for 10 hours work and extra money for overtime.

The COMMERCIAL VEHICLE Cost Keeping System for Motor Trucks



ONE FOR EACH WORKING DAY IN THE MONTH

HOW IT WORKS

The system is made up of but two forms, a driver's daily route card and a monthly cost sheet, printed on both sides. The latter sheet may be used for either a monthly or a yearly record. The lines between the monthly cost sheet and the driver's daily route card and the ledger indicate from where the monthly figures are obtained.

Motor Truck Costs May Be a Delusion If They Are Not Properly Obtained and Used

Operating Costs Should Be Secured Separately and Overhead Charges Added Later—A Simple Form for Keeping Truck Costs

MOTOR truck costs are a delusion and a snare unless they are properly applied and the conditions under which they were secured are fully considered. From the present or prospective truck owners' viewpoint, truck cost figures are of value from three angles as follows:

1—To determine upon the rates to be charged when the truck is used in public haulage.

2—To estimate the cost of truck haulage as compared with other methods of shipment.

3—To compare the costs of operation of one truck with that of another of the same capacity, in the same class of work, in the same city, or to determine if the cost of any one item of truck expense is excessive.

Taking up these three viewpoints in the order given, it seems evident that no truck owner can succeed in his business of hauling goods for profit unless he knows what it costs to operate his vehicles. The cost of the vehicle operation plus the desired profit must determine the price quoted on the work to be done. It is evident that if a price is quoted on work without knowing the total cost of operation of the vehicles doing that work, it is also impossible to know what the profits on the work will be. It is the purpose of this article therefore to point out specifically and in detail the items which must be included in any calculation of cost of operation so that the truck owner may be certain to obtain his desired profit providing no unforeseen contingencies arise.

In order to determine the comparative cost of truck haulage with railway or waterway transportation, in which the rates are generally given in so much per hundred pounds between any two points, it is of course necessary to calculate the cost of highway transportation on the same basis. In this connection it should always be borne in mind that whereas the railway and waterway rates are from terminal to terminal, the truck delivery is generally direct from the plant or place of business of the consignor to that of the consignee.

How to Compare Rail Rates

In any comparison of truck cost figures with rail or waterway haulage, the total cost of moving the goods from the point of origin to the point of delivery should be the basis taken when the motor trucks deliver direct from the shipper to the consumer. This is necessary because by the railway or waterway method of shipping there are many items which must be charged and which yet do not appear in the freight rate between the two points. These additional items include teaming charges at each end of the route; the extra costs of crating or boxing not generally necessary when goods are shipped by truck and the increased weight of the shipments by rail due to the weight of the crating or boxing on which the same rate per hundred pounds must be paid as for the goods themselves.

The importance of including these charges is well illustrated in the case of a large elevator manufacturing concern in Yonkers, N. Y., which used to ship goods by freight but which now employs the motor truck method because of the lower final cost by truck when such items are taken into account. That concern adds to the first class freight rate 15 cents per hundred pounds for teaming charges from the shipper's warehouse to the freight house, plus 15 cents per hundred pounds from the freight house to the receiver's warehouse at the other end of the line, plus 24 cents per hundred pounds for the increased cost of boxing to cover shipments made by freight, plus 17 per cent for additional freight charges on account of the increased weight caused by the necessity for crating. When all of these charges were included, it was found that it was cheaper to ship by truck than by freight, and that the truck gave a much greater speed of delivery which could not be calculated in so many dollars and cents.

No Fixed Truck Costs

Then there is the value of comparing the cost of operation of one truck operating in any particular business in any city with another truck operating over the same territory in the same city and delivering the same kind of goods. In this respect motor truck costs are worthless for comparing the estimated costs for similar trucks operating in similar work in a different city or under different loading or unloading conditions.

This leads to the conclusion that there is no such thing as a fixed motor truck cost for any capacity or make or motor truck. Instead, each present or proposed truck installation must be considered as an individual and separate case and the various items of operation determined with due consideration to all of the conditions under which the trucks must be employed.

Editor's Note—This article was given in the form of a short talk before the Motor Truck Club of New Jersey, April 15, 1919, by Joseph Husson, Editor, THE COMMERCIAL VEHICLE.

One example will serve to prove that there is no such thing as a fixed truck operating cost. A large publishing concern in Philadelphia had to move its periodicals in mail bags from its printing plant to the railroad post office. The haul was only one-half mile long each way, and it was said that it was impossible for motor trucks to successfully compete with horses in the work. Notwithstanding the apparent impossibility, the adoption of demountable truck bodies enabled a fleet of eleven electric trucks, put into service in the work to reduce the cost of haulage 12 cents per ton and to save $12,600 a year. This saving was made possible only by the adoption of demountable bodies, which reduced the loading time from over an hour to a few moments. This simply shows that it is necessary to consider each installation separately before determining upon any estimated cost of truck hauling. Unloading and loading devices and other truck adjuncts, such dump bodies and side-door delivery bodies, may greatly affect the cost per commercial ton-mile hauled. All of these items must be taken into account before any attempt is made to set a price upon moving goods by truck. If this is not done, the costs estimated are liable to be worse than useless.

With the necessity proved for some form of reliable cost figures, the next step is the manner in which the figures should be obtained and recorded. Most owners believe that the peculiar conditions of their own particular business require some special form for keeping their truck costs. This is not the case, for the items entering into truck cost are well known and only few in number.

Two Cost Divisions

Truck costs may first of all be divided into two main heads as follows:

1—The actual charges against the truck operation, including operating charges, maintenance charges and fixed charges.

2—All overhead items which are necessary in order that the trucks be operated as a means of performing work by actually moving goods.

It is very important that these two classes of charges be kept separately in order that the mechanical or operating efficiency of the truck be determined and leaks in that regard be stopped. Then,

(Continued on page 40)

Trucks Perform Yeoman Service in Oil Fields

Speedy Development of Burkburnett Oil Field in Northern Texas Would Have Been Impossible Without Use of Motor Trucks

THE greatly increased demands for gasoline and fuel oil used in the myriad automotive war appliances and under the boilers of our new merchant marine and the Allied navies of the world could not have been met during the war period of 1918 were it not for the most extensive use of motor trucks in our great Southwest oil fields. During 1918 there was the most feverish activity to increase the production of the present fields and to exploit new properties in order to meet the tremendous increase in the demand caused by the war.

The exploitation of new fields demanded the utmost speed in getting the drills, drill machinery, boilers, pipes, all sorts of rigging, tanks and even the men themselves to the fields, together with the food for them to eat and the clothes for them to wear. Because many of the fields were discovered far from the nearest railroad line, the transportation of all the necessary materials was exceedingly slow. It was not until the motor truck was called in to solve these transportation problems that the new production reached anything like the demand for the greater volume of oil.

Out in the great Southwest motor trucks are virtually jumping from rock to rock in a roadless country and carrying the necessary equipment for oil promotion work at a greater speed than ever before known in the history of oil production.

Trucks Helped at Burkburnett

The great Burkburnett field just north of Wichita Falls, Tex., owes its speedy development to the use of trucks in hauling all of the necessary equipment from Wichita Falls. There, oil was discovered right in the center of a small town, and it was not long before rigs shot up in almost every one's backyard. Wells were even driven on church and school property in the center of the town.

One of the Wichita 3½-ton trucks being loaded with baled hay directly from a railroad car. The truck is owned by the Humble Oil & Refining Co., and is used in the Burkburnett oil field in Northern Texas

Here is the 6-ton double-reduction-driven Wichita with a load of studding, sideboards and shingles to be used in building a workmen's shack at the Burkburnett field

After it has been decided to drill a hole at any particular location, the first requisite is to get the timber for the drilling rig on the ground. Trucks hauled new timber for this work from the railroads at Wichita Falls and transferred some of the completed rigs from other nearby holes which had run dry. At the time the writer visited Burkburnett late in 1918, there were several hundred rigs all set up but without the necessary drilling machinery or boilers to operate them. The next task of the truck was to haul this heavy and unwieldy equipment to the field, and it was done by means of motor trucks in less time than it could have been performed by any other method. With the price of oil high due to the increased demand, the need for speed in driving wheels can be realized when it is considered that every day consumed in drilling a well with any kind of a subsequent flow means just that many days of lost income. With so many wells drilled in close proximity to each other, all wanted to get their wells down first so that they could cash in on the oil secured should that particular strata of oil run out or be tapped at some other point by other wells.

Tanks Hauled by Trucks

As soon as oil was struck, it was necessary to provide tanks in which to store it until pipe lines could be laid to carry it to the nearest railroad tank car siding or to refining plants from which it could be piped to Gulf ports and loaded into tank ships.

Practically all of these tanks were hauled to the fields by means of motor trucks. One concern, Black, Sivalls & Bryson, with head offices in Oklahoma City, and one of the largest manufacturers and setters-up of oil and water tanks, have disposed of all their ninety horses and replaced them by a fleet of twenty-two motor trucks. The use of trucks instead of horses has enabled that company to carry a smaller stock of tanks at its distributing points throughout Texas, Oklahoma and Kansas, because by means of trucks tanks may be transferred from one point to another in a minimum of time as compared with shipments by railroad. The trucks have also saved considerable labor, since they are used to carry both the men and tanks to the job and the men back to the home office or to the next job. A smaller force of men is thus able to do the same work

Two views of Wichita 3½-tonners hauling baled hay for horses working in the Burkburnett field. Note that each of the trucks is equipped with metal instead of wood wheels. The size of the load is large enough to make any horse green with envy

required by a larger number when the men had to spend much of their time in riding on the railroads and waiting over at junction points to catch trains running infrequently to the settlements where the tanks had to be set up.

Practically all of the pipes leading from the various fields were hauled by means of trucks. The long lengths were generally carried on two-wheeled trailers with lengthy connecting poles.

Housing and Feeding the Men

After all of the necessary rigging and machinery had been set up, there was the problem of housing the men working the equipment and of feeding and clothing them. In this work the truck performed the same excellent service that it did in hauling the other materials. All sorts of lumber, consisting of studding, sideboards and shingles, were carried, as shown by one of the illustrations on the opposite page. Some considerable number of horses were used for short haul work in and around the fields and for pulling scrapers in the construction of new roads leading from the nearby towns to the fields. These horses of course had to be fed, and again the motor truck was called upon to haul bales upon bales of hay and other feed, as shown in three of the illustrations on this and the opposite page.

In the work at the Burkburnett field, the Humble Oil & Refining Co. used several Wichita 3½-ton worm-driven trucks and one of the new 6-ton Wichitas with double-reduction final drive. Another one of these Wichita 6-tonners was used in the same field by the Panhandle Refining Co. That truck performed excellent service over the poor roads leading to the fields by reason of the specially low gear reduction provided on first speed. The truck has a gear reduction of 77 to 1 on first speed; 43 to 1 on second speed; 28 to 1 on third speed; 14 to 1 on fourth speed and 82 to 1 on reverse speed.

Doing Work of Six Horses

One of the 3½-ton Wichita trucks owned by the Humble Oil & Refining Co. has continually performed work equivalent to that of six double teams, which may be hired for $9 a day apiece in the Burkburnett territory. One team can make only one round trip a day between Iona Park and the company's lease, 9 miles away. The horse wagon thus hauled only 2 tons per day. As compared with this, the truck can make three round trips or 56 miles in all and haul 4 tons per trip, or 12 tons as compared with the two tons hauled by the horse wagon. The great saving made by the truck can be visualized by noting that its earning capacity at a rate equivalent to the cost of the horse wagon is $54 a day.

On one occasion the two 3½-ton and 6-ton Wichita trucks hauled a 12-ton derrick to the Burkburnett field, where it was set up and in operation several days sooner than would have been possible had the material been moved by horses.

Many trucks are being used in laying new pipe lines in other parts of Texas. For instance, the Prairie Oil & Gas Co. used a large fleet of Whites in building a new pipe line over 200 miles long between Ranger, Tex., and Galveston. The size of the line may be gaged by the fact that it has a capacity of 75,000 gallons of oil a day. The Gulf Production Co. is using a fleet of White and Service trucks in laying a 100-mile pipe line from Ranger to Fort Worth. The Texas Co. is also laying a new pipe line from the Ranger field through Fort Worth to Dallas and is using trucks exclusively in the work.

Motor Trucks Reduce Farmer's Haulage Costs

(*Continued from page* 23)

of work the vehicle is engaged. These items are, in the order of their importance as determined by the amount of the expenses of each item, as follows:

1—Driver
2—Tires
3—Gasoline
4—Overhauling
5—Depreciation
6—Insurance
7—Interest
8—Garage.

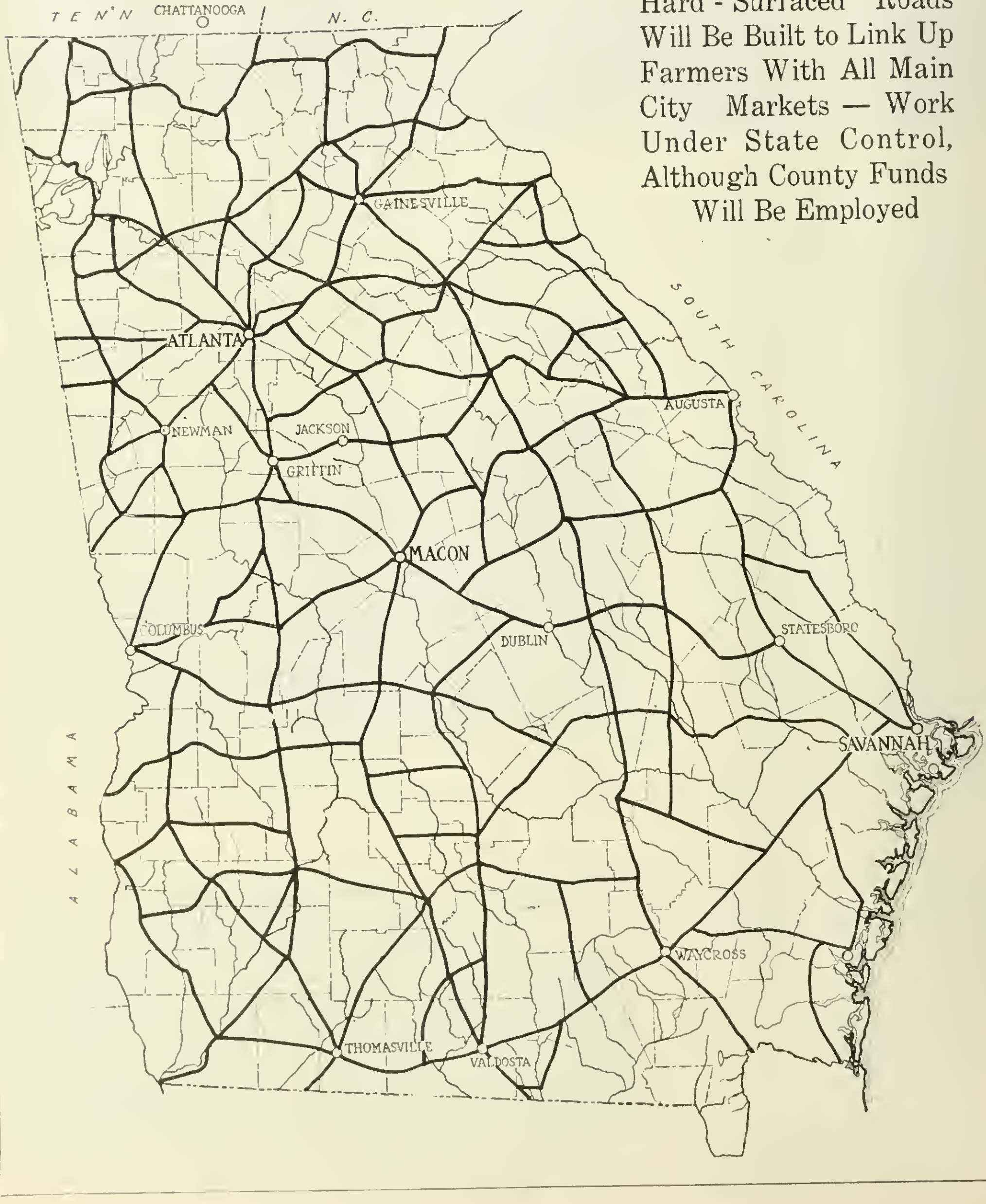
Provided the farmer does not wish to buy his own truck equipment, but would rather enter into an agreement with his neighbors to operate one or more vehicles co-operatively, he will find the example of the Farmers' Co-Operative Co. of Hartford County, Inc., of considerable assistance to him. That association operates in Hartford County, Md., and its trucks offer a daily round-trip service from Churchville and Bel Air to Baltimore. The trucks take to Baltimore milk and other farm products and bring back to the farmers foodstuffs, salt, seeds, fertilizers, farm implements and other articles for use on the farm, together with merchandise shipped from the wholesale houses of Baltimore to rural merchants who are members of the association. The distance covered daily is about 60 miles.

The territory served by the association is a very productive agricultural region. Prior to the advent of the motor truck, the farmer in that territory hauled his products by team to either the railroad station or to Baltimore. Except for the farmers near the railroad, hauling to shipping points meant the loss of a team and man for at least half a day. To the farmers producing milk who had to make this trip daily, the loss was appreciable. As the trip to Baltimore was hard on teams and always required 2 days' time, few farmers marketed in that manner.

The Co-operative association in this instance has proved successful because it issued stock to its members and has not tried to make money but to give as cheap a service as possible to every member. Greater details of the association and its method of operation will be given in a subsequent issue of THE COMMERCIAL VEHICLE.

2301 Miles of Real Truck Roads Included in Georgia's Proposed Highway System

Hard - Surfaced Roads Will Be Built to Link Up Farmers With All Main City Markets — Work Under State Control, Although County Funds Will Be Employed



Georgia Preparing for Increased Truck Use by Laying Out Adequate System of Roads

Twelve Main Routes Proposed to Connect All Important Cities — Work Will Not Wait on $40,000,000 Bond Issue

GEORGIA with its 7500 trucks is in bad need of good roads. These trucks, used mainly by the farmers to haul agricultural products to the markets, are not now giving their owners the service they should on account of the poor road conditions. Hauls from the farms to the markets are on the average long, and, on account of the present hindrance to good road navigation, much time is not only wasted but the wear and tear on the vehicle is enough to decrease its serviceability to a minimum.

However, the State of Georgia is now thoroughly aroused to the importance and necessity of providing adequate funds for a system of permanent truck roads to be built as rapidly as possible. A popular campaign is being carried on by good roads organizations for the purpose of calling a special legislative session to consider a constitutional amendment proposing a $40,000,000 bond issue.

Twelve Routes Proposed

The Highway Department of Georgia has proposed a system of roads which will include twelve routes to provide links for the farmers with the main markets. These twelve routes will require a total mileage of 2301. The following list of routes gives the cities connected and the mileage of each route:

1—Chattanooga to Thomasville, 395.
2—Gainesville to Jacksonville, 340.
3—Atlanta to Asheville, 119.
4—Atlanta to Montgomery, 84.
5—Newman to Columbus, 70.
6—Griffin to Dublin, 101.
7—Macon to Valdosta, 195.
8—Augusta to Birmingham, 242.
9—Columbus to Savannah, 300.
10—Savannah to Tallahassee, 305.
11—Waycross to Brunswick, 60.
12—Augusta to Statesboro, 90.

The preceding list of routes includes the main highway arteries that are to be improved. The Georgia Highway Department, however, has in its plans mapped out a comprehensive system of hard-surface roads that will reach every county in the state and permit truck owners to run their vehicles from one end of the state to the other.

By reason of the constitutional requirements in Georgia, it may not be possible to vote on the $40,000,000 bond issue until 1920. To save the time lost, a provision will be made in the bill whereby counties, with the Federal-aid money allotted to them, may construct a permanent type of road in accordance with the specifications and under the supervision of the state highway engineer and along the routing of the state highway. It is also proposed that the department be empowered to refund to the county the amount of money so expended.

Concrete Much in Favor

Georgia good roads organizations are boosting concrete road construction, using as an argument the results of a recent test in Cleveland where five 2-ton trucks, each carrying a full load, averaged 11.78 miles per gallon of gasoline over a concrete road and only 5.78 m.p.g. over an earth road in average condition. Other types of pavement showed results varying as the character of the pavement offered more or less resistance to traction. The great saving in fuel expense according to the character of the road being traversed and the large difference between good and poor road fuel consumption are strikingly shown in the accompanying table:

Earth	5.78 m.p.g.
Fair gravel	7.19 m.p.g.
Good gravel	9.39 m.p.g.
Fair bituminous macadam	9.48 m.p.g.
Concrete	11.78 m.p.g.

As a result of the need of permanent roads in Georgia and confident that the bond issue will be favorably passed, a number of counties are preparing to issue bonds and construct permanent roads within their borders, receiving the Federal aid allotted them for this purpose.

Bibb County Votes $700,000

Bibb County, of which Macon is the county seat, has voted a large bond issue of which $700,000 will be used on paving state highways within its borders. Chatham, of which Savannah is the county seat; Spalding, of which Griffin is the county seat, and Thomas, of which Thomasville is the county seat, are among the counties which will follow the same plan.

The number of roads designated in each county is determined by the number of representatives from each county. Instead of naming the high points of the state system of highways in the bill, Georgia's legislation will leave the designation to the State Highway Department and only limiting the number of roads to any one county.

Provisions of the Work

The provisions as regards the designation of roads by the counties are as follows:

Provision 1—Two main traffic roads, starting from the county seat, shall be so designated in each county for each member of the house of representatives in the General Assembly, representing such county; said roads to traverse the county to the county line, and to connect with the designated state-aid roads of any adjoining county or counties, provided no county shall have more than four such roads under this provision.

Provision 2—Additional main traffic roads may be designated which are necessary to complete the inter-connecting system set forth in Provision 1. Where unusual topographic or traffic conditions are met with, or to serve important market points not already reached, or to give more direct traffic routes between large business centers where the direct traffic is heavy, and the county seat routes involve substantial loss of distance, provided that the total mileage to be designated hereunder shall not exceed one-third of the mileage arising under Provision 1.

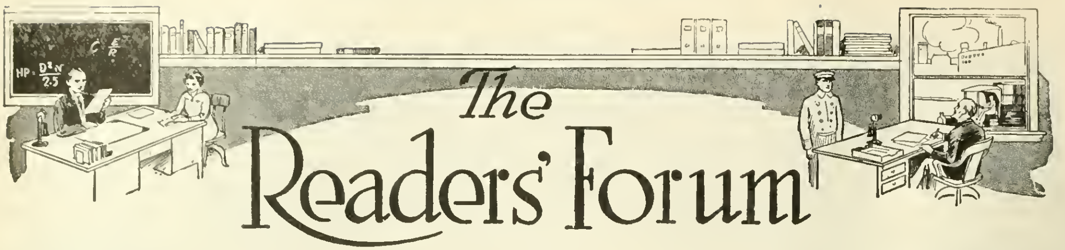
State to Control Building

Provision 3—In designating and locating the entire system of state-aid roads, the effort shall be made to serve as large a territory and as many market points as practicable with the said system, due consideration being given to traffic density, topographic and construction difficulties, and secure main trunk line routes between the large traffic centers of the state, provided that the total mileage to be designated as state-aid roads shall not exceed 4800 miles.

Provision 4—The state highway engineer shall prepare a report or reports accompanied by maps setting forth the general routes between county seats and traffic centers of roads recommended for designation as state-aid roads for approval by the state highway board.

Provision 5—That when any portion of the designated state-aid road system is taken under the jurisdiction of the State Highway Department by written notice as prescribed in Article 5, Section 1, hereof the county or counties in which said portion is located, shall not thereafter be required to levy taxes for construction or maintenance of said portions of highways.

Provision 6—That it shall be the duty of the state highway board to institute and carry out efficient and equitable plans for maintenance, for improvement, and for the construction of durable paving on the designated state-aid roads, whereby the entire system shall, as rapidly as possible with the funds made available, be prepared for, and receive such type of pavement known to be durable under heavy traffic as the State Highway Department shall specify.



The Readers' Forum

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

REMOVABLE TOPS MADE ON ORDER

List of Twenty-eight Body Builders Who Might Take Special Orders

To the Editor, COMMERCIAL VEHICLE:

We would like to secure designs of removable tops for furniture trucks. Can you advise us of the names of companies which manufacture such tops, preferably of light weight?—HOWARD K. BROWN, Brown, Curtis & Brown, Syracuse, N. Y.

We know of no concerns which manufacture motor truck tops as a special business. We believe however, that any reputable motor truck body builder can furnish you such a type of top on order.

A list of some of the motor truck body makers throughout the United States is as follows:

F. A. Ames Co., Owensboro, Ky.
Auto Body Co., Lansing, Mich.
Auto Body & Top Works, Nashville, Tenn.
H. H. Babcock Co., Watertown, N. Y.
J. G. Brill Co., Philadelphia, Pa.
J. L. Clark Mfg. Co., Oshkosh, Wis.
Commercial Auto Body Co., St. Louis, Mo.
Economy Mfg. Co., Indianapolis, Ind.
Fitzgibbon & Crisp, Trenton, N. J.
General Woodwork Co., Cincinnati, Ohio.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.
Hoover Wagon Co., York, Pa.
Theodore Kundtz Co., Cleveland, Ohio.
Lang Body Co., Cleveland, Ohio.
Lansing Body Co., Lansing, Mich.
Martin Truck & Body Corp., York, Pa.
Motor Truck Body Co., Detroit, Mich.
New Haven Carriage Co., New Haven, Conn.
Parry Mfg. Co. Indianapolis, Ind.
Paterson Vehicle Co., Paterson, N. J.
Irvin Robbins & Co., Indianapolis, Ind.
Shadbolt Mfg. Co., Brooklyn, N. Y.
Springfield Commercial Body Co., Springfield, Mass.
Standard Body Co., White Pigeon, Mich.
Tegetmeier & Riepe Co., New York, N. Y.
Troy Mfg. Co., Troy, Ohio.
Thomas Wright Co., Jersey City, N. J.
York Body Corp., York, Pa.

KITCHEN BODIES MADE TO ORDER

Names of Two Manufacturers Who Have Built That Type of Body

To the Editor, COMMERCIAL VEHICLE:

Can you give me the address of one or more companies which make motor truck kitchens and lunch wagons.—MCLESKEY GARAGE, Newport News, Va.

Motor truck kitchens and lunch wagon bodies are made on special order. Below are the names of two concerns which have made such equipment.

1—F. E. Rising, Los Angeles, Cal., who is using a truck and trailer provided with kitchen equipment for cooking and selling frankfurters. The mobility of the outfit enables the owner to follow circuses as a means of increasing his business.

2—D. W. Baldwin & Sons, New Haven, Conn., built an army kitchen presented to the army by the Hotel Taft, New Haven, Conn.

READER WANTS WIDTH OF CHASSIS

Data Not Now Available but Will Be Secured Later

To the Editor COMMERCIAL VEHICLE:

We find the specifications of trucks which you publish very useful, but are writing to ask if you can tell us the width of the chassis frames of the different sizes of trucks as these are not tabulated in your table. —E. J. FREDERICK, Field Mfg. Co., Owosso, Mich.

We regret that we cannot give you the width of chassis frames of the different sizes of trucks at this time. We shall, however, include a question asking for the width of the chassis frames in our next specification sheet which will be mailed to all motor truck manufacturers on September 1, 1919. The data from these sheets will be available after November 1, 1919.

PRICES OF THREE MAKES IN 1917

Kissel a 1¼-Tonner, Overland 3/5 Tonner and Republic 1-Tonner

To the Editor COMMERCIAL VEHICLE:

Will you give us the selling prices of the following trucks in the individual months as given after each make:

Kissel ....1-ton...Sept. 1, 1917
Republic ..1-ton....Jan. 1, 1917
Overland ..1-ton...Sept. 1, 1917

If the trucks are listed at less than 1 ton, or slightly over 1 ton, will you kindly indicate the actual rated capacity.—R. C. HUDSON, Cramer-Krasselt Co., Milwaukee, Wis.

Prices for the three makes of trucks on the dates indicated are as follows:

Name	Capacity	Price
Kissel	2250 lb.	$1,085
Republic	2000 lb.	1,095
Overland	1200 lb.	800

TEN BIGGEST TRUCK PRODUCERS

Ford Company Builds More Trucks Than Any Other American Manufacturer

To the Editor COMMERCIAL VEHICLE:

Will you give us a list of the trucks which are the biggest sellers, indicating the number sold yearly for the past 3 years.—SEARS ROEBUCK & Co., Chicago.

Taking the 1918 production of motor trucks as the basis for the number of trucks sold in that year, the best selling trucks would range somewhat in the following order:

Ford,
Republic,
I. H. C.,
Maxwell,
G. M. C.,
White,
Pierce-Arrow,
Packard,
Mack,
Garford.

We cannot give the individual production figures for the makes of trucks mentioned above, since the production figures were furnished to THE COMMERCIAL VEHICLE with the distinct understanding that they would not be published individually but used merely to determine the total production of trucks for the year covered.

ESTIMATED PRODUCTION FIGURES

110,400 Trucks of Three Sizes in Use in the U. S. on Jan. 1, 1919

To the Editor, COMMERCIAL VEHICLE:

Will you please answer the following questions: 1—What is the approximate number of 3-, 3½- and 5-ton trucks in use in the United States on Jan. 1, 1919? 2—What is the estimated production for these three sizes in 1919?—W. QUINLAN, Maynard H. Murch Co., Cleveland, Ohio.

The answers to your questions in the order given are as follows:

1—Based on the 1918 production of the three sizes mentioned and taking 480,000 as the number of trucks in use in the United States as of Jan. 1, 1919, the number of the three sizes in use on the same date would be as follows:

Capacity	Number in Use
3-ton	38,400
3½-ton	52,800
5- and 5½-ton	19,200

2—Based on the 1918 production of 3-, 3½- and 5 to 5½-ton trucks, the 1919 production will be as follows:

Capacity	Estimated Production
3-ton	23,200
3½-ton	31,900
5- to 5½-ton	11,600

TRUCKS USED IN LUMBER WORK

Many Articles Published Showing the Superiority of Motor Vehicles

To the Editor, COMMERCIAL VEHICLE:

We are interested in obtaining data relative to trucks, tractors, trailers, etc., which are used for transporting lumber. That is, what means are being used for the hauling of lumber from the woods to the saw mills.—G. B. WARNER, Renault Selling Branch, Inc., New York City.

Below is a list of articles which have been published from time to time in THE COMMERCIAL VEHICLE regarding the operation of trucks in the lumber business.

Aug. 1, 1916, page 18, contains a two-page article entitled TRUCKS OUST HORSES IN LOGGING WORK. It records the work of the Machias Mill Co., Woodinville, Wash., with 4-ton Riker trucks using dollies or trailers to haul logs from the forest to Lake Sammamish, from where they are floated to the mill.

Jan. 15, 1917, pages 5 to 8, contains a three-page illustrated article on LUMBER TRADE KEEPS PACE WITH BUILDING DEVELOPMENTS WITH TRUCKS. This article, by J. Crow Taylor, deals with the entire industry in an analytic way, pointing out the magnitude of the business, the proportions and importance of its transportation problems, and outlines the various fields of motor trucks and their manner of use.

April 1, 1917, page 27, gives a short article answering a Tennessee lumber merchant who is desirous of carrying about 10,000 ft. per load, or between 40,000 and 50,000 lb. over a rough country pike in that state.

Sept. 1, 1917, pages 5 to 8, contains an illustrated article telling of the superiority of motor trucks in logging work in the Northwest. Besides giving cost figures, this article also describes the use of trailers in lumbering work. The article is entitled MOTOR'S SUPERIORITY IN LOGGING WORK PROVED BY TRUCKS IN NORTHWEST.

Dec. 1, 1917, pages 5 to 8, tells the story of how one truck saves money for its owner in replacing six horses, three wagons and one driver in hauling sawed logs from the camp site to the railroad siding. Cost figures are given with this article. It is entitled ONE LUMBER TRUCK SAVES $1,016 IN 37 DAYS ON HAUL OF 1.92 MILES.

March 15, 1918, pages 26 and 27, contains an article showing how a lumber company has been able to replace its three horses with one truck. Cost figures are given with the article on how a 2-TON LUMBER TRUCK REPLACES THREE HORSE WAGONS AND PAYS FOR ITSELF IN 1 YEAR.

May 1, 1918, DELIVERY RADIUS DOUBLED FROM 12 TO 25 MILES BY PITTSBURGH LUMBER TRUCK, pages 16 and 17, tells how the Keystone Lumber Co. has made use of a truck to make its shipments more quickly and in this way increased its business.

Jan. 1, 1919, page 41, contains a reply to an inquiry received from one of our readers for the name of the manufacturer of some device to replace his jigger trucks. On page 28 of the Feb. 15, 1919, issue, is published an additional reply to the same inquiry.

Jan. 15, 1919, page 11, tells how three Federal motor trucks replaced 114 horses hauling all the supplies of a large lumber camp at Sugar Pine Mills, about 60 miles from Madera, Cal.

April 15, 1919, page 35, tells how the Lena Lumber Co., Benton, Ark., has replaced six mules with a 2-ton Kissel truck made up as a tractor with a Studebaker semi-trailer.

TRUCK OUTPUT AND REGISTRY

Production for Last 2 Years Given, with Estimate for This Year

To the Editor, COMMERCIAL VEHICLE:

Will you please answer the following questions regarding the registration and production of motor trucks:

1—Kindly let us have the truck registrations by states for the years 1917 and 1918, and the estimated registration for 1919.

2—The number of trucks built in this country during the past 2 years, and an estimate for the present year.—F. C. KEHR, Kissel Motor Car Co., Hartford, Wis.

The answers to the questions in the order given are as follows:

1—The registration of motor trucks in those states in which trucks are registered separately from passenger cars were published on page 20 of THE COMMERCIAL VEHICLE for Feb. 1, 1919. As pointed out in that issue, the registrations were for only twenty-three out of the forty-eight states and indicate that there are only 322,857 commercial vehicles in use in the United States to-day, whereas THE COMMERCIAL VEHICLE estimates from reliable sources of information that the total number of motor trucks in domestic use on January 1, 1919, was 480,000. The trucks registered and the increase in number and per cent of registrations in the twenty-three states for the years 1917 and 1918 are shown in the table given below.

While of course it is impossible to give any more than an estimate of the 1919 registrations in the various states, such a figure can be calculated by assuming that the same percentage of increase for 1919 will take place as occurred in the 11-month period of 1918, as compared with the 12-month period of 1917. On this basis the approximate registrations in sixteen of the states for 1919 will be:

California	37,663
Connecticut	23,329
Georgia	15,842
Maine	5,208
Maryland	13,025
Massachusetts	40,273
Michigan	34,226
Nevada	466
New Jersey	25,273
New York	130,170
Pennsylvania	74,748
Rhode Island	7,763
Utah	5,119
Virginia	2,767
Washington	23,860
Wisconsin	7,821

2—The production of motor trucks for 1917 and 1918 and the estimated production for 1919 were published on page 8 of the Jan. 1, 1919, issue of THE COMMERCIAL VEHICLE, and are as follows:

1917	190,000
1918	250,000
1919	290,000

TRUCKS WITH ELECTRIC DRIVE

No Makes of Trucks Now on Market With Hydraulic Power Transmission

To the Editor, COMMERCIAL VEHICLE:

Will you please furnish me with the names and addresses of gasoline motor truck manufacturers who are using any form of hydraulic or electric power transmission means in the various models of gasoline trucks now on the market.—G. M. BUCKLEY, New York City.

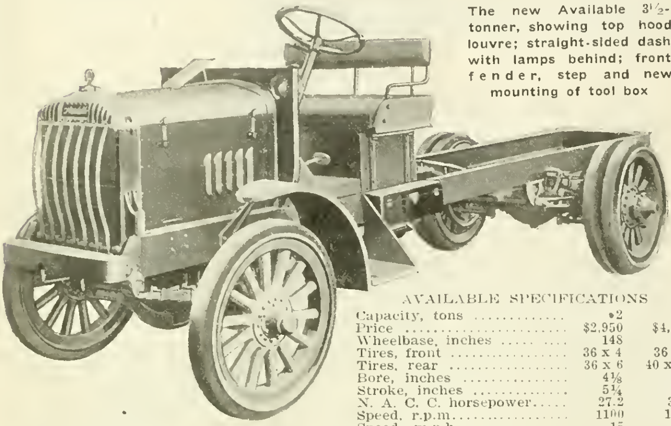
So far as THE COMMERCIAL VEHICLE has record, there is no maker of trucks at the present time offering a gasoline vehicle with any form of hydraulic transmission. There are several makes of trucks employing electric transmission. These include two gas-electric vehicles, the A & B, made by the American & British Mfg. Co., Providence, R. I., and the Couple-Gear, made by the Couple-Gear Power Truck Co., Chicago, Ill. The Bourne gasoline truck, made by the Bourne-Magnetic Truck Co., New York City, employs the Entz electric transmission.

	1917*	1918†	Increase	
			Number	Per Cent
Alabama		5,516		
Arizona	1,439			
California	10,765	20,141	9,376	87
Colorado		4,600		
Connecticut	9,702	15,051	5,349	55
District of Columbia		4,780		
Georgia	3,100	7,010	3,910	126
Iowa		7,500		
Louisiana	3,165			
Maine	3,382	4,200	818	24
Maryland	4,156	7,359	3,203	77
Massachusetts	26,964	33,011	6,047	22
Michigan	20,313	26,328	6,015	30
Minnesota		6,000		
Mississippi		2,000		
Nevada	225	324	99	44
New Jersey	9,622	15,601	5,979	62
New York	55,402	92,979	37,577	40
Oklahoma	3,688			
Oregon		3,200		
Pennsylvania	12,952	31,145	18,193	140
Rhode Island	4,065	5,626	1,561	38
Utah	2,500	5,069	2,569	100
Vermont	1,266	1,870	604	48
Washington	11,656	16,686	5,030	43
Wisconsin	6,000	6,861	861	14
	190,462	322,857	132,395	70

*1917 registrations as of January 1, 1918. †1918 registrations as of December 1, 1918.

Many Refinements in Two New Available Models

2- and 3½-Ton Units Are New—Each Has Inclined Front Axle, New Brake Rod Layout, New Spring Bracket and Improved Cab and Seat



The new Available 3½-tonner, showing top hood louvre; straight-sided dash with lamps behind; front fender, step and new mounting of tool box

AVAILABLE SPECIFICATIONS

Capacity, tons	2	3½
Price	$2,950	$4,250
Wheelbase, inches	148	156
Tires, front	36 x 4	36 x 5
Tires, rear	36 x 6	40 x 5d
Bore, inches	4⅛	4½
Stroke, inches	5¼	5½
N. A. C. C. horsepower	27.2	32.4
Speed, r.p.m.	1100	1100
Speed, m.p.h.	15	13
Gear ratio in high gear	7.75 to 1	10.3 to 1
Final drive	Worm	Worm

MANY refinements in detail construction have been made in the two new 2- and 3½-ton worm-driven trucks recently brought out by the Available Truck Co., Chicago. The line of that company now consists of three models and includes a 5-ton worm-driven truck, which has not been changed either in design or price since the latter part of 1918. The 1-ton truck offered during 1918 has been discontinued.

The new details of construction in the two new models may be divided up under seven main heads as follows: An inclined front axle, or one whose vertical centerline is not perpendicular to the ground level but slants toward the rear at the top; a new brake rod layout; a new spring shackle casting; a new seat construction and simplified dashboard; a new runningboard step; a new method of mounting the tool box, and a new method of constructing and mounting the front fenders.

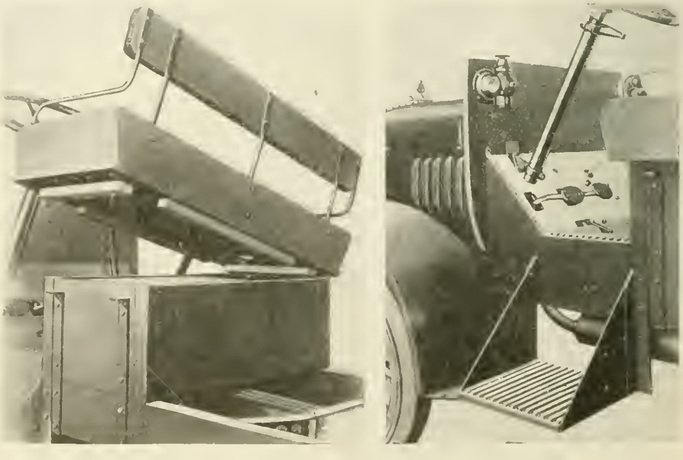
The front axle has been inclined with the top nearer the rear end of the truck than the bottom, on the principle that the placing of the axle in that position enables it to absorb the shocks to a greater extent than when placed in the ordinary vertical position. The mounting of the axle in that manner also gives the front spring a slight incline to the rear, its rear end being approximately 2⅜ in. lower than its front end. This construction permits of a longer shackle on the rear end of the front spring.

When the truck passes over an obstruction, the blow is transmitted to the axle at an acute angle and the wheel tends to mount the obstruction instead of being forced directly upward. By mounting the steering rod connecting the lower end of the steering column with the steering knuckle on the wheel parallel to the frame when the truck is under load, a castor effect is secured in the steering. This is aided by the inclined mounting of the front axle and makes the truck easier to steer by preventing wobbling of the front wheels.

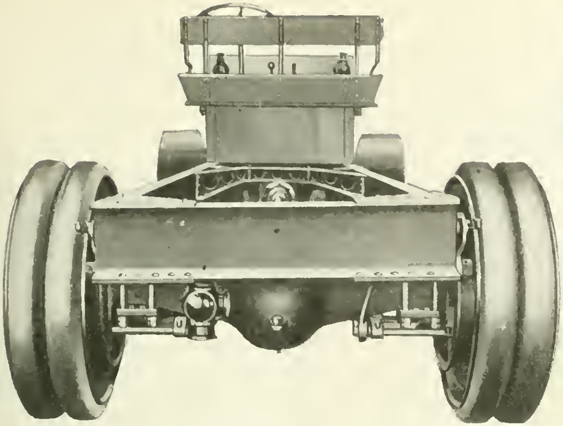
The brake layout is unusual in that an attempt has been made to equalize the pressure exerted on each brake drum when either the hand or the foot brakes are applied. Both the 2- and 3½-ton trucks are fitted with Timken rear axles, which are provided with the dual side by side internal-expanding brakes operating on the same drum. The brakes are each of the double segment type. Under the usual method of operation, the forward shoes of each set of brakes would be applied simultaneously on each end of the axle when that particular set of brakes was operated. With the available layout, however, the forward shoe of one set of brakes is set on one end of the axle at the same time as the rear shoe of the corresponding set on the other end. This is accomplished by means of linking up the brake-shoe arm with the cross-wise equalizer bars as shown in the illustration on the opposite page. The brake rods, for instance, on the foot set run from one equalizer to the rear brake-shoe arm on one end of the axle and to the forward brake-shoe arm on the other end. Each equalizer bar is mounted in a slotted member under each side of the chassis frame member to take up any inequality in the action of the equalizer bar itself.

The shackles placed on both ends of the rear truck springs are closed at the top so that they serve to support the ends of the spring in case of breakage and thereby permit the truck to be run to the nearest point of repairs under its own power. The front rear spring shackle is anchored to the same casting to which the front end of the radius rod is pivoted. The point of attachment of the shackle is slightly above and to the rear of the point of attachment of the radius rod, so that the pressures exerted on the casting by the spring shackle and by the radius rod act in opposite directions and tend to equalize each other.

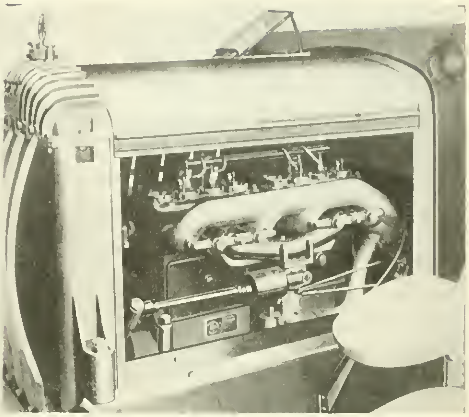
The truck seat is mounted in a new manner, in which wood cleats are supplied at both ends of the seat. These



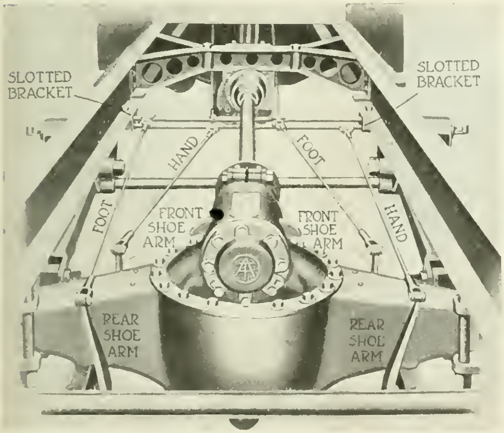
The new method of seat mounting is shown at the left and the new type of Available step at the right



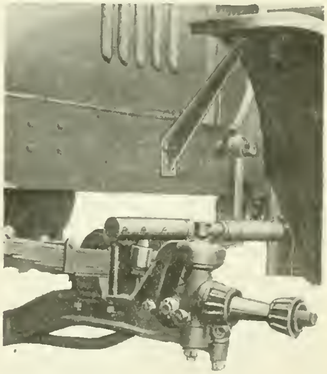
Rear view of the 3½-tonner, showing the low frame height for easy loading, the straight-line propeller shaft and frame gusset plates with no cross members



The engine is set low and the fender far back to provide accessibility for adjustments or repairs

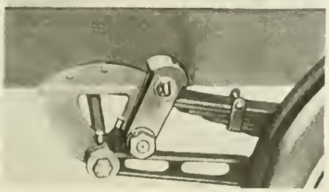


At the left is shown the new method of connecting up the brake rods to equalize the pressure on both brake drums. At the right is seen the inclined front axle and the one-piece fender bracket



fit down on to two points of support on the extreme outside of the seat riser. The supports are made up of a piece of flat iron which is bent over at its upper end to provide a horizontal support for the wood cleats. The same pieces of iron are bent over at their lower ends to provide a second shelf upon which the tool box is mounted. Each piece is bolted to the outside of the side frame chassis member and also to the seat riser. The actual connection between the seat and the riser is made by means of bolts through the end cleats and through holes drilled in the upper horizontal ends of the two flat pieces. This type of mounting prevents squeaks between the seat and the riser and also enables two- or three-passenger cabs to be fitted on either model without changing the construction of the seat riser or the hold-down metal pieces. This is accomplished by simply moving the end cleats in or out along the bottom of the seat itself to suit the fixed distance between the ends of the seat riser. The cushions on each seat are mounted on coiled springs to provide for easier riding.

The engine hood is provided with a top louvre or opening with a cover hinged at its front end to permit of the discharge of the hot air above the engine during the hot summer months. This makes it unnecessary to remove the side members of the engine hood and keeps the dust and dirt off the engine. The sides of the engine hood are entirely removable. They are held on springs at the top and hooks at the bottom and may be removed readily to give free access to the engine for adjustments or repairs. The radiator is spring mounted. As shown in the illustration at the upper right corner of this page, the front fender is set well back so that its forward edge is about on a line with the middle of the engine. This provides great accessibility to the engine. Furthermore, the front fender bracket is made of a one-piece electric steel casting to prevent rattle and looseness.



The shackle has a closed top and is mounted on radius rod bracket

The cab has straight vertical lines at the top of the sides so that closed cabs or windshields may be fitted with a minimum of carpenter work. The dash lights, which are of Adlake manufacture, are mounted in back of the dash instead of in front. This construction gives considerable light inside the cab and enables the driver to read bills of lading, etc., without getting out of his seat.

Both the 2- and 3½-ton trucks are fitted with Continental engines; Chicago finned-tube radiators with pressed steel cases; Bosch magnetos; Pierce governors, and drive through Brown-Lipe clutches and Brown-Lipe four-speed selective gearsets mounted amidships on three-point supports. The rear axles in each case are of Timken manufacture. Lavine steering gears are used and are placed at the left, with the control levers in the center.

New Splitdorf Aero Magneto Adaptable for Truck Use

Cotta Four-Speed Gearset—Black & Decker Electric Drill—Jones Hub Odometer—Flashon Anti-Skid Chains

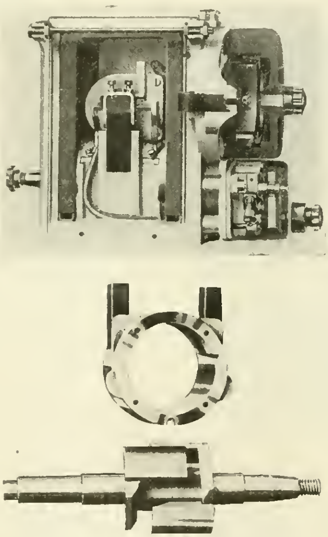
THE Splitdorf Electrical Co., Newark, N. J., has placed on the market a new series of magnetos known as the Aero type and adapted to trucks. A single square carbon brush is used, and there is a general increase in sturdiness, the interrupter points particularly being heavier. The gears are made of a special fabric known as Micarta, and the distributer board is made of Americanite, a new insulating substance produced in the Splitdorf factory.

The Mason principle of stationary windings and revolving field is retained, and the new instrument is uni-directional. Since the magneto is an alternating-current generator, it produces its current in the form of positive and negative waves. One wave series always is stronger than the other, and in the Aero magneto it is the negative, which is utilized as the spark-producing wave. These waves flow always in one direction through the instrument and the spark plugs. In the Aero magneto the breaker-operating cam has two lobes and the rotor has four wings.

This type of magneto differs from the ordinary magneto in that, instead of having a revolving winding it has a stationary winding. The revolving portion of the instrument consists of a shaft on which are two pieces, called wings, of magnetic material separated by a center piece of non-magnetic material. This shaft, instead of extending between the poles of the magneto, extends from one pole of the magnet to the other. The wings constitute rotating poles, because they are in contact with the magnet poles. Instead of a rotating armature two field pieces partly surround the shaft, these pieces being really continuations of the laminated core of the winding housed on the arch of the magnet.

The field is thus securely hidden from dust and dirt and its core extended to afford the magnetic lines of force a path. The rotating poles are always of the same polarity, because they are in contact with given poles of the magnet. As they revolve they brush the field pieces, thus breaking the magnetic circuit and causing a current to be produced in the primary winding. The remainder of the operation of the induction of the secondary, etc., is conventional. The condenser is mounted directly above the winding and, like all the interior parts, is accessible by removing two screws.

Some of the advantages claimed for this type of construction over the revolving armature are: Simplicity, fewer parts, complete protection to all parts, ease of adjustment even while magneto is operating, no wire on any revolving part, no change of polarity in the rotating member, the same high spark intensity regardless of spark lever position, reduced amount of iron in the field, quick break with unnecessary lag avoided and hence a hot spark.


Upper—Housing of stationary winding in Splitdorf aero magneto to protect from dirt and moisture

Lower—Rotor and field structure

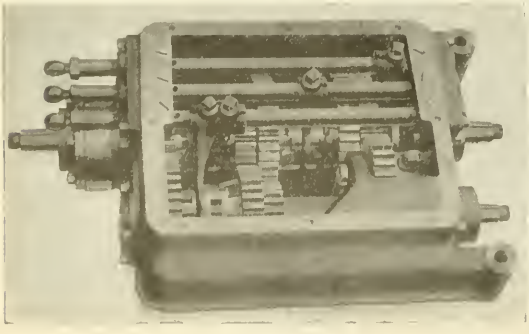
Cotta Four-Speed Gearset

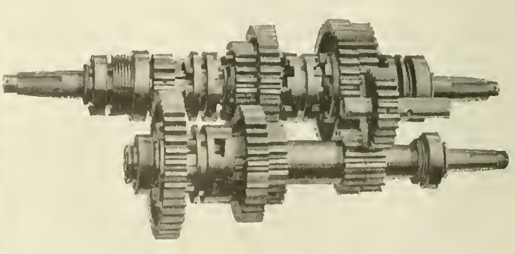
THE Cotta Transmission Co., Rockford, Ill., has brought out a four-speed gearset, embodying the features of its other models, in which the gears are always in mesh and in which it is possible to change gears without shifting them, due to the fact that jaw clutches are shifted instead of the gears themselves. Gearsets of this type for trucks and tractors in two and three speeds have been used for some time.

The four-speed Cotta gearset ratios are as follows: First, 5.2 to 1; second, 3.68 to 1; third, 1.86 to 1; direct or fourth, 1 to 1; reverse, 4.666 to 1. The gear reduction in second is low enough to start the truck under favorable conditions. Chrome nickel steel is used throughout the gearset.

On the face of the speed change gears, which are mounted on roller bearings, is a set of jaw clutches. On the driven shaft are two corresponding double sliding clutches, by means of which any one of the speed change gears may be locked to the shaft. No matter how fast the truck may be traveling, and regardless of the speed at which the gears may be rotating, the speed changes can be made instantly and with ease.

On high speed the driving and driven shafts are locked together and the clutch on the countershaft disengaged. The drive is then direct and the countershaft and all mainshaft gears idle. When the sliding clutch is returned from direct to neutral position, the countershaft clutch automatically engages. The shifting forks are of high carbon heat-treated steel. The gearset is provided with





Left—Cotta four-speed gearset showing shifters and shifting arms

Above—Details of Cotta gearset showing jaw clutches and spiral threads for oiling a locking device which prevents the engagements of two speeds at the same time.

Upon shifting any rod lengthwise the other two rods will be automatically and positively locked against shifting movement until the shifted rod is returned to its original position. Locking balls or members are of such size and so arranged that upon shifting a rod lengthwise, for example, the ball will be forced out of its notch into engagement with its complemental locking ball and confined against movement in the opening between the periphery of the rod and the complemental ball, so that this rod will be locked against lengthwise shifting movement.

Jones Hub Odometer

JONES-MOTROLA, Inc., New York, is producing a hub odometer, type P, which is attached to the front wheel. This instrument records mileage up to 100,000, and then automatically repeats. In installing no extra attachments, such as flexible shafts, gears or brackets, are needed. A new hub cap of malleable iron is supplied with the instrument and it is only necessary to remove the old hub cap, insert a pin in the axle and put in place the new hub cap.

A special graphite-treated packing precludes any possibility of grease or oil entering the instrument. Even if oil or grease were permitted to enter, it would not affect the reading, due to the large recording figures.

The cap of the instrument is a heavy stamping, and the base a casting of liberal cross section dimensions. The index wheel supporting arms are integral with the base casting. The index pinions, pawls and driving gears are of brass, while the driving worm is steel.

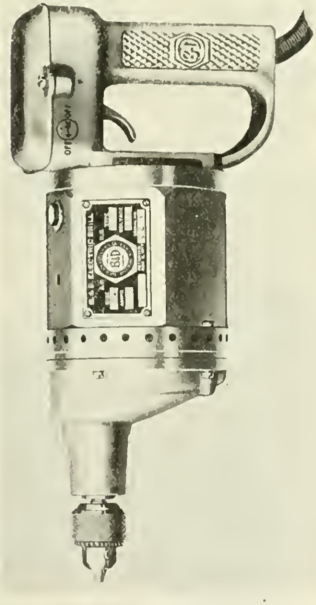
An additional feature of the instrument is the positive indexing device. The figures on the recorder will always be in a straight line when read from the outside. The instrument may be locked on the wheel by the insertion of a wire through the cap and sealed.

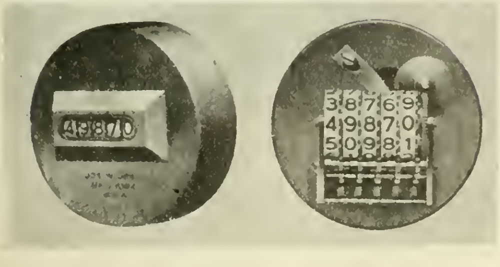
Provision has been made for working the oil or lubricant in the casing away from the stuffing box of the driven shaft. This is achieved by means of a left-hand spiral thread which prevents the oil from crowding and leaking through when the driving shaft is in operation. Referring again to the method of keeping the lubricant within the casings, this consists of a peripheral right-hand oil groove formed integral with the clutch element, so that when the driven shaft is revolved in any forward speed, the right-hand thread will work the oil inwardly. When, however, direction of drive is reversed, the right-hand thread will have a tendency to work the oil outwardly, and to obviate this the manufacturer has equipped the spacing collar with peripheral spiral thread of a lead in a different direction from that on the clutch element, adapted to work the oil inwardly when reverse speed is engaged.

Black & Decker Electric Drill for Small Sizes

THE Black & Decker Mfg. Co. Baltimore, Md., has placed on the market 3/16 and ¼ in. portable electric drills, with trigger switches and pistol grip. This feature has heretofore been only obtainable in the ⅜, ½, ⅝ and ⅞ in. sizes. A 1/6 hp. motor with series compensated windings and operating on any current from direct to 60-cycle alternating is used. Cooling is by means of a vane impeller mounted on the armature shaft, which causes a forced circulation of air all through the housing. Gears run in grease in a grease-tight compartment. The no load speed of the 3/16 in. is 1600 r.p.m., energy consumption being 175 watts. The no-load speed of the ¼ in. drill is 1200 r.p.m., energy consumption being 175 watts.

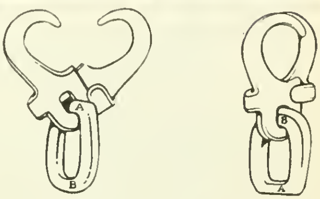
The drill is complete with almond chuck for straight shank drills, 15 ft. of duplex electric cable and separable attachment plug. The net weight of the 3/16 in. cable is 6⅜ lb. and that of the ¼ in. size is 6¾ lb.





Above — B. & D. electric drill

Left — Jones hub odometer



Flashon anti-skid chains

Flashon Anti-Skid Chains

ANTI-SKID chains for solid motor-truck tires are being manufactured by the National Chain Co., New York. Flashon chains consist of a single unit of chain, at one end of which is a patented interlocking link. At the other end the chain is divided into two short lengths, V-fashion. These short lengths are drawn around the wheel spoke and are then held together by the link. The latter consists of a pair of hooks and an especially shaped link designed to insure a rapid and positive lock. This link is curved at one end and straight at the other end. When the straight end is up the two hooks fall open freely, but when the link is twisted half-way round so that the curved end is in the mortise of the hooks, then the hooks are securely locked.

These chains are made in nine sizes, sufficient to fit all makes of trucks and all sizes of solid tires on either wood or steel wheels. For single tires prices run from $1.70 to $3.25 per unit. For dual tires the price is from $2.55 per unit up.

Flashon anti-skid chains can be used in other ways. By hooking several of these chains together, a towing chain may be had. Several units in combination also make a perfect sling chain that helps hold cases, crates and bales snugly in place. If a truck hits a sink-hole, two or more Flashon units can be put around the same spoke, giving added traction.

Truck Costs May Be a Delusion If Not Properly Obtained

(*Continued from page* 29)

too, the actual operating, maintenance and fixed charges are of practically the same nature for any size or make of truck, whereas the overhead charges vary greatly according to the class of work in which the trucks are engaged. Because of this great variation, these overhead items should be charged separately. They should not be lost sight of entirely by any means, as has often been the case when a truck owner forgot to charge overhead, supervision and provision for idle truck time or part-load work.

The Cost Headings

The actual charges against the truck operation may be divided under three heads, including operating charges, maintenance charges and fixed charges, as shown in the monthly sheet of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks reproduced on page 28. Under the heading of maintenance charges may be placed the items of gasoline, oil, grease, kerosene, driver, helper and mechanic. Under maintenance charges may be placed the cost of tires at so much per mile according to the guaranteed life; repairs, overhauling, painting, etc.; spare vehicle rental and a pro rata charge for garaging. Under fixed charges may be placed items for all forms of insurance, including fire, liability and collision, on the truck itself and insurance on the goods carried; interest on the investment at 6 per cent or other legal rate of interest; depreciation on chassis, body and equipment, and total taxes and licenses. These items must be charged against the actual truck operation and hold true no matter what size or make of truck is employed nor what manner of work it is engaged in.

Operating Costs vs. Initial Cost

It is interesting to note that the average yearly cost of operation of a motor truck, including the items just given, is sometimes equal to if not greater than the original cost of the truck chassis, body and other equipment. It is very important for the truck owner to know the relative importance of the various items under the three heads of operating, maintenance and fixed charges. It is easy to visualize these various charges and their importance in the yearly cost of operation by thinking of them as the Big 8 in truck operation. These Big 8 items and their order of importance are generally as follows:

1—Driver.
2—Tires.
3—Gasoline.
4—Overhauling.
5—Depreciation.
6—Insurance.
7—Interest.
8—Garage.

Only two principal forms are necessary to keep these various items of actual truck operation included under the heads of operating, maintenance and fixed charges. One of these forms must be a driver's daily route card, on which he will put down the work accomplished during the day. This should include the number of trips made; the number of tons or packages hauled in and out; the mileage per trip; the amount of gasoline, oil, grease, kerosene and waste used; a notation for a helper, if employed, and for a mechanic if any work was done on the truck outside of the time usually set aside for it.

The information set down on the driver's daily route card must be secured day by day and kept separately for each truck. At the end of the month it may be transferred to a monthly sheet, the various items being set down under the heads of operating, maintenance and fixed charges.

After all these data for a month's operation have been gathered together, the reverse side of the monthly or yearly form may be employed for estimating the unit cost of operation on any desired basis. This may well be done, as shown on page 28, by dividing up the data under the heads of Investment, Performance Record, Performance Averages and Recapitulation. Under the head of Recapitulation one may estimate the cost per day maintained; the cost per day operated; the cost per mile operated; the cost per commercial ton-mile, package-mile or stop-mile.

Overhead Must Be Added

After these cost figures have been obtained on two such forms, one must add the overhead charges. For truck owners engaged in public haulage, the final or total operating charge as determined from the monthly or yearly sheet mentioned above should be doubled if the truck owner expects to obtain a revenue of from 10 to 15 per cent profit on the capital invested.

Too often the truck owner estimates his monthly or daily cost of operation with a maximum load, only to find that in actual practice his truck is idle 50 or 60 days a year, and, in addition, is only 33 per cent efficient on the days when it is not idle.

As a general rule the doubling of the monthly or daily cost of truck operation to determine upon a rate to be charged for moving goods will be sufficient to take care of idle truck time and all of the other overhead expenses to insure the truck owner obtaining a revenue of from 10 to 15 per cent profits on the capital invested. These other necessary items included in the doubling of the charge consist of supervision, office rent and office force, idle truck time, non-capacity loads, the maintenance of warehouses or depots, advertising, the cost of getting business and many other smaller items which must be included when the truck owner sells transportation as a business and has no other source of revenue, as is the case of a wholesaler or retailer who must first sell his goods and then deliver them by means of trucks.

In the latter class of truck owners, the actual operating charges included under the heads of operation, maintenance and fixed expenses are of the same nature as with the trucks doing public hauling, although the overhead charges naturally vary according to the class of business considered.

American Trucks Going to Foreign Lands

When you read in the columns of this publication that umpty-ump motor trucks were exported from the United States in, say, April, let it call this picture to your mind and emphasize that statistics are based on reality. This is a small fraction of the monthly output of the American commercial vehicle factories which is awaiting shipment to foreign lands

The Commercial Vehicle
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
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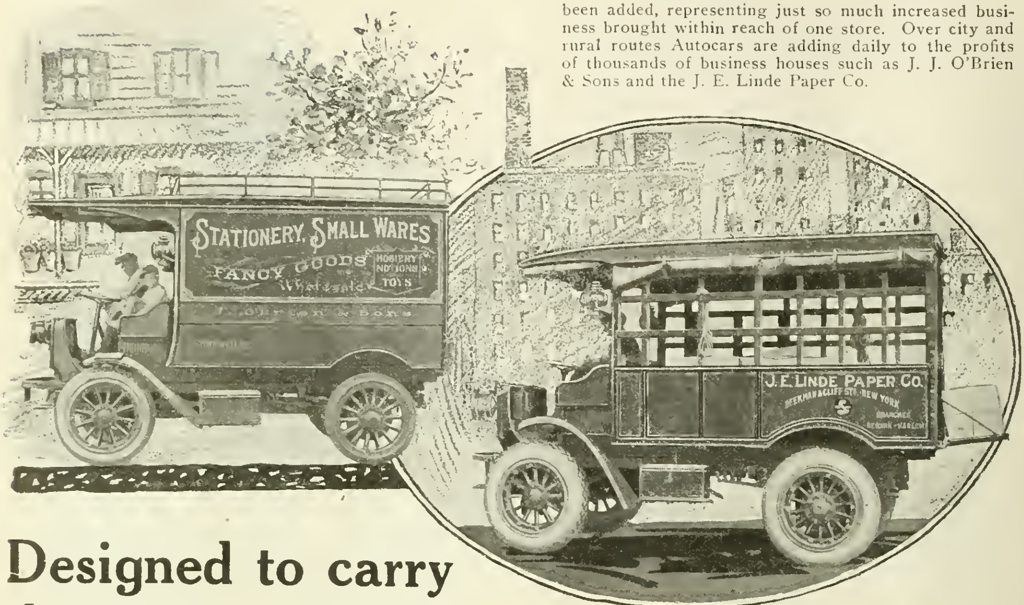

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The Commercial Vehicle
Read by Business Men
Vol. XX May 15, 1919 No. 8

Trucks Plus Good Roads Move Food Crops Both Quickly and Economically

Great Speed of Trucks as Compared with Animals Enables Food to Be Carried from Field to Warehouse Without Loss

By Robert E. Jones

WE sat on the broad veranda of a pioneer home in the Sacramento Valley, Cal., watching a string of motor trucks, pyramided with bags of rice, pass by bound for the river docks at Colusa. It was last fall. Overhead a squadron of airplanes from Mather Field at Sacramento had just flown headed for the old Glenn homestead, domicile of a bonanza wheat farmer of the early days, where a Red Cross fête was to be held in the evening.

"It seems almost unreal—a weird dream," said my companion, the daughter of one of the first settlers. "I can remember when there were no roads and no railroads here, not to mention motor trucks, concrete boulevards and airplanes. During the wheat harvest father used to set off for the river in a buckboard dragging a chain to mark a trail in the grass for the teamsters, with their loads of wheat to follow. Those wagon trains crept along through that clump of oaks yonder—there were no fences—going to the river in one day and returning the next."

One of the pyramid-like loads of rice being carried up the levee grade at Colusa

"And now it's motor trucks, almost an army train of them, carrying from 5 to 9 tons of rice at a load, moving swiftly over hard-surfaced roads," I put in.

"We are living in a wonderful generation," she mused.

Of course it was a trite remark—so because many people have realized the truth of it and voiced it.

Motor truck transportation in California has grown as the state's system of hard-surfaced highways has been extended, and this has been rapidly. Trunk-line roads, connecting the county seats—more than fifty of them—are being built under a $33,000,000 bond issue, and the work is more than 50 per cent completed. Counties have followed the example and are building similar concrete roads to tie up with the state system. The shortest routes between shipping points were selected when the state system was laid out for the sake of through tourist travel and freighting.

A form of rural motor express has existed in California almost since the beginning of motor trucks. It followed closely upon their appearance in cities. But the most recent development has been in crop handling on a large scale. In this service the motor truck has played a tremendous part in getting food under cover before stormy periods of the year, for even California has some wet weather.

Rapid transfer from field to warehouse is vital to such crops as rice, beans and hops, and growers of these goods never realized before how much they were losing to the weather. Of course, there has been a saving, too, in cost of moving, but that is a second consideration with them.

Trucks for crop moving first were tried by a community of hop growers in the Sacramento Valley, where the fields are 20 miles from the railroad and the river. A progressive truck man offered to carry their hops to the steamer landing at 35 cents a bale and got the business. Eight-mule teams with three wagons had been carrying these hops, making a trip from the country in 8 to 10 hr., three round trips a week. The trucks made three trips daily, carrying fifty bales each.

Trucks had not been operating long before a totally unsuspected benefit to the grower appeared, a factor which saved him entirely the cost of the new kind of transportation. In the old days, during the 7 to 8-hr. trips under the boiling sun,

Two of the Kern County Land Co.'s trucks, each with a trailer loaded with bagged wheat. The motor outfits haul the wheat from the company's fields to Bakersfield, Cal., 20 miles away. The bags are lifted into the trucks and trailers by means of a portable elevating loader

hops lost weight by evaporation. This shrinkage was reduced by the speed of the motor trucks to such an extent that the first season they were used it was figured the saving in weight per truck load amounted to $35. Since hops were weighed by the buyer at the end of the journey the grower got the benefit of the saving thus effected. Trucks handled hops at $17.50 a load against $20 for the same quantity by mule-team power. In one season growers of that district saved $12,400 by contracting with the motor truck people instead of using mule teams.

Most of the trucking on a large scale is by individual truck owners or companies in the cities which go into the country after the harvest and contract to move the crops. While the summer and fall are busy periods in California it is almost a year-around business.

Vegetables Hauled by Truck

Hardy vegetables such as lettuce, celery and spinach begin to move in the early winter to railroad stations for shipment east or to canneries and dehydrating plants. Thousands of truck loads of spinach grown in fields that produce tomatoes in summer are hauled to canneries and drying plants at Sacramento through the winter. A truck with a large flat bed has almost the capacity of a box car, for spinach is light in proportion to its bulk. The plant is stuffed into crates, which are piled high on the truck.

With asparagus and artichokes in the early spring the vegetable season keeps many trucks busy until the first deciduous fruit is ripe. Fruit growers usually are established farmers operating on their own land, and many of them own trucks. But the canneries, obtaining fruit from a distance even up to 50 miles, contract with truck owners for hauling fruit to their plants, for it not only saves in the actual cost of moving, but the boxes are handled only twice. If shipped by rail, boxes would have to be handled four times. Everyone knows that handling costs more than moving for a short haul.

Move Fruit by Trucks

The fruit season lasts through summer and winds up about Nov. 15, so that a large extra force of trucks is necessary when grain ripens. While wheat and barley farmers have not taken to trucks as readily as the rice and bean growers, still the truck is handling a great deal of these cereals, particularly for large operators.

Manager H. A. Jastro of the Kern County Land Co. at Bakersfield, learned that he could handle wheat from a 20,000-acre field 18 to 20 miles from the company's warehouse in town at 50 per cent of the railroad rate.

Mule-drawn wagons carried the sacked wheat from field to the state highway and piled it beside the road, where an automatic loader was used to lift the bags onto trucks. Eight 3-ton trucks with 3-ton trailers have been used for several years. The trucks carried an average load of from 5 to 5½ tons and the trailers, from 5½ to 6 tons. Careful account of the cost of operating these trucks and trailers has been kept, and a table showing the expense account of one outfit and its earnings over a period of 18 months is given on page 9.

A Story of Truck Saving

The railroad rate was 9 cents per 100 lb. from the station adjoining the ranch to the warehouse, or $1.80 a ton, plus 15 cents a ton for switching and 6 cents a ton war tax, or a total of $2.01. Trucks with trailers delivered the wheat at 83 cents a ton, or 4 cents per 100 lb. They made two trips daily and last season transported 300,000 bags of wheat. The daily charge for a truck was $12.50 and for the combination of truck and trailer, $15.

While most of the wheat in California

Two of the trucks loaded with bags of rice waiting to be weighed on the scales at the levee warehouses at Colusa, Cal. The leading truck is loaded with close to 8 tons and the one following with over 5 tons still is handled in bags, some of the larger and more progressive growers are turning to bulk handling. This is the method used on the Moreing Brothers' farm of 23,000 acres near Sacramento. Two years ago they were using forty-five wagons with four-mule teams and forty-five drivers to haul wheat from their harvesters to the bins on the Sacramento River levee, whence grain was loaded by gravity onto barges.

A line of motor trucks waiting to move up to the doors of the Sacramento River warehouses at Princeton, Cal.

Buy Seven Trucks and Reduce Crew

Foreseeing a troublesome labor season, they bought seven 3-ton trucks and thereby reduced their force of men by more than forty, for the teamster crew had required an additional cook and the mules, three stable boys. Teamsters had been getting $3 a day and board, and it was difficult to keep the force together. The seven truck drivers were paid $5 a day and board and remained throughout the season.

General Foreman C. M. Owen had not checked up the difference in cost of transportation when he was interviewed, but was satisfied to stay with the trucks.

"I don't know how we would have got through the season if it had been necessary to hire forty-five teamsters," he said. "Besides I find that while the wagons carried 3 tons at a load and made 2 m.p.h., the trucks carried 5 tons at a load and made 12 to 15 m.p.h. The wagons made from two to three trips daily, while the trucks made seven."

These trucks have been equipped with special bodies of tongue and groove material for bulk wheat. They are loaded from a 5-ton bin on the side of the thresher in the field in 3 min., and the load is discharged even more quickly at the other end. The truck is driven onto a wooden grating of 2-by-12-in. planks placed on edge over the hopper with the front wheels up an incline of 30 deg. and the rear wheels resting over the top of the hopper. The end gate at the lower edge of the truck bed then is opened and the wheat runs out.

Busy days for the contract trucks come when the sugar beets are ready for digging and the beans and rice turn yellow. The sugar factory's sphere of influence on farming has widened tremendously since trucks have come into use. Formerly most of the beets were grown on land within a few miles of the factory, but now, thanks to the truck, they can be produced at a profit many miles away.

Rice is a comparatively new crop in California and, with beans, ripens late in the fall. The quantity of both has increased so greatly in a few years that the transportation problem has been multiplied. In fact, the first rice grown in the Sacramento Valley was planted in 1908, and for 1918 the crop was valued at $15,000,000. The bean crop for 1918 was valued at about $50,000,000.

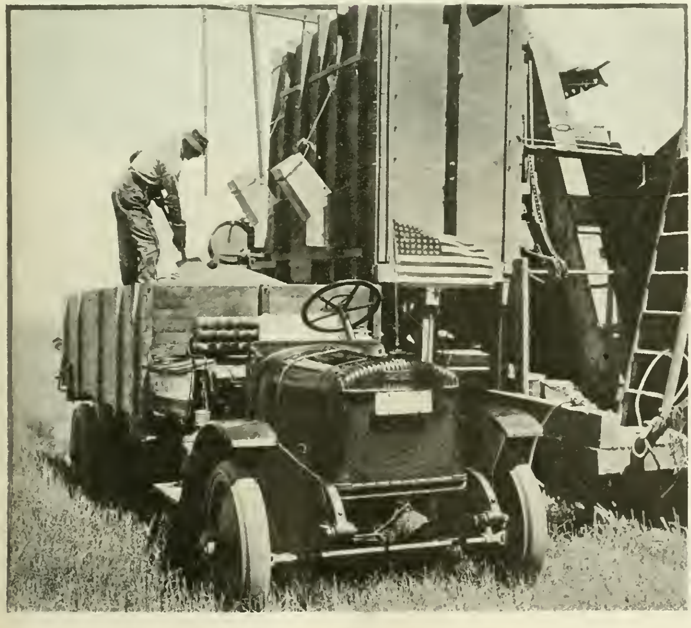
Truck Prevents Rice Loss

The main problem of both rice and bean men is to avoid the early fall rains. They may grow a wonderful crop, but if the rain comes while sacks are piled in the field, losses may mount to thousands of dollars in a single night. Accordingly, the truck has fitted very profitably into the scheme of operations on bean and rice farms. Both of these crops are motor machine planted and cultivated, and trucks for quick moving complete the motorized equipment.

In Colusa, the center of the rice district, fifty trucks were operating last fall through the town, from the rice fields beyond to warehouses on the river levee. While the trucks on the land and big barges in the river form an admirable combination for moving the quantity of rice, the total yield has become so large that all rail lines get their share of the through business. Trucks do not venture onto the wet and boggy rice fields but pick up their loads along the concrete roads where the bags have been piled from wagons.

In the Colusa district all sorts of machines were pressed into service, from the made-over light passenger car to 7-ton trucks. One machine was carrying 180 bags, more than 9 tons, and it tipped the scales at 28,740 lb., the figures, of course, including the weight of the truck as well as its load.

Beans are handled in similar fashion, though most of the bean fields are nearer the river and the haul is shorter. Trucks can go directly into the bean fields, where



Motor trucks are now being used to carry wheat in bulk instead of in bags. This saves the cost of bagging and speeds up the loading so that the trucks can be kept almost constantly in motion. The truck shown above is fitted with a tongue-and-groove body to prevent the bulk wheat from sifting out while in transit. It is a 3½-ton Republic owned by Moreing Bros., Sacramento, Cal. The portable hopper is filled by a bucket elevator driven by power from the harvesting machine the soil is on a more solid foundation.

All railroad expansion in California now takes the motor truck as a crop mover into consideration. One electric line in the Sacramento Valley is in the curious position of fostering the building of a hard-surface road, for it would make a certain large producing district tributary to its line by motor truck.

Manager George Maddock of the great Armour project involving 70,000 acres of rich river-bottom land in the Sutter basin is planning on a gridiron of concrete roads for motor trucks to carry vegetables to canneries and dehydrating plants.

Thus far the standard state highway seems to be standing up under this heavy transportation, but State Highway Engineer Austin B. Fletcher is watching the situation closely to see if any change in specifications may be necessary. If the weight becomes too heavy it will be possible to put another slab on top of the present 5 in. of concrete.

What the Table Tells

The table on this page, giving the costs of operation for one of the 3-ton Packard trucks and 3-ton four-wheeled trailers used by the Kern County Land Co., Bakersfield, Cal., is interesting in that it gives the monthly charges for gasoline, oil, repairs, tires and drivers over an 18-month period. It is highly important, however, that the figures as given are not taken as total cost figures, for the item on which data are furnished includes only the operating charges of gasoline, oil, repairs, tires and the driver. The other items which should be included but which are not given in the table on this page consist of garage charges; spare vehicle rental, if any; cost of insurance, including fire, liability, collision and property damage and the insurance on the goods moved, if any; interest on the truck, body and equipment investment at 6 per cent; depreciation on chassis, body and equipment and the total taxes and licenses.

One of the excellent California state highways in the fertile Sacramento River Valley. It is roads such as this which make motor trucking on a large scale both possible and practicable

Operating Costs of One Kern County Company's Truck and Trailer

Month—	Total miles	Tons hauled	Gasoline	Oil	Repairs	Tires	Driver	Operating costs	Ton miles	Operating cost per mile	Operating cost ton, mile	Earnings
January	1,342	329	$57.00	$25.40	$27.20	$70.00	$105.00	$284.60	4,957	$0.212	$0.057	$331.00
February ...	901	336	38.10	16.00	36.95	70.00	110.00	271.05	2,608	.301	.104	244.50
March	1,804	213½	70.00	25.80	271.65	35.00	130.00	532.45	4,964	.295	.107	384.00
April	1,307	168	46.00	22.00	13.82	......	120.00	201.82	2,888	.154	.077	324.50
May	1,178	339½	51.60	25.80	14.45	......	105.00	196.85	5,301	.167	.035	280.00
June	1,118	384½	39.40	18.00	96.04	......	115.00	268.44	4,874	.24	.055	326.25
July	2,077	918	54.60	38.80	47.81	85.25	152.50	378.96	11,128	.187	.033	431.45
August	1,867	627¼	54.10	28.00	90.56	......	125.00	297.66	8,876	.159	.033	437.00
September ..	2,026	495¼	63.00	32.80	34.97	106.92	117.50	248.27	10,412	.123	.024	383.00
October	556	370½	18.30	9.30	89.70	92.00	110.00	227.30	2,001	.407	.113	186.05
November ...	1,200	264½	45.70	20.10	23.50	......	120.00	209.30	4,975	.174	.042	350.50
December ...	1,096	406½	41.90	19.00	171.02	......	117.50	456.34	5,857	.405	.077	383.86
January	1,586	542½	64.50	22.00	87.95	......	133.33	399.78	7,714	.252	.051	424.63
February ...	669	157½	30.10	11.00	63.10	......	128.00	232.20	1,605	.347	.145	200.87
March	799	648	35.60	12.50	11.01	......	131.00	190.11	3,370	.243	.056	310.68
April	1,003	268½	46.20	14.40	3.80	......	136.20	200.60	4,375	.20	.045	364.77
May	1,020	351½	25.80	13.00	7.89	......	132.33	179.02	4,080	.176	.043	370.26
June	905	252	45.50	14.40	40.87	......	152.64	253.41	2,952	.26	.089	388.28
	22,454	7,102½	$827.40	$368.30	$1,132.29	$459.17	$2,241.00	$5,028.16	93,337	$4.302	$1.186	$6,121.60
						Average	....	....	....	.224	.0539	

Balance in favor of truck, $1,093 44.

NOTE—These figures DO NOT include all truck charges; the cost of garaging, insurance, interest on investment, depreciation, overhead and taxes and licenses are not given. The items given include only gasoline, oil, repairs, tires and driver.

Building a unit of the California state highway through the Sacramento Valley. Concrete roads are the most popular. The road shown above is being built in halves, one laid after the other

With these items not given, it is important to bear in mind that the average cost per mile and per ton-mile deduced cover only the five operating charges of gasoline, oil, repairs, tires and drivers. Too often the average motor truck operator is prone to make serious errors in giving cost operating statements in which all of the necessary items are not included. For this reason particular attention is called to the items included in the table on page 8.

Only Operating Items Given

Even though the table published on page 8 is not as complete as it should be on account of the other items not being available, it is nevertheless of considerable interest in showing the cost of truck operation for the five items given. It should be remembered in making use of the table for comparative purposes that 3-ton trucks and 3-ton trailers were employed and when fully loaded carried from 5 to 5½ tons on the truck and from 5½ to 6 tons on the four-wheeled trailer. It should also be borne in mind that automotive bucket type elevators were employed to load the sacks of wheat from the ground onto the truck body. The use of this labor-saving equipment naturally permitted the trucks to be loaded more quickly than would have been the case were they loaded entirely by hand. The good condition of the California roads in the vicinity of Bakersfield and to the company's warehouse 18 to 20 miles away also have an important bearing on the cost figures.

With all of these conditions in mind it is interesting to note that the trucks averaged approximately 1247 miles a month and handled on the average of 395 tons a month. For a 26-working day month, this gives an average of 15 tons moved daily, the main proportion of which was sacked wheat carried from the field to the company's warehouse. Except when fuel and other supplies used in the field were carried the trucks ran back to the fields empty.

What Figures Show

The average cost per mile of 22.4 cents includes only the operating items of gasoline, oil, repairs, tires and drivers. Similarly, the cost per commercial ton-mile given of 5.39 cents includes only the same five items and does not take into account the garage charges and items included under the head of fixed charges such as insurance, interest on investment, taxes, licenses and overhead. The column of earnings simply shows what it would have cost if the same tonnage had been moved by means of mule-drawn wagons. Even with only the five items given included in the cost figures, the truck operation shows a very substantial saving of close to $1,100 in addition to the quicker and more reliable service offered.

How Fleet Owners Can Reduce Truck Tire Costs

FLEET owners interested in getting increased mileage from their solid tires, and thereby reducing their truck operating costs, must be continually on the lookout to prevent either momentary or constant overloading. Rubber is a substance with great possibilities, but like any other good thing, has its limitations. A tire can be stretched repeatedly and still retain its elasticity and strength. As the load weight on the tire increases, the tire becomes displaced both to the left and to the right. Up to a certain point it will endure this displacement and spring back into normal shape as soon as the weight on that spot is removed, as when a truck is running and the wheel is turning. But if a too heavy load is allowed to rest upon the tire, even for a single instant, the rubber may be distorted beyond its power of recovery. The momentary overload might occur just at one spot in the whole tire, as when a loaded wheel hits a bump or obstruction which resists passage of the tire until the force exerted is sufficient to shove the tire over the obstacle.

In such a case, the internal structure of the rubber might not be immediately apparent. The rubber structure, however, having once been broken down, its elasticity sapped and its ability to hold together lost, would easily be cut by rough objects along the road or separate slightly around the base. Such a cut or separation has a tendency to spread gradually around the tire and thus render it unserviceable before the proper mileage has been secured.

Constant Overload Disastrous

If the overload is constant, the entire tire is affected and trouble will develop much sooner than in the case of the momentary overload.

Another cause for excessive tire wear is the use of small dual solids with widths of 2½, 3 and 3½ in. When such duals are employed, the inner dual must bear considerably more weight than the outer dual when the truck is running on a crowned road. This causes an overload on the inner tires, with resultant low mileage secured. Sometimes when a bad spot in the road is struck, one of the small duals must carry the entire load. This has a most disastrous effect upon the tire and means rapid deterioration.

Some very pertinent rules for the fleet owner to follow in order to reduce his tire costs were recently given by S. V. Norton of the B. F. Goodrich Co., Akron, Ohio. The rules are as follows:

1—**Avoid overloading** whenever possible and strive to place the load in the truck body so that it is distributed equally over the two rear wheels.

2—**Avoid overspeeding**, for overspeeding often causes momentary overloading, even though the truck is not loaded to its full capacity. When a bump or other road inequality is struck, considerable force is exerted upon the tire at that point, and this pressure has the same effect as that of abnormal weight.

3—**Use large single tires** in preference to small duals. As explained above, small sized duals do not always have the load distributed equally over them, especially when the truck is operating over crowned roads.

The Editor's Viewpoint

Successful Co-operative Delivery

As a general business proposition, co-operative motor truck delivery has been looked upon with more or less disfavor by persons with haulage to do. The reason for this attitude has no doubt been due to the failure of many such co-operative companies. After investigation, these failures, however, have been found to have been due not to a faulty idea or principle but to an unbusinesslike manner of working out that idea.

One of the greatest difficulties in operating a successful co-operative delivery for any kind of goods is the building up of mutual confidence between those making use of the common delivery vehicles. Unless this mutual confidence is established at the very beginning, any such delivery will not succeed. In cases where packages have been the goods delivered, many of the persons in the agreement have adopted the policy of giving the difficult deliveries to the co-operative company and keeping the easy or nearby deliveries for themselves. Such action is of course unfair, since the co-operative delivery, if an attempt is made to earn a profit, must get the easy deliveries as well as the more difficult ones in order to offset the extra cost of making the longer or more difficult runs.

In principle, the co-operative delivery has many advantages. In the first place, the co-operative use of a truck in any work should enable it to run with more nearly capacity loads over any given period. This should permit the truck to deliver at a lower cost per package, ton or other unit handled.

Co-operative deliveries to date have been formed in two general ways. In one, the trucks have been owned by a separate company and operated to make a profit for that company. In the other, they have been owned co-operatively by the persons or concerns using their service and operated to meet operating, maintenance and investment charges but not to make a profit.

Under the latter classification comes a farmers' co-operative delivery operating in Maryland. The company has been running trucks for over 2 years and with a considerable degree of success. Among the new ideas worked out by that company are a co-operatively-owned garage and house for the drivers at one end of the route. The company, like all other truck operators, soon found that the driver may make or break a truck line.

In carrying the farmers' goods to market, the driver had to get up very early in the morning and at first spent much time in getting from his home to the first pick-up point on the route. This difficulty has been overcome by building a two-family house for the drivers out of the truck operation funds and of then renting it to the drivers at a rental proportionate to that charged for similar accommodations in the same neighborhood.

By this means, the house investment is wiped off the books gradually and at the same time a means provided for making the truck operation more economical by eliminating the previous waste of time. The co-operatively-owned garage is only a stone's throw from the driver's house, so that there are no empty runs to or from the end of the route in the morning or evening.

Saving Money with Truck Bodies

One large wholesale jobber operating two score trucks in Baltimore, Md., several years ago purchased thirty demountable bodies at a cost of about $15,000 and during the first year saved $28,000. Last year, with the great difficulty in getting goods over the warehouse platforms and to and from the various railroad terminals, the same thirty bodies made it possible to meet the peak-load rushes when shipping facilities were open. If the demountable truck bodies had not made possible this quick movement of the goods across the warehouse platforms, it would have been necessary to buy or rent another building. As storage space was at a premium, it might even have meant the construction of a new building.

This is just one example of where the intelligent selection of time-saving motor truck adjuncts has saved much money. Truck owners, no matter how efficient the operation of their vehicles may be in low cost of gasoline, tires, etc., should be continually studying their transportation problems to discover if some up-to-date truck adjuncts such as demountable bodies, loading telphers or the like will not make their vehicles still more efficient.

Trucks Meet Increased Demands for Ice Cream

Ice Cream Makers Must Motorize Delivery If Nation Goes Dry

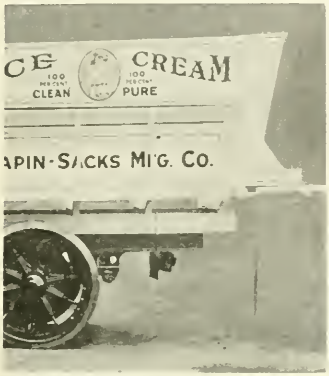
IF nothing transpires before July 1, 1919, to prevent the enforcement of the National Prohibition Law on that date, ice cream manufacturers and distributors will do well to take stock of their delivery equipment and put it on an efficient basis in order to enable them to handle the greatly increased sales of ice cream at that time. This study of the existing delivery equipment of the wholesale distributor or manufacturer will be necessary because there will be a large boom in the ice cream and soft drink business when the sale of liquor is prohibited.

The law of averages holds good and that the abolishment of strong drinks will result in increased ice cream sales is well proved by the case of Washington, D. C. Last summer the sales of ice cream in Washington proper and in the outlying sections of the District of Columbia increased tremendously.

One of the largest wholesale and retail dealers in ice cream in the District, the Chapin-Sacks Mfg. Co., had to entirely reorgainze its delivery equipment in order to take care of the greatly augmented sales. Whereas a combination of horse wagons and several makes of trucks were previously employed for the work the increased amount of business made it necessary to eliminate the horse-wagon and standardize on one make of truck in order to reduce the maintenance upkeep charges and simplify the repair work.

The company then standardized on White 1½ and 3-ton trucks. Ten of these vehicles are at present employed in Washington and of the remainder, five are used at the company's branch in Richmond, Va.; two at Macon, Ga., two at Hanover, Pa., and six at Jacksonville, Fla.

All of the trucks work on regular routes in which it is the aim of the company to serve every customer daily. Deliveries are made in the city of Washington by the 1½-ton trucks and by the 3-ton trucks for the cities some distance away. The interurban deliveries include routes south to Alexandria, Virginia, 8 miles; southwest to Clarendon and Ft. Myer, 14 miles; northwest to Chevy Chase and Rockville; northeast to Hyattsville and Riverdale, and east to College Park. The trucks also deliver to the steamboat landings along the Potomac and to Camp Meigs and the U. S. Naval Academy at Annapolis.



The crushed ice and salt chute

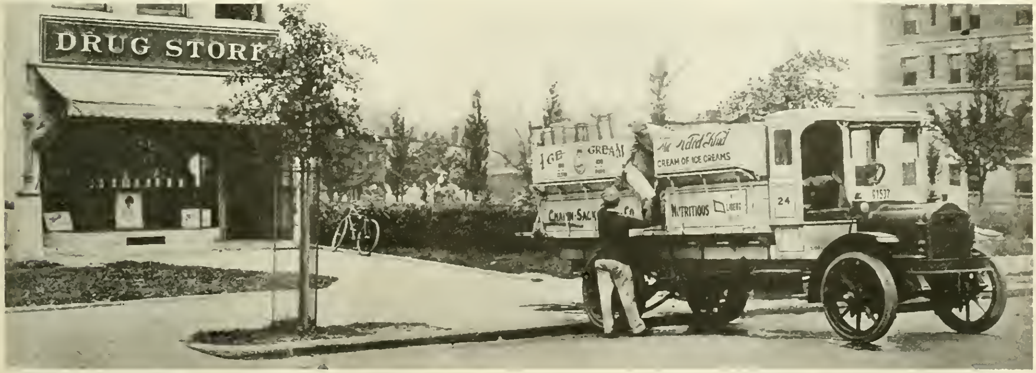
Each of the trucks is manned by a driver and helper, the Chapin-Sacks company having found it more economical to employ two instead of one man on each truck on account of the quicker deliveries and the greater mileage which can be covered when a helper is used in making deliveries.

Each of the trucks is equipped with a new type of ice cream body as shown in the accompanying illustrations on this page. The body is designed particularly with a view to quick loading and unloading. It is further characterized by the fact that so long as it is loaded with cans of ice cream in the proper manner, no more than the rated capacity can be carried. The body, which appears to be somewhat of the open express flareboard type, is in reality quite different.

The bottom and sides of the body are first of all lined with sheet metal suitably protected by wooden cleats in order to prevent salt water from leaking through and corroding the underneath chassis parts. The body is then divided into two main sections by means of a transverse aisle running crosswise with the body at the center, but open on the right side only.

The cans of ice cream are carried in the forward section or that directly back of the driver's seat. They are not simply loaded into the truck body where the sun can get at them but instead are inclosed in a metal container which fits into the flareboard sides of the body proper and extends several feet above the top edge of the flareboards. The container is fitted with air-tight covers hinged in place so that it is a comparatively easy matter to take out a can of ice cream and swing it to the side of the truck through the crosswise aisle, where it can be given to the helper and carried directly into the customer's store.

Empty cans are carried in the rear section as shown in the accompanying illustration. Crushed ice and salt are carried in a special section in the extreme rear. The ice and salt compartment is fitted with a chute which extends out over the tailgate of the body so that it is convenient for a man standing on the ground to fill a bucket with salt and ice in a few seconds.



One of the 3-ton Whites with the driver and helper making a delivery to a Washington drug store. The new type of body with the center crosswise aisle is clearly shown. Note the chassis step directly beneath the aisle body opening.

Solid and Pneumatic Prices Reduced

Firestone and U. S. Cut Solids 32% and Pneumatics 15%

NEW YORK CITY, May 14—There has been a decided cut in the price of both solid and pneumatic tires for motor trucks. The prices of solids have been reduced about 32 per cent by two of the largest makers and the prices of pneumatics and tubes about 15 per cent. It is expected that all of the other tire companies will have to follow suit in order to meet competition. The Firestone Tire & Rubber Co. was one of the first to quote the new prices, stating that a stabilization of the rubber market was the cause. . That company has cut the prices of its pneumatics 15 per cent and its solids 32½ per cent. Similarly, the Goodyear company cut the prices of its pneumatics 15 per cent, effective May 12. New prices of Goodyear solids have not been given out.

At the same time, the United States Tire & Rubber Co. has reduced the price of some of its pneumatic tires approximately 15 per cent and made a cut of about 32 per cent on its solids.

Many other companies contemplate price changes to meet the existing conditions, but have not yet gone on record as to the exact amounts.

ROOSEVELT MEMORIAL HIGHWAY

CHICAGO, May 8—Plans to establish a Chicago-St. Louis highway as a perpetual memorial of Theodore Roosevelt, were to-day made by a committee of the Chicago City Council, headed by John Toman. Frank G. Logan, member of the Roosevelt Memorial Committee, accompanied by Alexander H. Revell and John G. Shedd, appeared before the committee with the project, which was received with great enthusiasm by the councilmen.

ROAD WORK PROGRESSING

WASHINGTON, D. C., May 7—During April, 1919, the Secretary of Agriculture approved project statements for 120 Federal-aid projects involving the improvement of 923.53 miles of road at a total estimated cost of $16,261,326.51, and on which Federal aid to the amount of $7,528,550.68 was requested. This represents the largest number of project statements approved, the largest total estimated cost, and the greatest amount of Federal aid requested during any month since the passage of the Federal Aid Road Act.

During April there were executed by the secretary and the several state highway departments fifty-five project agreements involving the improvement of 521.51 miles of road at a total estimated cost of $4,626,415.48, and on which $2,039,614.99 Federal aid was requested and set aside in the Treasury. In addition, agreements to cover seventy-two other projects were placed in process of execution during the month.

Up to and including April 30, 1919, project statements for a total of 1057 projects had been approved, after deducting all approved projects cancelled or withdrawn by state highway departments. The 1057 projects involved 10,580.17 miles of road, a total estimated cost of $92,933,121.81, and a total of $36,576,857.48 Federal aid. On the same date a total of 535 project agreements had been executed, involving 4,624.83 miles of road, a total estimated cost of $39,059,327.44, and a total of $15,614,929.61 Federal aid.

NEW ILLINOIS FREIGHT LINE

BLOOMINGTON, ILL., May 4—The Staunton-Livingston Motor Transportation Co., with headquarters at Staunton, Ill., has been organized and will operate a line of trucks for passenger and freight business between Staunton in Macoupin County; Livingston, in Madison County, and other points 10 to 20 miles distant, and which are not now connected by steam or electric lines. A certificate of convenience and necessity has been asked of the State Board of Public Utilities, and an order will be placed for trucks as soon as permission is granted.

MOTOR TRANSPORTATION COURSE

DETROIT, May 2—The greatly increased use of trucks for overland hauling and city work has made it necessary that a greater number of men be employed for this class of work. Men who are especially trained to assume executive positions in this kind of service are in great demand. Realizing the necessity as it exists to-day, the University of Michigan will shortly introduce a course in Highway Transportation which will train a man as a specialist in this line of work. A plan to inaugurate a similar course as a regular study in all of the universities will shortly be placed before all such institutions for their consideration.

TRAILER ASSN. OPENS OFFICES

NEW YORK CITY, May 12—Headquarters for the recently-organized Trailer Mfrs. Assn. of America have just been opened here at 110 West Fortieth Street, in the World's Tower Bldg. A meeting of the executive committee is to be held shortly in the new offices, when matters of interest and importance to the trailer industry will be considered.

Coming Events

May 10-17....Bristol, Va.-Tenn., Great Southern Automotive Show.

May 21.......New York City, Monthly Meeting of Motor Truck Assn. of America, Automobile Club of America, 247 West 54th Street.

May 19.......Detroit, Motor Transport Day.

May 20-24....Quebec, Can., Good Roads Congress.

Sept. 22-24...Philadelphia, Pa., Annual Convention of National Assn of Purchasing Agents, Bellevue-Stratford Hotel.

Regulations of Excise Taxes on Trucks

Treasury Dept. Issues Rulings Regarding Payments

WASHINGTON, D. C., May 6—The Treasury Department has completed regulations on the excise tax on trucks, which became effective February 25, 1919, regardless of the time when the truck was manufactured, and applies on the actual sales price and not the list price of the manufacturer. If the tax is included in the sales price the tax must be computed on the increased price. It is payable regardless if the commodity has or has not been paid for, once the title of ownership has changed.

Discounts for cash made subsequent to the sale cannot be deducted, but where trucks are sold over a period of time in quantities a rebate is allowed when a certain quantity is sold, deduction for that rebate is allowed and must be claimed in the month when the final price is determined.

Commissions to agents or other expenses of sale are not deductable.

Trucks sold f.o.b. factory do not include the freight charges in computing the tax even if they are paid by the manufacturer, provided he is reimbursed by the purchaser. Credit can be taken for taxes paid on trucks, if they are sold and returned.

There can be several taxes on the same truck. The maker of a body pays a tax, the maker of a chassis pays a tax, the assembler of both pays a tax. However, the assembler can credit himself with the amount of the tax imposed on and paid by the body and chassis makers when making his computation.

Where makers have agencies in which they have a financial interest the agency pays the tax. A tax applies when the title of ownership passes from the seller to the buyer.

When a manufacturer sells motor trucks to the Government, the tax applies unless the Government has supplied the manufacturer with all but a small portion of the parts used in the assembling.

There is no tax on motor driven vehicles used in intra-factory work at railroad stations, etc., where they are used to pull other vehicles. Motor trucks equipped as hook and ladder trucks are taxable.

A "part" for a motor truck is any article designed or manufactured for the special purpose of being used as or to replace a component part of the vehicle and which by reason of some peculiar characteristic is not such a commercial commodity as would ordinarily be sold

(*Continued on page* 13)

Approve Plans of the Highways Committee

Federal Highway Commission Is Approved by C. of C.

ST. LOUIS MO., May 2—Establishment of a Federal Highway Commission, appropriation of federal funds for building and maintaining highways, continuation of the Federal Road Aid Act beyond 1921 and expenditure of federal funds for highways of a permanent type only, were advocated in the resolutions presented to the United States Chamber of Commerce by the Highways Committee, of which F. A. Seiberling, president of the Goodyear Tire & Rubber Co., is chairman. The resolutions were approved and passed by the convention.

The resolution adopted reads:

"That highways are an integral part of our nation's system of transportation has been emphasized by the war and an enormous development is at hand and is so important as to require a comprehensive national policy under which federal appropriation for highways will be applied to national needs for interstate commerce, agriculture, postal delivery, common defense and general welfare.

"Congress should create a Federal Highway Commission independent of present departments of the government, composed of members from the different geographical sections of the country to perform all executive functions of the federal government pertaining to highways including those relating to existing appropriations in aid of state construction. Such a commission should act in co-ordination with any federal agency that may have functions of articulating rail, trolley, water and highway transportation.

"Congress should make substantial appropriations for the construction and maintenance of a national highway system to serve the need for the maintenance of interstate travel and traffic.

"The commission should report to congress a plan for continued aid for state construction of highways in the period beyond 1921, to which time the provision of existing federal aid laws extend.

"Expenditure of funds should be permitted only for highways which are of permanent type, having thorough drainage, substantial foundations, sufficient width and a capacity for traffic which will be reasonably adequate for future needs."

TO HAUL FREIGHT ON TRUCKS

SIOUX CITY, IA., May 8—The Interurban Motor Express Co., the purpose of which is to operate a daily system of trucks for the purpose of carrying merchandise and livestock over the various highways radiating from Sioux City, Iowa, will be organized within a few days and articles of incorporation filed. Fifty motor trucks of varying sizes and designs have been ordered by the company. It is stated that some of them will be placed in operation as early as the coming week.

Daily express and freight service will be provided upon regular schedules to all points within a radius of from 50 to 75 miles of Sioux City. The company, which will be headed by Charles Babcock of Moville, Iowa, will maintain regular agents at the stations on the highway schedules. The highway transport system originated by the Iowa Council of Defense will be made the basis of the express system. This divides Iowa into five districts, Sioux City being in the second, which is composed of nineteen counties.

The Truck Tax

(Continued from opposite page)

for general use and which is not primarily adapted for use as a component part of the motor truck; consequently bolts, nuts, screws, etc., are not taxable. Articles which would ordinarily be classed as commercial commodities become taxable when the design or construction adapts them for use as component parts of vehicles, as, for example, plates, jars and separators for motor truck storage batteries are taxable when sold separately. A chassis is a part of a truck, as is also a body, and is taxable at 5 per cent when sold separately.

An accessory is any article designed primarily for use on a motor vehicle to add to its utility and is taxable whether or not it is essential to its operation.

Where a manufacturer sells truck accessories or parts to a jobber who in turn sells them to a manufacturer of completed trucks, the tax is paid by the manufacturer who sells these parts or accessories to the jobber. Where a manufacturer sells raw materials to an accessories maker who in turn sells the accessories to a manufacturer of completed trucks, the producer of the completed vehicles pays a tax on his sales and no tax is due on the previous sales.

Taxes are returnable and payable monthly and every return must be made under oath and in duplicate if it exceeds $10. A tax does not apply to the sale of a motor vehicle which is shipped directly to a foreign country by the manufacturer himself or sold by him for export and in proper time exported by the purchaser. If, however, an article sold for export is not exported within six months it becomes taxable. It is necessary for a manufacturer to secure a written certificate to the effect that the truck sold is to be exported. Proof of exportation comprises an affidavit containing the name and address of the manufacturer and of the exporter, the dates of the sale and shipment and export of the truck, the price paid and a statement that the commodity has not been subjected to further manufacture following its purchase, the name of port of export, the name of carrier issuing the export bill of lading and a copy of the export bill of lading

TRUCKS HAUL SCHOOL HOUSES

ST. LOUIS, MO., May 9—Motor trucks are being used by the St. Louis Board of Education to haul school houses. The frequent necessity of moving portable buildings from time to time led the authorities to purchase two G. M. C. trucks from the General Motors Corp.

May Hold Motor Truck Shows in January

N. A. C. C. Truck Show Committee Discusses 1920 Plans

DETROIT, May 6—At the meeting of the directors and truck committee of the National Automobile Chamber of Commerce held in Detroit on May 6 the truck committee took under consideration the holding of motor truck shows the same weeks as the national automobile shows. The show committee outlined plans for the national truck shows to be held in New York and Chicago in January or February, 1920.

TO STUDY TRUCK FREIGHT RATES

WASHINGTON, D.C., May 8—A study of existing railroad freight rates and motor freight rates will be made by Capt. A. J. Stevens, assigned from the Department of Purchase, Traffic and Storage, War Department, to the Highways Transport Committee, National Council of Defense, for the purpose of fixing equitable and profitable rates by which motor trucks can haul commodities over rural routes. Existing rates, it is said, are neither equitable nor profitable and many motor truck fleet owners are losing money in some instances and overcharging in others. It is to overcome these problems and to establish motor truck rural express on a sound basis that this work is being undertaken.

LEGAL RULING IN ILLINOIS

BLOOMINGTON, ILL., May 2—A decision of importance to the motor truck user was handed down by Justice McCulloch of Will County, Ill., in the case of the Auto Clearing House of Joliet against A. C. Johnson & Co. The former filed suit against the latter for damages when a truck owned by the defendant accidentally demolished the air-filling station of the complainant. Damages were denied by the court on the ground that the air station was on public ground. Citing the criminal code of Illinois, the attorneys for the defense declared that it is a public nuisance, punishable by fine or imprisonment, to encroach upon or obstruct sidewalks or public highways with permanent structures for private purposes. Furthermore, it was argued, it is the duty of the municipal authorities to prevent such encroachments and remove such obstructions. It was maintained that the city council cannot by ordinance or resolution, legally grant permits to anyone for the private use of a sidewalk or street such as it did when the Joliet Auto Clearing House was granted a permit to obstruct a portion of Van Buren Street by the erection of the air station. It is enough, it was argued, that the law was transgressed.

NEW YORK'S MARCH EXPORTS

NEW YORK CITY, May 8—A total of 530 trucks valued at $1,143,488 were exported from the Port of New York during the month of March.

Dept. of Agriculture Gets 20,000 Trucks

To Be Utilized in the Various States for Building Roads

WASHINGTON, D. C., May 8—Twenty thousand motor trucks are being turned over to the Bureau of Public Roads, Department of Agriculture by the War Department, to be distributed among the various states and used on road construction work. These trucks are a part of the 31,000 which were recently declared surplus by the army, and this disposition of them practically insures that there will be no trucks available for sale to the public or resale to the manufacturers. The Post Office Department has requisitioned 7000, and it is expected that other government departments will absorb the remaining 4000.

The trucks turned over to the Department of Agriculture are valued at more than $45,000,000, and include 11 000 new and 9000 used trucks, ranging from 2- to 5-ton capacity. All are in serviceable condition. The trucks are turned over under Section 7 of the Post Office Appropriation bill, which authorizes requisition of surplus trucks by the various government departments from the army. They must be used by the states on road construction under Federal aid, for which $200,000,000 was appropriated in the same bill. The only charges the states will pay will be for loading and freight.

The trucks will be apportioned to states only upon request of the state highway departments on the basis of the requests received from the various states and in accordance with financial apportionments under the Federal Aid Law. Requirements of the law prohibit the distribution of any of these trucks to counties and individuals.

NEW BUSES FOR DETROIT

DETROIT, May 10—As told in THE COMMERCIAL VEHICLE for April 15, 1919, double deck motor buses, similar to the Fifth Avenue buses in New York City, which carry 3,500,000 passengers monthly, will be in operation in Detroit before the end of this summer. Richard W. Meade, former president and general manager of the Fifth Avenue Coach Co., is president of the Detroit Motorbus Co., recently incorporated and now getting ready for business. The company will operate under the ordinance of March 26, 1916, licensing motorbuses. Under present plans of the corporation, which will be financed and directed by Detroit men, the first fleet of twenty buses will give service in Jefferson Avenue with one terminal at the Campus Martius and the other near the Hudson and Chalmers motor car plants, with a later extension to Crosse Point.

As rapidly as possible the service will be increased to include at least 100 buses. Definite arrangements have already been made for that amount of equipment. The plans contemplate two lines parallelling Woodward Avenue to the city limits and a line to the Michigan Central station from the heart of the city.

Each bus will seat forty-seven passengers, twenty-two on the enclosed lower deck and twenty-five on the open upper deck. Two and one-half minute service will be the aim, with "A Seat for Every Passenger" as the motto. Ten cent fare will be charged. The buses will be lower than those used in New York, being 8 ft. from the pavement to the floor of the upper deck, allowing them to pass freely under trolley wires and viaducts, the lowest of which has an arch of 12 ft. 6 in.

ROAD BONDS IN TEXAS

AUSTIN, TEX., May 2—The people of Texas will vote on issuing $75,000,000 bonds for the construction of highways this fall. The good roads of El Paso must be duplicated all over the State, say the highway boosters. That county spent more than $1,000,000 on 40 miles of concrete road and built many miles of other hard-surfaced roads.

ST. LOUIS MAY LIMIT TRUCK USE

ST. LOUIS, MO., May 9—Heavy motor truck traffic on streets in certain districts in St. Louis without a permit will be prohibited if a proposed ordinance, drawn up by Commissioner of Streets and Sewers Talbert is passed by the Board of Aldermen of St. Louis.

NATIONAL HIGHWAY ASSN. IS FORMED IN SPRINGFIELD

SPRINGFIELD, ILL., May 8—At its first annual convention in Springfield on May 6 the national organization of the Liberty Highway Assn. was effected. Stephen Lawless, Liberty, Ill., was elected president, and Truman T. Pierson, Quincy, Ill., treasurer and national organizer. Other officers are: vice-president, R. J. Holmes, Decatur, Ill., C. A. Hetrick, Asbury Park, N. J.; Joseph T. Daniels, Columbus, Ohio, George A. Dinkert, Quincy, Ill., and W. H. Conkling, Springfield, Ill. The organization has been formed for the purpose of having a hard surfaced highway built across the continent from ocean to ocean.

TRUCK CONTRACTS OUTSTANDING

WASHINGTON, D. C., May 5—Of $419,184,000 worth of orders for motor trucks and other motor vehicles outstanding on Nov. 11, 1918, there were $18,023,000 left on order on April 1. Of the total, 67 per cent were canceled, 29 per cent delivered, leaving a balance of 4 per cent due.

REPUBLIC DEALERS TO MEET

KANSAS CITY, MO., May 9—The Republic Truck Distributors' Assn. will hold its first semi-annual meeting at the La Salle Hotel, Chicago, on June 2 and 3.

Detroit's Trucks Will Parade on May 19

Will Show How Trucks Were Used in War and Peace

DETROIT May 3—The Detroit Transportation Assn. will stage a motor truck parade on May 19, Motor Transport Day, as it has been named, to show the varied uses to which trucks have successfully been put both in peace and in war-time work. In the parade will be seen trucks fitted for service with the armies in France and at home, trucks loaded with dairy products, farm implements, merchandise, machinery, live stock and other products to show how trucks have been utilized for overland haulage work. Special prizes will be offered for the best decorated trucks.

WORLD'S LARGEST GARAGE IN ST. LOUIS

ST. LOUIS, MO., May 10—The Motor Garage & Realty Co. of St. Louis is planning the erection of the largest garage in the world at St. Louis. The garage will be used for housing trucks used by the large wholesale firms in that city, and will accommodate 1000 trucks.

ILL. URGES STATE CO-OPERATION

CHICAGO, May 10—A great stimulus to Illinois' already vigorous road-building movement has been given by the report this week of the senate committee on the prices of building materials, after a 2 months' investigation. The report urges the speedy launching of road building enterprises, with the direct participation of the state in the manufacture of road-building materials where it is felt that prevailing prices are too high.

The report finds that there is no evidence of a combination of paving brick manufacturers. It finds indications that seem to point to a combination on prices between cement manufacturers, and recommends the establishment of a state plant to manufacture cement.

"State operation of road building material plants," is one legislative recommendation of the report. "The direct interest of the state in a comprehensive system of roadbuilding makes it imperative that the state should protect the public from extortionate charges for road-building material. We believe the state should be authorized by law to manufacture products entering into the public improvements of the state."

With the exception of a few minor stretches held up by engineering difficulties, all of the dirt roads between Chicago and the Mississippi on the Lincoln Highway are now under contract for construction, according to the report of Director of Public Works Frank I. Bennet, who says that by July 1, 654 miles of road will be under construction.

Highway Traffic Assn. Meets in N. Y.

To Discuss Highway Problems and Special Truck Uses

NEW YORK CITY, May 10—The annual meeting of the National Highway Traffic Assn. will be held on May 14 at the Automobile Club of America, 247 West Fifty-fourth Street. The afternoon session will start at 2:30. An informal dinner will be served at 6:30 in the grill room of the club, and the evening session will open at 8 p. m. The program for the day follows:

AFTERNOON SESSION, AT 2:30

"Development of Rural Motor Express Throughout the United States," by F. W. Fenn, Secretary, Motor Truck Committee, National Automobile Chamber of Commerce.

"Transportation Surveys for Rural Motor Express Routes," by J. H. Collins, Member, Highways Transport Committee, Council of National Defense, and Investigator of Market Surveys, United States Department of Agriculture.

"Wanted: Rural Motor Express in the State of New York," by James E. Boyle, Extension Professor of Rural Economy, Cornell University.

"Sign Posting for Through Routes in Municipalities and Detours During Highway Construction," by Elmer Thompson, Secretary of the Automobile Club of America.

EVENING SESSION, AT 8

Presidential Address, **"Highway Transport Engineering'** (illustrated), by Arthur H. Blanchard.

"The Townsend Highway Bill and the Work of the Federal Highway Council," by H. G. Shirley, Secretary, Federal Highway Council.

"Highway Requirements for Twentieth Century Transportation," by W. G. Thompson, State Highway Engineer of New Jersey.

"The Control of Traffic on Feeder Highways," by Edward J. Mehren, Editor, Engineering News-Record; George H. Pride, President, Heavy Haulage Co., and George M. Graham, Pierce-Arrow Motor Car Co.

"The Open Road to a Greater America," by the Educational Department of the Universal Film Mfg. Co. First production af a motion picture created to show the high cost of bad roads and the advantages of motor transport.

SMITH GOES WITH MIDWEST

INDIANAPOLIS, IND., May 7.—L. R. Smith has resigned as sales manager of the Buda Co., Harvey, Ill., to take effect on June 1, when he will take up the position as general sales and advertising manager of the Midwest Engine Co., Indianapolis, Ind.

ILL. GETS FEDERAL ALLOTMENT

CHICAGO, May 5—Of keen interest to motor truck men of Illinois is the recent Federal allotment of $4,152,546 for road-building in Illinois. Following the congressional appropriation of $209,000,000 for road-building, the Federal Bureau of Public Roads has completed its report, and consigned the money, which will be available to Illinois on July 1, 1919.

To those who have been prominent in the good roads movement in the state, the report of the bureau comes as a seal of approval, with the declaration that Illinois leads all other states in the country in systematic, scientific road-building, and has submitted and had approved the longest continuous line of highways. One is a trunk line across the northern part of the state, made up of fourteen sections approximately 75 miles long. Seven sections of this road have already been completed, and work is now centering on two other trunk lines—one from Chicago through Danville to St. Louis, and the other from Chicago to Rock Island.

The states are expected to spend at least dollar for dollar with the government, and that Illinois will do more than that is evidenced by the declaration that she will raise at least $6,000,000 annually for upkeep, gathering the money from licenses, and expects to construct 5,000 miles of hard-surfaced roads.

S. A. E. SUMMER MEETING

NEW YORK, May 3—Reservations for the summer meeting of the Society of Automotive Engineers which is to be held at the Hotel Ottawa and cottages, Ottawa Beach, Mich., June 23-27, are coming in at a rapid rate. All reservations are being handled entirely through the S. A. E. office in New York. Accommodations are entirely on the American plan. Ottawa Beach is about 30 miles from Grand Rapids, Mich., on the east shore of Lake Michigan. It can be reached direct from Chicago by boat to Holland, or by the Pere Marquette Railroad to Holland, or by Michigan Central, Pere Marquette, Grand Trunk or Grand Rapids and Indiana Railroad to Grand Rapids and thence by electric car through Holland to Macatawa.

STEALING OF TRUCKS FELONY IN PENNSYLVANIA

HARRISBURG, PA., May 3—Governor Sproul has approved the Hollingsworth house bill making it a felony hereafter for any one to steal a motor vehicle in the State of Pennsylvania.

The measure increases the penalty for such thefts to a maximum of $5,000 and 10 years in prison, and for being accessory thereto, or receiving or buying a car truck known to have been stolen.

NEW DETROIT FINANCE CORP.

DETROIT, May 8—The Motor Bankers Corp. is the name of a new company just organized in Detroit to finance retail sales of new and used trucks, following in a general way the approved methods of other finance and guaranty companies. The directorate of the new company includes Clarence H. Booth, Alonzo P. Ewing, Edward A. Loveley, Harvey B. Wallace, Laman W. Goodenough, attorney, and Richard D. Ewing, who will act as active manager of the corporation. Offices have already been secured.

CANADIAN ROAD CONVENTION

QUEBEC, CAN., May 10.—The 1919 Good Roads Convention of Canada will be held in the City of Quebec on May 20, 21 and 22.

Non-Standardized Army Trucks Are to Go

Surplus to Be Offered Makers Before Put on Market

WASHINGTON, D. C., May 7—The standard types of trucks purchased for the Army during the war will be used to replace all of the non-standard vehicles at the various army camps and posts in this country and the non-standard vehicles will be disposed of. They will be turned over to the various government bureaus, and if not entirely absorbed by them, the manufacturers will be given first opportunity to buy them back from the Government. Arrangements for these plans are being completed.

The standard vehicles include the Class B 3-tonner, the A 1½-ton model, the AA ¾- to 1-ton trucks and the Four-Wheel-Drive trucks, as used in the Ordnance Department.

OVERLAND HAULAGE IN OREGON

PORTLAND, ORE., May 2—The Highways Rapid Transit Co. of Portland, Ore., has been organized to operate a freight service between Portland and Salem. The route, which is 55 miles one way, passes through the towns of Oregon City, New Era, Canby, Aurora, Hubbard, Woodburn, Gervais, Brooks and Chemawa. The rates charged vary from 30 to 40 cents per 100 pounds. The company is operating three Federal trucks of 3½-ton capacity which give day and night service between the two points. In addition it is using a 2-ton truck in Portland for pick-up and delivery service in that city. The company expects to make use of 1-tonners for this service at each end of the route, at which time the 2-tonner will be put into service between the two cities.

SHIP-BY-TRUCK BUREAU

OMAHA, NEB., May 3—The Firestone Ship-by-Truck Bureau, 2566 Farnam Street, is the address of an enterprise which has gone into development of motor truck service in this territory with both hands and feet. Already it has stirred up a lot of talk, and concrete results are expected very soon.

W. B. Alexander is manager of the Omaha branch of the Firestone corporation. His territory covers Nebraska, South Dakota, western Iowa, Wyoming and Colorado. He calls his venture "the establishment of a clearing house for all information regarding truck routes, shippers and schedules." He cheerfully assumes a labor which the Omaha Chamber of Commerce abandoned after trying out a return local exchange in South Omaha because it did not prove profitable to the agent. Alexander is sure the thing can be done. Anyway he proposes to find out.

Intelligent Garage Layout Reduces Truck Maintenance Costs

The Robert Gair Garage Is Open for Business Day and Night

By building its garage with room for expansion, by locating it near one of the main arteries connecting New York City and Brooklyn, and by giving a day and night supply service, the owner of the garage shown above is able to meet all of the operating expenses of the garage by fees collected from transient passenger car and motor truck owners

THE intelligent design of a truck garage, with sufficient space to take care of additional trucks as the business of the company increases, has made it possible for a Brooklyn fleet owner to handle transient or outside truck and passenger car storage to such an extent that the outside income is sufficient to take care of the cost of garage overhead and maintenance. The firm is the Robert Gair Co., which manufactures paper products. Its factories occupy 35 acres of land between the Brooklyn and Manhattan bridges along the East River waterfront.

In order to bring the trucks near the loading platforms, the garage was located between two of the Manhattan bridge supports, across the street from the shipping department building. The company owns the garage building and leases the land from the city. Not only has the company succeeded in bringing the trucks nearer to the loading platforms, but it has also saved time and money by having a garage large enough to house its trucks on a single floor without the necessity of an elevator. The garage is triangular in shape and has a floorspace of a little over 18,000 sq. ft. Storage room is large enough for sixty trucks. The garage is excellently lighted on account of the ample window area, which obviates the need of very few artificial lights during the day. The roof supports occupy little space and are located a little to the side of the main passageway, which extends in a straight line from the two front entrances opposite the loading platforms through to the rear exit. Each of the three doorways is 15 ft. wide. They are never closed, the garage being opened for service during the night as well as in the day. Being located in the heart of the factory district of Brooklyn as well as near such important arteries as the Manhattan and Brooklyn bridges, it is natural that other truck and passenger car owners would take advantage of its storage facilities, the former renting space monthly at regular garage rates and the latter at transient rates during the day. At present the company is storing twenty-seven of its own trucks and about thirty outside vehicles.

Systematic Storage of Trucks

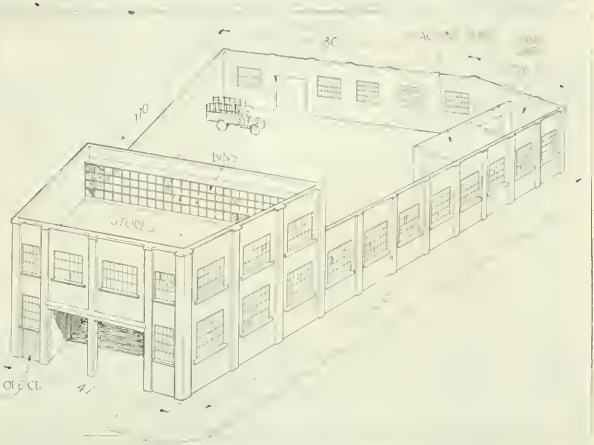
During the day when the garage space is partly occupied by the passenger cars owned by the company's officers as well as outside owners and by unused trucks owned by the company and other firms, little difficulty is experienced in parking the vehicles on account of the ample space afforded. However, at night, conditions are different, all of the trucks being in, and, as a result, a systematic apportionment of space must be made in order to get the best results. Before the company's trucks come into the garage at night, they are usually loaded with paper products for the next day's delivery, so as to get under way without delay early the next morning. These are placed at the rear of the garage, near the exit, in order to give them preference in the morning. Each truck has a specified garage space. The electrics, which are charged at night, and which go out the front entrance, are placed along the left side walls, where there are eighteen electric connections for charging purposes.

The company supplies its own electric power for lighting and charging purposes, as well as making its own distilled water for the batteries. An Eimer and Amend water purifier is used for distilling purposes. Steam comes in contact with a coil of pipes containing cold water, and by this action is condensed. It has been figured that the company saves at least $500 a year by the use of this machine. Before it was put in use, the annual bill for broken bottles amounted to about $250 and the water itself cost another $250. The distilling outfit cost $90. The company makes all repairs on the electric trucks and batteries.

Machine Shop Completely Equipped

As in the case of the electric trucks, most of the repair and overhauling of the gasoline trucks is done in the garage machine shop, where facilities are such as to enable work of this kind being done. The machine shop is equipped with a drill press, hack saw, lathe, and an emery wheel. Besides this equipment, there is a portable crane, a welding outfit, a small truck for carrying heavy units, and a paint shop. The machine shop is large enough to enable work being done on two trucks at one time. Each truck is given a thorough inspection every month, and, if slight repairs are needed, the work is done without moving the truck from its allotted space. On the other hand, if there should be need of a general overhauling, the truck is put in the machine shop, where it is completely torn down and turned out as a practically new truck. With the exception of a few heavy units, all of the parts renewed are made within the shop itself. Upon the completion of the overhauling work, the trucks are put in the paint shop, located next to the machine shop.

During the day, ten men make up the working force in the garage—one painter, one carpenter and black-

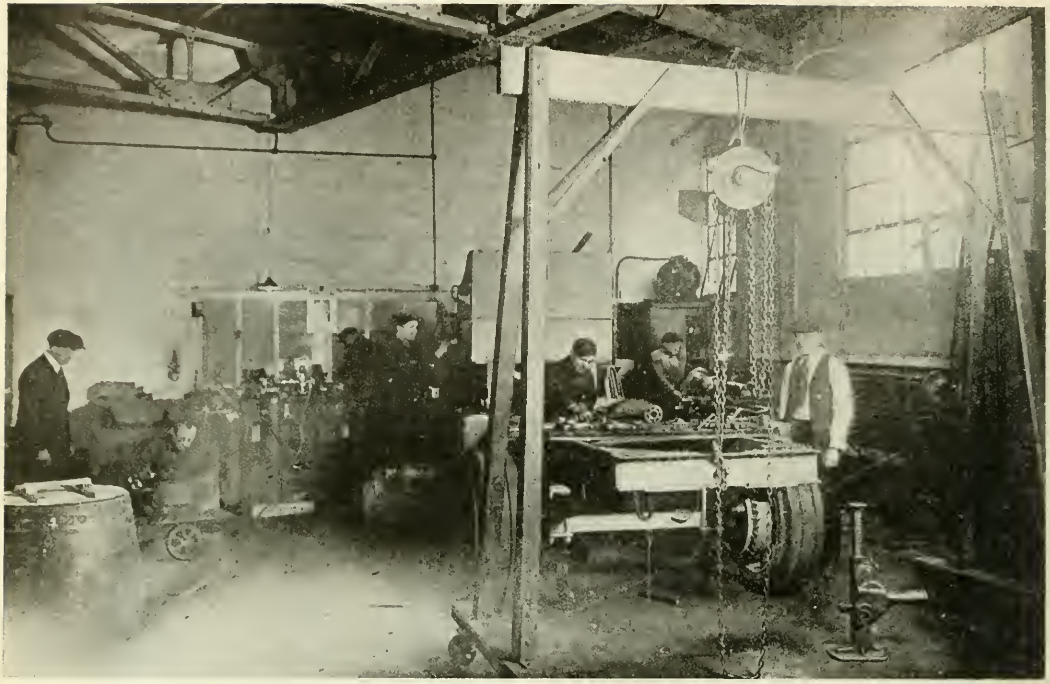


Plan View of Robert Gair Garage

No elevators or ramps are needed in this garage, as it is large enough to accommodate any increase in the company's fleet. Sixty trucks can be stored at one time

Passenger Cars Occupy Much of the Space During the Day

Fully thirty vehicles owned by outsiders are parked in the Gair garage during the day, when most of the company's trucks and those of other companies are out on their delivery routes. Gasoline, oil and battery charging service are also sold to customers



All Heavy Repair Work Is Done in This Machine Shop

It is large enough to take care of two trucks at one time. Each truck is overhauled about once a year and turned out as a practically new job. All worn parts are replaced. After the repair work is completed the truck is sent to the paint shop

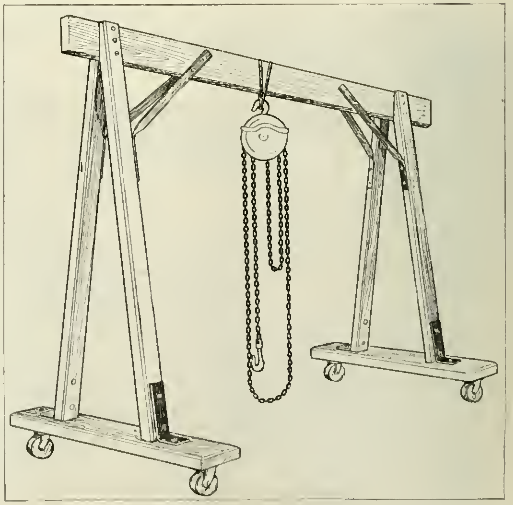
smith, two chauffeurs and six mechanics. The night force consists of three men—a washer and two battery men.

Portable Devices Time and Labor Savers

Several devices have been installed in the garage which have become invaluable as time and labor savers. These include a portable crane, a four-wheeled truck for carrying heavy units, a four-wheeled truck on which is mounted the oxy-acetylene welding outfit, and an accessible device for testing carbureters for leaks.

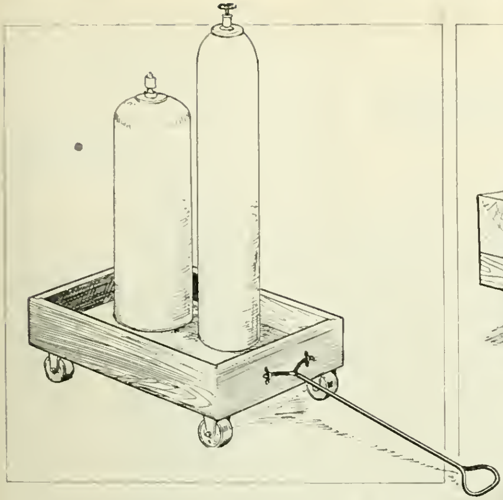
The portable crane consists of a wooden horse, 10 ft. high and 8 ft. wide, mounted on four swivel-caster wheels. The cross beam upon which the chain hoist is hung is bolted to the four supporting legs and reinforced by four diagonal steel braces. The legs are bolted at the bottom by four angular steel braces. This crane is strong enough to carry a 2-ton load and is used mainly in the machine shop when the trucks are being overhauled. It is high and wide enough to clear a truck when the body is off, and as a result it is a handy device for lifting heavy units, such as axles, engines, etc., with a minimum of effort. Another feature of this crane is the space and time saved when it is in operation. On account of its height and width it can straddle a truck instead of being placed on the side. As a result, two trucks can be placed in the machine shop at one time and units can be installed or taken out without the necessity of moving one of the trucks in order to make room for the crane.

The four-wheeled truck is a handy device for carrying



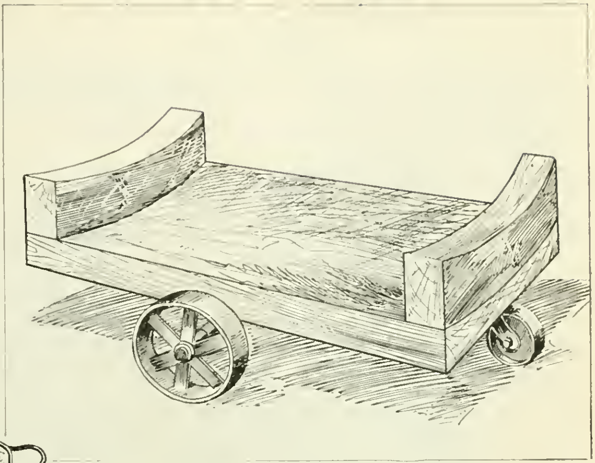
This Crane Straddles a Truck Chassis

Useful for cramped quarters when there is no room for pulling a crane up to the side of a truck. Strong enough for a 2-ton load



Welding Outfit Always Accessible

Carried on a four-wheel swivel-castor truck, it is easily moved to different parts of the garage



Truck for Carrying Heavy Parts

This four-wheeled truck with concave sides and floor is strong enough to carry most any truck unit

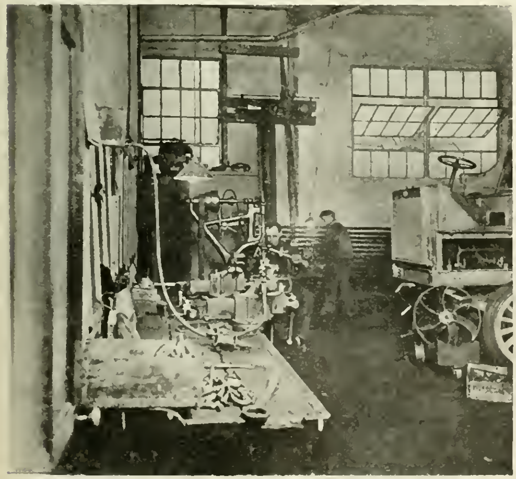
engines, axles, etc. The load is carried by two large steel wheels placed on the sides of the truck and either one of the two wheels mounted at both ends. Steering is accomplished by balancing the truck so that the entire load is carried on the two side wheels, the other two being off the floor. The floor of the truck is concave in order to prevent parts from rolling off the device. The end pieces are also concave for the same purpose.

The four-wheeled swivel-caster truck for carrying the acetylene welding outfit resembles an enlarged type of soap box with the sides cut down to within 2 in. of the bottom. The sides prevent the oxygen and air tanks from sliding off the truck as it is pulled around the machine shop. A handle is included in the equipment.

The grease barrel cover is made to fit snugly by forcing the top hoop down a little further. This enabled the spreading of the staves at the top, thus making it easier to fit the cover. The company also devised the scheme of attaching a handle to the cover in order to obviate the bother of lifting the cover bodily. Before the handle was put on, the grease was usually exposed to dust because of the inconvenience in handling the ordinary cover.

Device for Testing Carbureters for Leaks

After each carbureter is repaired, it is tested for leaks. This is accomplished by means of connecting the carbu-

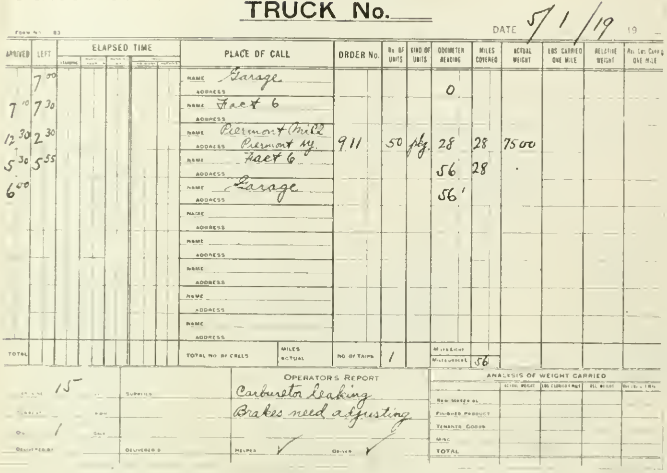


Overhauling Facilities Complete

Machine shop equipment includes a lathe, emery wheel, hack saw and a boring machine. Practically all of the parts are made here

$500 a Year Saved by This Device

Though this water purifier cost $90, it saves the company $250 a year for distilled water and $250 for broken bottles



DAILY REPORT—MOTOR TRUCKS

TRUCK No.

Form No. 83

DATE 5/1/19 19

Arrived	Left	Elapsed Time	Place of Call	Order No.	No. of Units	Kind of Units	Odometer Reading	Miles Covered	Actual Weight	Lbs. Carried One Mile	Relative Weight	Rel. Lbs. Carried One Mile
	7^{00}		Name Garage Address				0					
7^{10}	7^{30}		Name Fact 6 Address									
12^{30}	2^{30}		Name Piermont Mill Address Piermont N.Y.	911	50	pkg.	28	28	7500			
5^{30}	5^{55}		Name Fact 6 Address				56	28				
6^{00}			Name Garage Address				56'					
			Name Address									
			Name Address									
			Name Address									
			Name Address									
			Name Address									
Total			Total No. of Calls	Miles Actual	No. of Trips	1	Miles Light Miles Loaded	56				

Gasoline 15

Oil 1

Supplies

Delivered

OPERATORS REPORT

Carburetor leaking

Brakes need adjusting

Helper ✓ Driver ✓

ANALYSIS OF WEIGHT CARRIED

	Actual Weight	Lbs. Carried 1 Mile	Rel. Weight	Rel. Lbs. 1 Mile
Raw Material				
Finished Product				
Tenants Goods				
Misc.				
TOTAL				

All Repair Work Centered Around Driver's Daily Reports

This is the Gair company's elaborate driver's report card, which in actual practice is only partially filled out. The items filled in include starting and ending times; places of delivery; weights carried; kind of goods; mileage; gasoline; oil and needed repairs. The Relative Weight column is to show whether capacity loads are carried

reter by rubber hose to a 2-qt. tin can filled with gasoline, conveniently hung on the wall in back of the work bench. A stop cock controls the flow of gasoline from the tin can.

Though there is a systematic inspection once a month for wear and tear on the trucks, most of the repair work and inspection is centered around the daily reports from the drivers. Close attention is paid to fuel and oil consumption, mileage covered, loads carried, and the operator's attention to minor troubles, such as brake adjustment, loss of grease cups, loss of engine power on hills, squeaks and rattles, etc. These records are compared, and if it is noticed, for instance, that the truck is not getting good mileage from the fuel under ordinary conditions, the engineer in charge of the maintenance of the trucks immediately gets in touch with the garage foreman to ascertain the cause of the trouble. Tests are made to see whether the engine is receiving the proper mixture for the prevailing weather conditions and whether there are any leaks in the gasoline fed pipes, etc. Occasionally the trouble is traced to dragging or improperly adjusted brakes which retard the vehicle. Oil consumption is also closely watched. Should it be noticed that the truck is using more oil than usual for a given mileage, close attention would be paid to leaky piston rings, scored and oval cylinders, leaky gaskets, a leak in the crankcase, etc. In short, oil trouble will sometimes indicate whether the engine needs an overhauling or not.

Inspect Trucks Excessively Overloaded

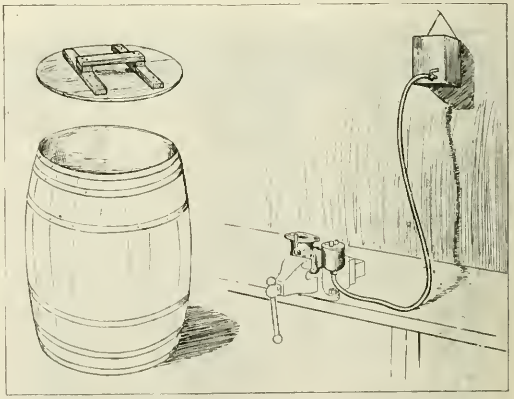
Overloading the trucks under reasonable conditions, that is, with smooth roads and a short haul, will pass by the engineer's scrutiny of the driver's report without causing an inspection of the vehicle for breakages. On the other hand, if the truck has been excessively or systematically overloaded, it will call forth an inspection. This inspection usually means a trip of the truck fully loaded up some neighboring hill to test out the engine, brakes, etc. Close attention is paid to the radius rods, tires, etc. Though this inspection may not show any defects, any breakages during some later date will usually be traced back to the overload.

Loads Adapted to Truck Capacity

The company has realized the necessity of adapting the individual load to the capacity of the truck which is used to transport it. For instance, corrugated paper is an item which combines bulk with relatively little weight. It constitutes an exception to the rule of full capacity loads, for it is only practicable to carry 3½ tons of this product on the regular 5-ton truck. Obviously, this means an apparent loss of 1½ tons of pay loads. As a result, corrugated paper is carried on the 3½-ton trucks entirely, so as to get the maximum service. This important item is noted in the column headed by "Relative Weight." In the same way, an analysis of the weight carried is made with raw materials and miscellaneous goods.

Makeup of the Fleet

The company's fleet consists of two G. V. 5-ton electrics, two Lansden 2-ton electrics, seven 5-ton Atlantic electrics, two 7½-ton Macks, three 3½-ton Alcos, three 5-ton Alcos, two 2-ton Autocars, one 2-ton Velie, one 6½-ton Locomobile, one 6½-ton Saurer and one ¾-ton Reo. The latter is used as a service truck.



Labor Saving Devices for Grease Barrel and Carbureter Tester

Adding a handle to the grease barrel cover has made it easier and more convenient to pick it off the floor, and as a result the grease is kept free from dust and other foreign matter

After each carbureter is repaired it is tested for leaks by means of the above 2-qt. tin can filled with gasoline. The flow through the rubber hose is controlled by a stopcock

When Nation Goes Dry, Ice Cream Makers Will Have to Motorize Their Deliveries

Southwest Dairy Company Finds Only Trucks Can Handle Increased Sales

One of the Terry company's three Fords which are used for special deliveries of milk and ice cream. Milk cans are seen in the truck body with empty ice cream cans on the loading platform in the background

WHEN a dairy or ice cream company is confronted with the problem of taking care of a greatly increased volume of business it has been found that the substitution of motor trucks in place of horse-wagons is one of the surest methods of its solution. When from 20 000 to 40,000 men were suddenly dumped into Little Rock, Ark., during the latter part of 1917 and in 1918 and quartered at Camp Pike, 8 miles outside of the city, the business of the Terry Dairy Co. in that city was increased tremendously. While the Terry Dairy Co. sells household milk, it also does a large amount of ice cream business, and it was in the ice cream sales that the business increase was most evident.

Prohibition Will Increase Sales

While of course the war is now over and Camp Pike as an important military post no longer exists, the problem which confronted the Terry company will be duplicated in hundreds of localities during the coming summer should the emergency prohibition law go into effect as planned on July 1, 1919. Large numbers of the civilians arriving at Camp Pike came from states in which the sale of liquor was permitted. Arkansas has been dry for several years so that they immediately had to find some new means of liquid refreshment and ice cream and soda water were the only two articles available.

As a result, the ice cream business of the Terry company more than doubled over night and immediate steps had to be taken to meet this increased demand by a reliable and efficient delivery means. Horses could not expand their radius of action or be worked for longer periods each day because they were already worked to the economic limit of their capacity. To add more horses would have only complicated the problem and would not have enabled the Terry company to serve Camp Pike, since the horses could not stand up day in and day out under the trying conditions and uphill work over the 8-mile stretch of road from Little Rock to the camp site. Accordingly, all of the horses owned by the Terry company except those used in a house-to-house delivery of milk were disposed of and replaced by motor trucks, as will be told in greater detail further on in this article.

Story of Terry Company Interesting

The point which is wished to bring out at this time is the fact that very similar conditions will occur during the summer of 1919 in those states which now permit the sale of liquor, but which will prohibit it after July 1 provided the prohibition restrictions go into effect at that time. The story of the Terry Dairy Co. and the manner in which it solved its delivery problem is therefore of the most timely interest to ice cream concerns who may be shortly confronted by exactly the same or very similar problems.

The work of the Terry company under the old horse-wagon method was divided into two general classifications. The first of these was the haulage of milk from the railroad depots in Little Rock to the company's plant, where it was pasteurized, bottled and finally delivered to the city's householders in the usual manner by means of one-horse wagons. The second portion of the work was the delivery of ice cream from the company's plant to retail confectionery stores, drug stores, department stores and other businesses maintaining soda fountains. This work was also done by means of horse wagons of the usual low-sided panel type of body pulled by two instead of one horse.

Only 4-Mile Radius Covered with Horses

When horses were used exclusively in all of the company's delivery work, the delivery radius covered was only 4 miles. Horse-wagons could not be sent out beyond the 4-mile circle because they were not physically able to stand up under the work on longer routes, and if they were sent on such long routes they had to be rested up the day following. This, of course, sadly disarranged any delivery schedule which was adopted.

Under the horse-wagon scheme of delivery practically all of the milk sold as milk after pasteurization or transformed into ice cream had to be shipped into the company's plant by railroad because all of the farms on which milk could be secured were beyond the 4-mile circle.

Notwithstanding these drawbacks of the horse-wagon service, that method of delivery managed to partly satisfy the company until the great increase in sales occasioned by the establishment of Camp Pike. Then the whole system fell to pieces because it could not expand rapidly enough to keep pace with the increased orders.

When it thus became evident that the horses could no longer handle any of the work except the house-to-house delivery, the company began to purchase trucks, and at this writing has a fleet of eleven motor vehicles. The fleet is made up of two Seldens one of 1-ton capacity and one 2-tonner; six Republics, two each of 1-, 1½- and 2-ton capacity, and three 1-ton Fords. Thirty horses and wagons are still retained for the house-to-house delivery of milk.

Can't Exist Without Trucks

S. S. Summerfield, in charge of the trucks for the Terry company, states that his company could not now exist without the trucks. As a result of the truck use, the company has secured business which it positively could not handle were horses employed. Little Rock is a city of between 80,000 and 83,000 population and taken in conjunction with Argenta, a city of 18,500 population, across the Arkansas River, gives a community of close to 100,000 persons. Much of the additional business secured outside of that at Camp Pike is in the outlying territory and was not obtained sooner because the company had no economical means of making deliveries to such concerns before the purchase of the company's trucks.

The Terry company also owns a large dairy farm on the Nineteenth Street Pike approximately 11 miles from its plant in Little Rock. Before the introduction of trucks, all of the milk produced on the company's farm had to be shipped into Little Rock by railroad unloaded, reloaded on to the company's horse-wagons and finally unloaded at the plant after the haul from the railroad sidings.

Now, by means of trucks, the company is able to ship its milk direct from its farm to its city plant with only two handlings, the loading at the farm and the unloading at the plant. This method of shipment is much more reliable than by rail and was practically the only means available during the period of railway congestion in 1917 and 1918. Considering the elimination of the handling to and from the railroad at each end of the run, the direct truck method of shipment is also considerably cheaper than by the rail method.

Other Advantages

There are other advantages in the favor of the truck, including a smaller loss due to badly damaged cans and delays caused by cans going astray. By the truck method of shipment, both the cans and the milk they contain are continually under the authority of the Terry company. If the milk is entirely used up on the same day it is brought into the city plant, the empty cans are taken back to the farm on the return trips of the trucks. This certain service enables the company to ship a far greater quantity of milk each day with the same number of cans than would be possible if shipped by rail, for a certain reserve number of cans always has to be kept so that the following day's shipment may be sent forward even though cans shipped previously had not been returned. Taking all these advantages into consideration, it is no wonder that the Terry company states with considerable pride that it could not exist without its motor trucks.

Drivers a Problem

While the Terry company is pleased with the service which its trucks have rendered, it has had its problems like all other truck owners, and the path has not been entirely a rosy one. Two of the company's most pressing problems were the selection of proper drivers and the method of maintaining the trucks and repairing them. In regard to the driver problem, the company endeavored to secure competent white drivers, but the scarcity of men, especially during the war period, was so great that colored drivers had to be employed.

What men could be secured who knew anything about truck operation had had their previous experience on passenger cars. When they got behind the wheel of a motor truck they invariably endeavored to pursue their former passenger practice and drive at high rates of speed. Until they could be broken of this habit, one which is not yet entirely eradicated there was a continual succession of repair work, including broken parts and damaged vehicles to put into shape.

At first the company tried to have the repairs done at nearby public garages, but this did not prove entirely satisfactory either from the viewpoint of cost or of speed in getting the trucks out on the road again ready for work. Next the company tried to make its own repairs, but this, too, did not prove successful because of the high cost of doing the work. Better results have been secured by having the work done at the service stations of the three concerns from which the company's three makes of trucks were purchased.

Salt Water Corrodes Springs

Considerable repair work was necessitated due to the corroding effect of salt water dripping on the vehicle's springs and other underneath parts of the chassis. The bodies were not pitched to the rear to a sufficient degree to make the salt water leaking out of the ice cream can containers drip off the rear end of the tailgate entirely free from the chassis parts. Then again the bodies were not metal lined to prevent the water from saturating the wood floor and eventually seeping through onto the truck side chassis frame members, springs and other rear end parts. To secure immunity from rusting caused by salt water, metal lining of the body and a pitch of about ½ in. to the foot, or 6 in. for a 12-ft. body, are the easiest and the most inexpensive expedients.

The trucks are maintained in the company's own garage, which is supervised by one man, who is responsible for minor repairs and adjustments on the eleven vehicles. As told previously, all repair work requiring the use of tool machinery is done at the service stations of the local branches from which each of the different makes of trucks was purchased.

To enable the trucks to cover the increased delivery radius as compared with horse wagons, it has been found economical to employ colored boys as helpers on all of the vehicles. With the exception of the 8-mile run to Camp Pike, most of the company's delivery work is done within a radius of 7 miles as compared with the 4-mile radius previously covered by horse wagons. The helpers are paid $15 a week.

Some Drivers Earn $40 Weekly

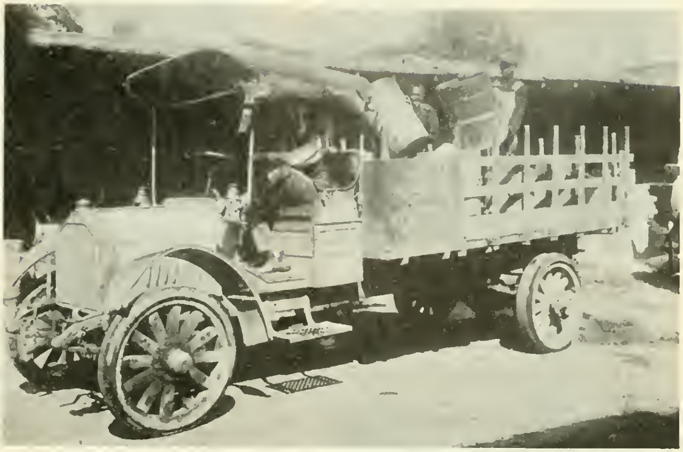
The drivers earn from $20 to $40 a week, depending upon the amount of sales secured and the amount of business done during the week. Each driver is paid 5 per cent of the total business done. He is thus really more than a truck driver and to a certain extent becomes an ice cream salesman. The more new

One of the Republic 1-tonners, showing the type of body and cab top used and the type of driver and colored helper employed. The size of ice cream tub carried is clearly shown, as is also the removable type of body side stakes business he secures on his route means a greater weekly income, so that it is to his advantage to secure the maximum amount of business on any given route and to give his customers a satisfactory service once the business is secured. In the busy seasons of the year, during the summer months, some of the best of the truck drivers earn even more than $40 a week.

The Truck Work

As a general thing, a certain number of the trucks are used for the haulage work from the railroad milk terminals and for hauling the raw milk between the company's farm and its plant; others for the outlying deliveries and the lightest vehicles for the close-in orders and for special delivery work. The Seldens, which are provided with side stake bodies, in which one of the stakes on each side is removable for easy loading or unloading, are used for the depot haulage and for the outlying deliveries when the loads are too heavy for the 1-ton and 1½-ton trucks. The two latter sizes are used for most of the delivery work, since on some of the routes they must cover between 60 and 75 miles a day, and have to be operated at fairly good speeds in order to cover that amount of ground. The Fords are fitted with low flareboard bodies with low seats made up of a cross board with pillow cushions, as shown in the illustration on page 21.

While the roads in the vicinity of Little Rock are none too good, not much trouble has been experienced so long as the trucks kept on the main routes. The difficulties have been encountered principally on the side roads during wet weather.

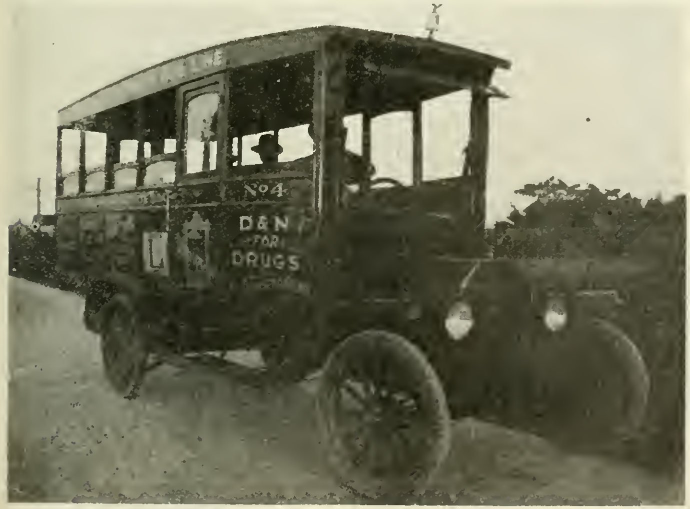


A 2-ton Selden with its load of empty ice cream tubs and its pickaninny helpers. The absence of body floor pitch to drain off the salt water to the rear is noticeable in this illustration. This at first resulted in rear spring corrosion

TRUCK DEMONSTRATION IN ST. LOUIS

ST. LOUIS, MO., May 8—A motor truck run in which manufacturers, dealers and agents of motor trucks in the St. Louis territory will participate is to be held early in June. This was decided upon at a meeting of the commercial car bureau of the St. Louis Automobile Manufacturers' and Dealers' Association last night. Fourteen companies were represented at the meeting. Thirty-eight trucks have already been entered for the trip. The purpose of the run is to demonstrate the practicability of motor trucks and to show their varied uses. The following committee was appointed at the meeting to make final arrangements for the run: C. E. Lightfoot, L. H. Amrine, C. A. Aldrich, Joseph Duncel and J. N. Magna. A motion favoring the adoption of a uniform low-price body for all chassis was defeated because of the opinion that limitation to such bodies would reduce public interest.

Getting the Advertising Value Out of a Truck Body



Here is a good example of how to make the maximum advertising use of a motor truck body. The bus runs between Fort Wayne and New Haven, Ind.

THE great possibilities for the use of motor truck bodies for advertising purposes as previously outlined in the July 1 and July 15, 1917, issues of THE COMMERCIAL VEHICLE, is well illustrated in the case of the motor bus shown in the accompanying picture. The bus itself, which is mounted on an adapted Ford chain-driven chassis, is fitted with a one-man type body with the entrance and exit door on the right side. The body panels between the bottom of the side and end windows and the floor of the body have various advertisements painted on them. The portion of the seat supports directly under the seats is also used for advertisements. This brings in a large revenue, the profit from which is added to that made in carrying passengers.

The bus runs over the Lincoln Highway between Fort Wayne, Ind., to New Haven. The advertisements are mostly those of concerns situated along that route so that the bus patron is guided in his purchases and the bus owner incidentally paid in turn for the service rendered. Many truck owners operating vehicles in public work may apply this idea with remunerative results.

One of the Big 8 in Truck Operation

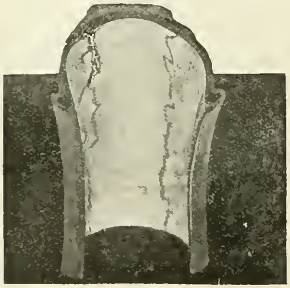
TIRES

W. N. Britton Discusses Results of Abusing Pneumatic Tires and How to Overcome These Difficulties So As to Get the Maximum of Service and Lowered Expenses

THE cost of maintenance of motor truck tires is an expense a fleet owner can hardly overlook. In fact, it ranks in importance with the driver expense item in the cost of maintaining trucks, as evidenced in the reports published in THE COMMERCIAL VEHICLE, April 15. It was shown that the tire expense item, though second on the list of the big 8 in truck operation, was almost as large as that for the driver, thus indicating that the fleet owner should be thoroughly familiar with the results of truck tire abuse and the elimination of these abuses as a step forward toward satisfactory service. W. N. Britton of the Kelly-Springfield Tire Co., in discussing tire service before the Motor Truck Club of America at its meeting in New York on April 16, gave briefly some of the various difficulties which are encountered in connection with the use of pneumatic tires.

Underinflation and Overloading

One of the greatest reasons for premature wearing out of tires is underinflation, and another equally as important is overloading. Both underinflation and overloading cause severe bending stresses above the bead. The sides of the tire are worked very severely and this constant working breaks the fabric and also bends the side of the tire over the rim and causes rim cuts. Excessive deflection of the tire also causes tread separation, because it means that the tire is flattened and the tread rubber compressed. This constant working of the rubber between the carcass and tread rubber produces the tread separation. Constant bending of the fabric also breaks down the rubber between the layers and causes fabric separation and very rapid deterioration of the tires.



Overloading of tires results in the same general damage as underinflation. The remedy is in larger tires. The illustration shows the breaks from excessive loads and the severe driving strains to be expected under such conditions

Results of underinflation. Notice the chafed condition of the beads, the broken side wall and the broken condition of the fabric

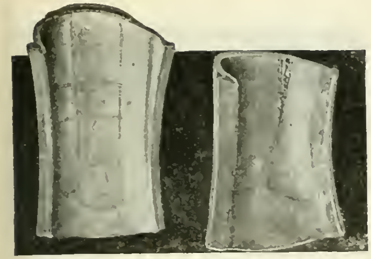
The tire is also subject to injury when it is underinflated, due to the rim striking against stones or other substances and cutting the interior of the tire. In overloading, especially under high pressure, which must always be used when heavy loads are being carried, the tire also breaks at the sides. When a tire is overloaded under high pressure, a very severe bending occurs at the point of contact with the ground. This excessive bending very quickly breaks the fabric at these two points. It will be found that in a tire that has been very decidedly overloaded the fabric has broken inside of it at these two points, circumferentially with the tire.

Proper Air Pressures

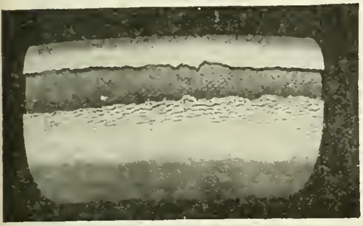
If excessive air pressures are carried, the tread will wear out before the carcass. Too high air pressure results in a very small area of contact, consequently the area for wear will be small and excessive tread wear will occur. On the other hand, too low air pressure will result in excessive deflection and working in the tire. The fabric will break and the tire will blow out before the tread has worn down to the breaker strip. Another effect of high air pressure is excessive vibration of the vehicle, and consequently excessive vehicle depreciation.

The question will then arise as to

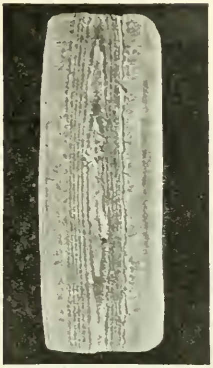
Severe application of the brakes will injure the tire tread so that the tire will be worn down to the fabric base in quick time



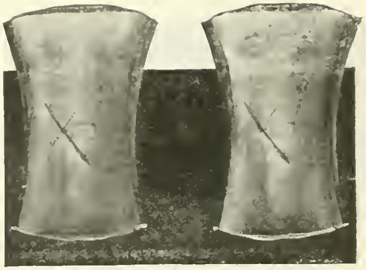
Result of careless application. The section to the right shows mistake in applying tube over the flap. Section to the left shows that the flap chafed and cut into the fabric at a point where the tire receives considerable hinging action



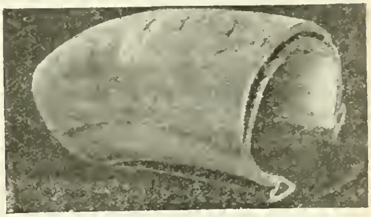
Result of wheel irregularity. The extreme roughness of the rubber shows the wheel to have been in very bad condition, the tread having worn through to the breaker fabric in a short time



Wheel irregularity will cause a tire to wear as in the above illustration. Ordinarily the wear is more pronounced in one to three places on the tread, at points where the wheel shifts and wabbles most



Fabric rupture caused by the breaking of a few threads from a cut, severe bump, or bruise. When once started a break in the fabric will continue to lengthen until a blowout is the result. Internal pressure and weight on tire cause rupture to continue to break along bias of fabric



Neglected cuts cause tread separation. A cut expands when under the weight of the machine and in contact with the road. In this way mud, sand and pebbles are forced into the opening

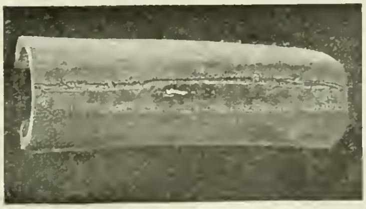
how to determine what air pressures should be carried. With a large tire lower air pressures must be carried, because the proper load depends on the deflection of the tire. The proper deflection of a tire is in the neighborhood of 10 to 12 per cent of the nominal tire width. One of the most obvious methods of determining air pressures is the bulge of the tire. If, on observing a tire on the ground, the sides are bulged out, one knows, of course, without measuring air pressures, that the tire is underinflated or overloaded.

If it is found that the tire has a nominal air pressure, from 13 to 20 lb. per square inch, and bulges excessively, it shows at once that it is entirely too small and a larger tire must be used. However, the proper method of determining whether the tire is properly inflated or not is to place a jack under the axle near the wheel and run the jack up until it is just snugly underneath the axle, without any freedom, but not sustaining the weight. Mark the shaft of the jack at that point and raise the wheel on up until it just clears the ground. Mark again on the side of the jack and the deflection of the tire is shown. That amount, as said before, should be approximately 10 to 12 per cent of the nominal tire width. The way the 5-in. cord tire is now being made is about 10 per cent oversize, or 5½ in. in width. The amount of that deflection, as determined in the manner previously described, should not be over 12 per cent.

Skidding Causes Wear

Premature tread wear is caused by various conditions. One of the most common reasons for premature tread wear is skidding around corners and too sudden application of the brakes. Mr. Britton stated that he found in tests that tires which give a very high mileage in ordinary rough use will wear out at just about half of that mileage when used on the very best roads; fine, smooth, hard roads, where care is not taken in going around corners, where the drivers slide them around just a little more than ordinary or put the brakes on suddenly and slide around corners at a high rate of speed.

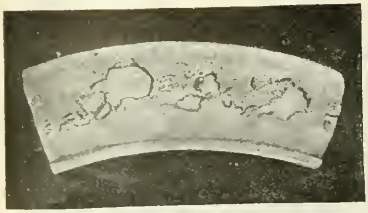
Another very common reason for tread wear is misalignment of the wheels; that is, bent axles or spindles or wobbly wheels. If the wheels are not properly lined up, the front tires will wear out very rapidly. The normal adjustment of the front wheels should be done by taking all of the slack out of the front of the tires; that is, spreading the front of the tires apart and then measuring the distance between the felloes on the wheel, not tires themselves, because they may vary a little in their application. The felloe of the wheel should be measured with the front of the wheels strained apart. The distance between the inside of the felloes, front and back, should measure exactly the same. Mr. Britton stated that all instructions about allowing from ¼ to ⅜ in. greater spread at the rear of the wheels than at the front should be disregarded. The strain should be placed on the wheels and the slack taken out at the front, then measured. They should then be the same on the front as at the back, as that is all this difference is meant for, to take care of the spreading of the wheels when under the strain of the load.



The continual rubbing on the road through wheel irregularity wears down the tread to a very thin layer, until finally a sharp stone or sudden application of brakes will tear through to the fabric base

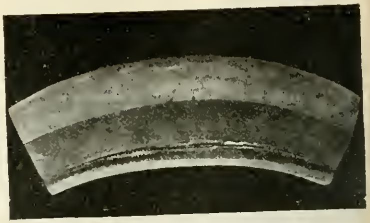
Must Align Wheels Properly

Another thing which is often lost sight of by many is the fact that when the wheels measure an equal distance apart they are not neces-



Snags and rut wear, the damage being done by driving in rutty, unbroken or frozen roads. When this wear is noticed, the tire should be reversed and the worn side turned to the inside

Driving in car tracks continually will shorten the life of any tire, as the rails wear away the tread rubber and cause a bending action of the fabric



Under inflation dented and irregular rims, excessive loads and stiff reliners are some of the common causes for cutting and breaking above the beads. Coat all rusty surfaces with graphite

sarily properly aligned and will oftentimes wear out prematurely. That is due to the fact that the steering spindle arm on one wheel is closer to the wheel than the steering arm on the other. One steering arm may have been bent and the wheels were then lined up by adjusting the tie rod, bringing them correctly in line so far as the wheels are concerned, but the distance from the center of the pin on one spindle to the wheel is not the same as the distance from the wheel to the spindle on the other. As a result, in going around a curve the wheels are not properly placed. Steering is hard and consequently there is excessive tire wear.

If an accident has occurred which appears to have bent the steering spindle, it should be ascertained whether the distance from the center of the pin on the spindle to the wheel is the same in each case.

Wobbly wheels are also a very fertile cause of tire wear. This generally produces excessive tire wear at one spot. It can be ascertained very readily by jacking up the wheel and spinning it. Uneven brakes are also another very common cause of excessive tire wear. If the brakes are unevenly adjusted all of the braking effect is taken on one tire, giving not only poor braking, but excessive wearing on that particular tire. The sudden application of the brakes gives premature tire wear.

Fenders Scrape Tires

Another reason for tire wear is where there is too small clearance allowance over the tires, as between the tire and fender. This is oftentimes due to the settling of springs, or not providing proper stops for the springs in striking chuckholes or where trucks are excessively loaded and come to uneven places in the ground.

Practically the only time when retreading is a practical thing is when tires have been worn out prematurely because of some of the defects already enumerated. The tires which have been ruined in that manner can very profitably be retreaded and give excellent service. In most other cases it is not advisable to retread tires. Most tires have been properly balanced in that respect, and if the tread is worn out in ordinary service it will be found that it is hardly practical or economical to retread such tires.

Ineffective repairs will do the tire more serious damage than if left alone. Lower cuts show snag repaired on outside only with no fabric reinforcement on inside. At upper left, scraps of material used and improperly applied, not therefore affording strength or reinforcement

Damage from fender sometimes results from an extending bolt on the fender bumping the tire when a heavily loaded truck passes over rough places in the road. In using an oversize tire it should be seen that there is ample clearance between the tire and fender

Rim cutting and broken beads are the result of many causes. The tires are sometimes applied on rims which have been bent due to their being run when the tires were underinflated or entirely deflated, and these uneven rims permit wobbling of the bead or rolling of the bead on these uneven surfaces and break the bead down and allow it to blow out at that point.

Attention to Flaps

Mr. Britton emphasized the importance of the flap in pneumatic tire equipment. Care must be taken in the application of these flaps. Blowing out at the bead is generally the result of the misapplication of the flaps, which will sometimes be left lying underneath the bead instead of being placed inside the casing as it should be. That prevents the bead of the tire from properly seating on the rim and allows it to roll at that point. This rolling very soon breaks down the bead and causes it to blow out at that point.

Small cuts and blisters should be given proper attention in order to get greater mileage. These small cuts allow water and oil and dirt to enter and the constant working of the casing soon breaks the tread loose from the casing. This breaks down the cushion at that point. Small cuts should be filled with a tire filler, being previously cleaned with gasoline and cemented and kept properly filled. If the casing were carefully inspected once every 2 weeks, and all of these little cuts and blisters cleaned up, better mileage would be obtained.

Oil and grease from garage floors enter cuts and rot the tires in a very short time. Stone bruises should be attended to at once, because they will continue to enlarge until a blowout occurs. Oftentimes they will result in pinching the tube and blowing it out in a very short time, even if they do not blow out the casing.

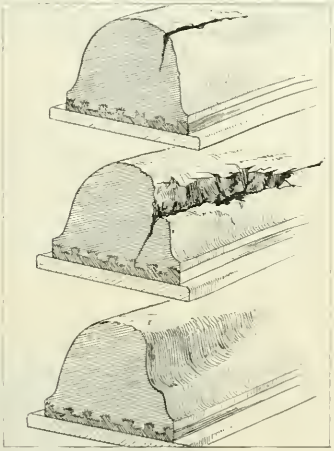
Spare tires do not receive the attention they deserve. These tires are usually placed in the open and left there until a blowout occurs. By that time it will be found this tire is in a worse condition than any other tire on the truck. Tires depreciate when left in the light and the sun and the air much more rapidly than they do when they are in use, and they should be taken off occasionally and used and another tire carried as a spare, because rubber is kept alive by use. The best plan, however, is to cover the spare tires with a tire cover, which keeps them away from the light, sun and air, and prevents what is called blooming, in which the rubber becomes brittle and loses its elasticity.

How to Get More Solid Tire Mileage

IN discussing the solid tires, Mr. Britton warned against overloading them. When tires are overloaded, the bulging effect has been excessive; that is, it has gone to such a point that the internal strains have gone beyond the tensile strength of the material and they have broken down. As a result, the rubber does not come back to where it was before. In that respect it differs very decidedly from the overloading of a pneumatic tire. If a pneumatic tire is overloaded a few times, it is not injured materially, but if a solid tire is overloaded once, the tire is ruined. It is just like a piece of steel which is overstretched beyond its elastic limit almost to the breaking point. If overstretched but once, the effect is irreparable.

The occurrence of cuts is often unavoidable, and, if neglected, will seriously decrease the life of a tire. Every time the cut comes in contact with the road, a spreading and tearing action occurs that soon causes an extension down to the base and also around the tire.

The method of remedying cuts is shown in the accompanying illustrations. It has been found impracticable to fix truck tires by vulcanizing. When this is done the portion of the tire around the cut becomes weakened, and under action of heavy loads soon breaks away, weakening the tire as much as if the cut were neglected. The remedy is to trim the cut as illustrated.


The top figure shows the appearance of a cut when first made. The second figure shows how the cut expands and the third how to properly trim out the cut to prevent further damage

Overspeeding causes about the same damage to a solid tire as does overloading. In this case the blow is the result of speed, and not of weight, resulting in a tearing and breaking down of the tire body. Overheating also enters in and combines its effects with those of the road shocks.

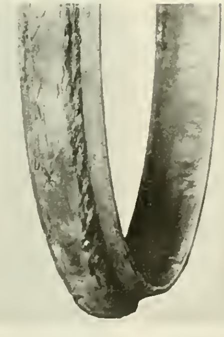
Running in car tracks is bad on solids because most of the load is concentrated on a small portion of the tread, so that it is an overload and the tire is quickly worn away.

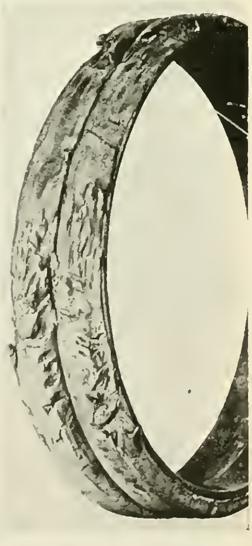
Bad roads will cause rapid wear.

(*Continued on page* 44)

Result of neglected cuts. The rubber was allowed to open, spread and finally chip off, thus throwing an overload onto the remaining portions

High truck speeds over poor roads tend to chew up the tread, as illustrated above. The remedy is to go slow if traveling over bad roads


Riding in car tracks throws the weight on one side of the tire only, with the resultant wearing away of that side, as illustrated


Skidding and blocking brakes caused this tearing away of the tread at one point. The brakes bound at the same point and wore the rubber at that point

Garaging Electrics for the Small Fleet Owner

Edison Battery Company Offers Owners Full Service at a Fixed Sum from a Special Garage with Every Modern Facility

OWNERS of electric trucks in New York City who operate small fleets of two or three vehicles and who do not wish to go to the expense of installing an electric charging outfit costing between $600 and $700 until such time as their fleets are increased, may now secure full garaging and charging facilities at a nominal fixed sum varying according to the size of the truck. The company which offers this service is the Edison Storage Battery Garage, Inc., located at 247 West Thirty-fifth Street, where it has a three-story and basement fireproof garage with a capacity of 110 trucks. The garage is centrally located and is equipped with all of the most modern apparatus for handling efficiently and economically all types of electric vehicles.

The Rates Charged

The Edison Garage company handles the vehicles given over to its care under two distinct contracts, one of which gives a full service, including charging, and the other a full service with an extra charge for battery charging. The rates under the two forms of contract are as follows:

FULL SERVICE, WITH CHARGING

Lbs. capacity of truck	Cost per month
750	$43
1,000	48
2,000	53
4,000	65
7,000	75
10,000	85

These rates include housing; washing and polishing; oiling and greasing; monthly inspection of vehicle and battery; watering and regular charging of battery. They do not include repairs to vehicles or battery or other service of any kind. Repairs will be made only on a written order from the owner. A rider covering emergency repairs not to exceed $25 for the cost of any one single job will be attached to the contract if it is the desire of the truck owner.

FULL SERVICE, CHARGING EXTRA

Lbs. capacity of truck	Cost per month
750	$25
1,000	25
2,000	25
4,000	30
7,000	35
10,000	35

These rates include the same service as in the first contract, with the exception of charging the batteries. The cost for charging the batteries is 5 cents per kilowatt hour for current consumed. All repairs are charged for on the hourly basis plus material.

Evolution of Service

The evolution of this service has been due to the increased sales of electric trucks in fleets of two and three in the metropolitan area. During the past few years so many electric vehicles were purchased that a shortage of garages having the necessary facilities for charging and taking care of the batteries resulted. This was especially noticeable in the central part of the city, where the greater number of the trucks are operated.

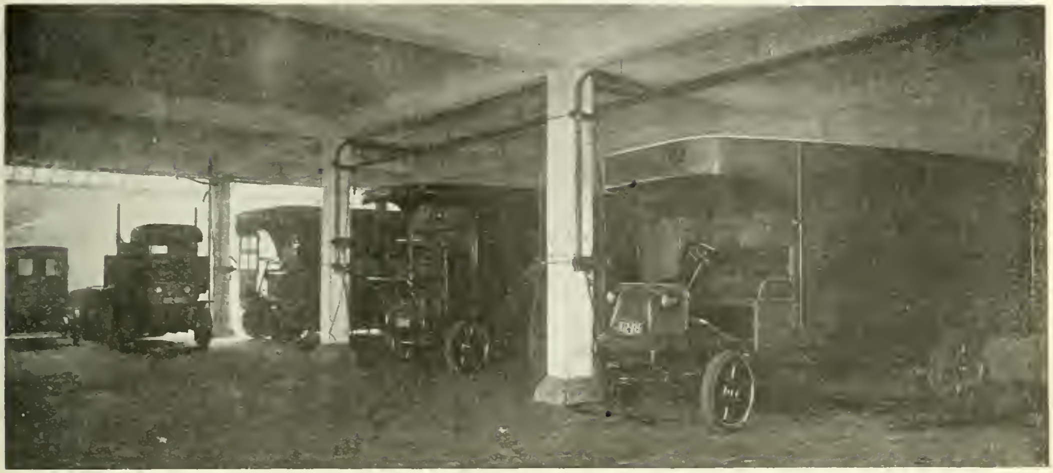
This shortage of garage space for these particular vehicles was such that at times the trucks had to be left in the streets the greater part of the night. These trucks would be left in the street in front of the garages until midnight, when vehicles having their batteries charged had the work completed and could be rolled out on the street to admit of some of the waiting vehicles.

Of course, this affected few of the warehouse or transfer men, or other operators having large fleets of electrics and who had sufficient space in the warehouse or other such facilities where they had installed their own charging sets. But few owners operating only one or two vehicles have such apparatus. Besides, a charging outfit which will take care of two to five trucks will cost between $600 and $700, a sum which few wish to invest until they have more than two vehicles.

The representatives of the Edison Storage Battery Co., Orange, N. J., of which the garage company is a subsidiary, who had charge of the New York section, saw that if this condition was allowed to exist for any length of time it would seriously affect the use of small fleets of electrics in the New York City territory.

Realizing these facts, a new company was formed, known as the Edison Storage Battery Garage, Inc., and a three-story

Front view of the three-story and basement garage of the Edison company in New York City, where owners of small numbers of electric trucks may secure a complete garage and battery service at a nominal monthly charge



The first floor of the garage on which the heavy trucks are maintained. The layout of the charging lines on each column is plainly shown. Additional light is secured from the glass transom at the rear. The trucks which must leave early in the morning are garaged nearest the exit door

and basement fireproof garage, 69 x 100 ft., with a capacity of 110 trucks, was constructed in a central locality where the greater number of electric trucks are operated. The garage is equipped with all modern apparatus for handling these vehicles efficiently and economically.

The Equipment Installed

For carrying on this work efficiently the company has equipped the garage with all modern devices for charging batteries, making repairs to batteries and trucks, and for the convenience of the employes and drivers. The basement is used for a large storeroom, where a stock of all truck parts are kept, a fireproof oil room, and a repair department, the latter being equipped with a drill press, lathe, hydraulic press, grinder and riveter, all electrically driven. In addition to these devices, the plant is also equipped with four-wheeled trucks for handling the batteries and a steam pump having a pressure of 60 lb. for cleaning the batteries. The elevator is 10 x 14 ft. and has a carrying capacity of 6 tons. All floors are heated by steam and equipped with a warm water system for cleaning the vehicles.

Two charging outfits, installed in a specially constructed room are utilized for charging the batteries. The larger set connects with forty-nine outlets installed on the first floor, and the smaller one with seven outlets located in the basement. The forty-nine panel set cost the company approximately $38,000. With these fifty-six outlets the company is able to charge 125 truck batteries during one night, allowing each battery between 3 and 5 hours.

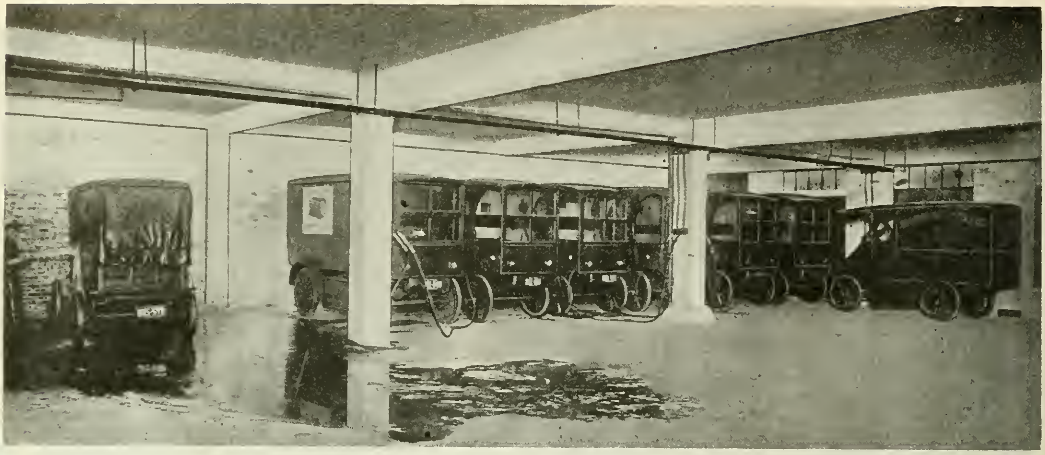
One corner of the basement, showing a portion of the storeroom where a large stock of electric truck parts and battery parts is kept for the convenience of the truck owners making use of the maintenance and battery service

Twenty-nine Men Employed

A force of twenty-nine employees is employed regularly to operate the garage, the men working on a night and a day shift. On the day shift five men are employed in the battery room, one foreman, one floor man, one mechanic, two inspectors for field work, four clerks and an office manager. During the night one foreman is employed, one charger, two mechanics, two shifters, two flushers, one oiler and three field inspectors. In addition to being able to give its customers efficient service and increase its cell sales, the operation of the garage has enabled the company to reduce its inspection force less than half. Heretofore the company employed a large force of field inspectors whose work it was to call upon the various truck owners and inspect the batteries about once a month. Now the greater portion of this work has been eliminated, the vehicles now being brought to the garage during the slack periods. This method saves the truck owner much time.

The Garage System

The system under which the garage is operated is very efficient, having been worked out to the extent that .t covers every detail involved in the housing, charging, repairing, etc., of the trucks. A clock system is employed for recording the vehicles as they come in or are taken out of the garage. The daily time card is also utilized for other work such as recording the number of cells charged, flushing, battery inspection and repairing, washing, polishing, oiling, greasing, vehicle inspection and repairing. At the end of each day the record from the



One corner of the second floor where the trucks with panel bodies are garaged. The trucks are lined up along the walls and have their batteries charged from the front end. A special washstand is provided, as shown at the left, and the trucks tentions as to what work was done and when. This leads to satisfied customers

daily time card is transferred to the monthly record sheet. This record sheet is made up in book form of twelve pages, one for each month of the year. One of these books is kept on file for each truck. A copy of the record sheet is shown on this page.

How Owners Are Served

A rule adopted by the company is that no driver is allowed to touch or shift his or any other trucks in the garage. The garage employs shifters to do this work exclusively. For instance, when a truck owner signs a contract he states what time he desires the vehicle each day, this record being kept on a chart so that the shifter will know what time to have the truck at the entrance ready to be turned over to the driver. Then, when the truck is returned at night, the driver runs it to the entrance, where it is turned over to the shifter, who places it in its proper location for the night. By following this system the damage to other vehicles has been entirely eliminated.

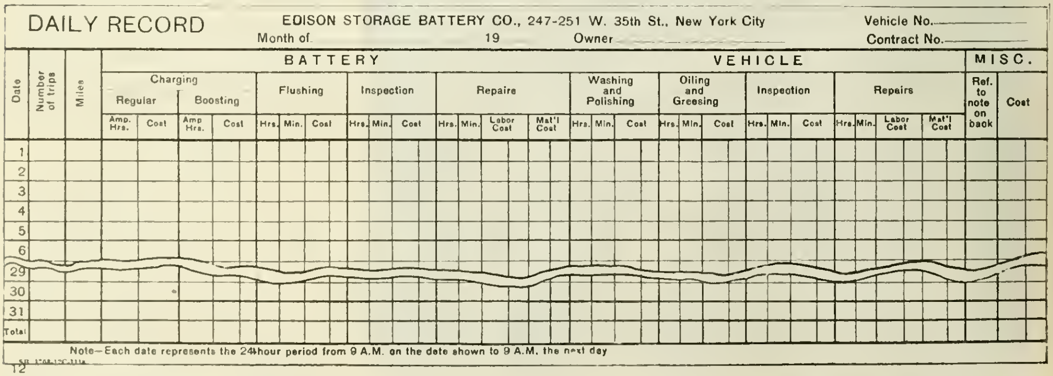
Another strict rule is that of having the employes follow instructions, thus enabling the garageman to give the truck owner efficient service. For instance, if a truck is to be at the garage entrance at 8 o'clock in the morning in perfect condition, with batteries charged, etc., it is the work of the superintendent to see that the driver is not delayed when he reports. Although the building is only equipped with one elevator, the trucks are spotted so that those going out first are housed on the lower floors, the upper floor being reserved for the vehicles leaving later in the day. The trucks equipped with panel bodies are housed on the upper floors away from the heavy trucks which are never garaged above the second floor. This permits all of the trucks to get out of the garage on time every day and besides prevents damage to the vehicles.

CANADIAN LEGISLATION

TORONTO, ONTARIO, CAN., May 2—According to the following two amendments to the Ontario Vehicles Act cut-outs are banned, and mufflers are required on all motor vehicles. Also all motor trucks must be equipped with mirrorscopes:

1a—Every motor vehicle shall be equipped with a noise muffler, and no contrivance for releasing such muffler shall be attached to the motor vehicle so that it may be operated from any seat in the vehicle.

1b—Every motor truck shall be equipped with a mirror securely attached to it and placed in such a position as to afford the driver of such motor truck, while driving or operating the vehicle, a clear vision of the road in the back of said truck so that he can see any vehicle approaching from the rear.



DAILY RECORD

EDISON STORAGE BATTERY CO., 247-251 W. 35th St., New York City

Month of 19

Owner

Vehicle No.

Contract No.

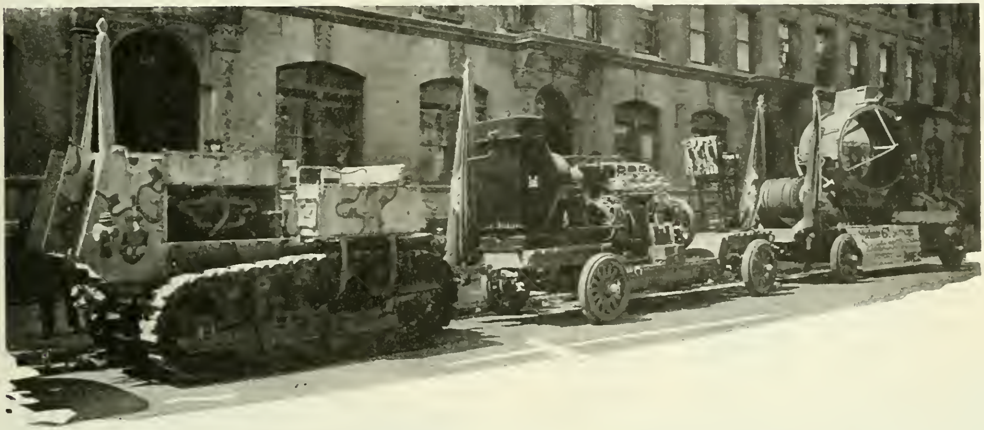
Date	Number of trips	Miles	BATTERY														VEHICLE													MISC.	
			Charging				Flushing			Inspection			Repairs				Washing and Polishing			Oiling and Greasing			Inspection			Repairs				Ref. to note on back	Cost
			Regular		Boosting																										
			Amp. Hrs.	Cost	Amp Hrs.	Cost	Hrs.	Min.	Cost	Hrs.	Min.	Cost	Hrs.	Min.	Labor Cost	Mat'l Cost	Hrs.	Min.	Cost	Hrs.	Min.	Cost	Hrs.	Min.	Cost	Hrs.	Min.	Labor Cost	Mat'l Cost		
1																															
2																															
3																															
4																															
5																															
6																															
29																															
30																															
31																															
Total																															

Note—Each date represents the 24-hour period from 9 A.M. on the date shown to 9 A.M. the next day

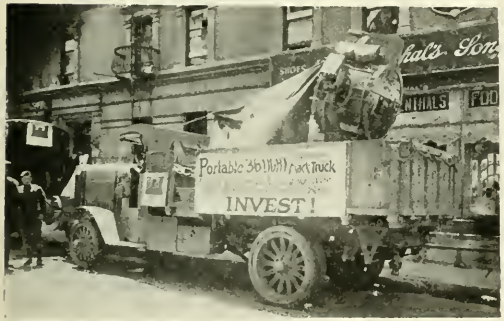
12

The daily record sheet which forms a permanent record of the repair work and battery service performed on each vehicle. This record is available to the truck owner to enable him to accurately check his monthly bills and thereby eliminate any contentions as to what work was done and when. This leads to satisfied customers

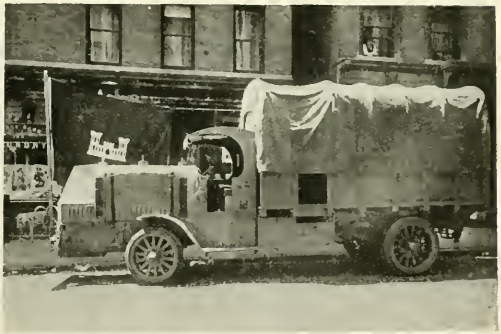
Victory Loan Parade Shows Many Truck Uses



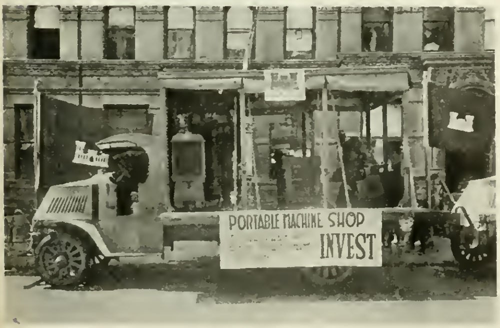
The first automotive parade in the world was held in New York City last week in aid of the Victory Loan. It was over 8 miles long and took 4 hours to pass the reviewing stand. Above are seen an Ordnance Department caterpillar type tractor, an Engineer Corps electric power plant and a searchlight, the two latter on trailers



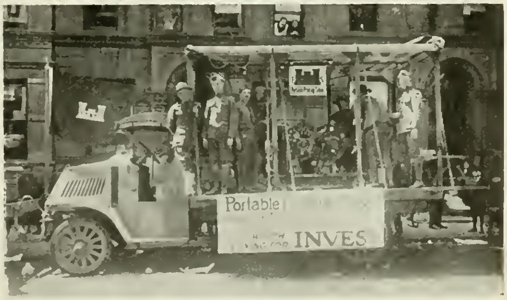
Here is one of the famous portable searchlights, mounted on an Engineer Corps Mack AC truck, which also supplies the current for operating the light at all times



Another view of the truck shown at the left. The electric generator for supplying the lighting current is mounted under the extended hood at the front of the truck chassis



This is an Engineer Corps portable machine shop, also mounted on a Mack AC truck. It is completely equipped and performed yeoman service in all of its work abroad



To keep up the morale of the boys, they had to have newspapers and this portable printing shop made newspapers possible, even close up to the firing lines

New Golden, Belknap & Swartz Engine for Trucks

Accessibility a Feature—Is Also Adaptable for Tractor Use —Designed to Handle Low-Grade Fuel—L-Head 3¾ x 5 In.

A NEW truck and tractor engine is being brought out by the Golden, Belknap & Swartz Co., Detroit. The four-cylinder engine is 3¾ by 5-in. and known as the AA, designed to handle low-grade fuel. It is a new product in every respect and incorporates the most up-to-date features of design, especially from the standpoint of service.

The engine is laid out so it adapts itself to trucks and tractors and will fit the individual requirements of the various chassis. As an example, the carbureter can be mounted on either side. Thermo-syphon or pump water circulation can be employed, and battery or magneto ignition is suitable, driving facilities being arranged to take care of either.

If the engine is used in tractor service, an oil cooler can be fitted, and if it is desired to mount a governor, there is a vertical shaft with a slotted end to take the governor drive and a flange face upon which to mount it. The engine is a fixed-head type with removable water header. Both halves of the crankcase are aluminum and the cylinders are cast in a block of gray iron.

The piston has cut in it two annular grooves, together with drilled holes, which act as oil retainers and serve to keep the oil from working by the piston, thereby eliminating spark plug fouling. The piston pin is anchored in the boss, and the weight of the piston complete with wristpin is 3 lb. 1 oz. The length of the piston is 3¾ in. The wristpin bearing is 1½ in. wide and 1 in. in diameter. These large bearings seem ample to eliminate loose bearing trouble.

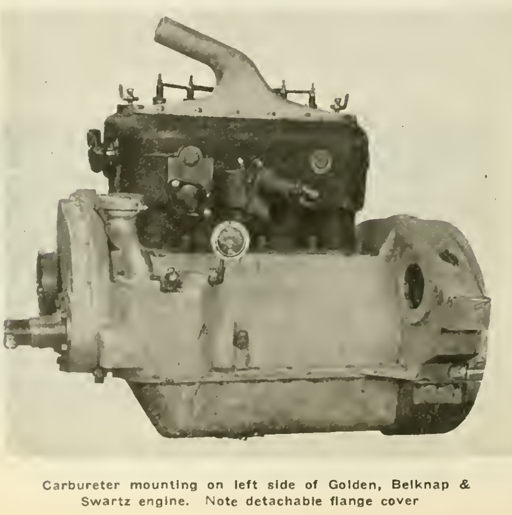
The connecting rods are 10¼ in. in length, center to center. They are machined quite closely for light weight. The weight of the connecting rods is 2 lb. 4 oz. They are provided with lower bearings, 2 3/16 in. in width and 1⅞ in. in diameter. The crankshaft is 2¼ in. in diameter and is carried on three main bearings, the front being 3 in. in length, the center 2½ in., and the rear 3 in. Both the main bearings and the connecting rod bearings are bronze-back, babbitt lined.

Lubrication is by full pressure system, with no splash. The oil pump is driven off the water pump shaft and is a gear type. It is mounted outside and thus can be removed readily for inspection. The pump delivers oil under pressure regulated to suit requirements as regards pressure. There is provision for mounting the oil gage on the dash. The pump has a regulation feature that is very accessible. It permits of the regulation of the oil pressure with a screwdriver and a small wrench. Under ordinary conditions the oil is fed under pressure of 15 lb. a square inch. The oil leads are self-contained, taking oil from the pump direct to each one of the main bearings and another lead for pressure to the pressure gage. The crankshaft is drilled through the cheeks to the crankpin, which is drilled to feed the oil to the lower connecting rod bearing. As the oil is fed under pressure and supplied to the bearings in quantity, there is a marked spray off the lower end of the connecting rod which lubricates the cylinder walls. In ordinary practice the engine oil is cooled by pump circulation. The bottom portion of the crankcase being aluminum, considerable heat is radiated. The rapid circulation of the oil, together with heat lost in the crankcase, insures a cool supply of oil.

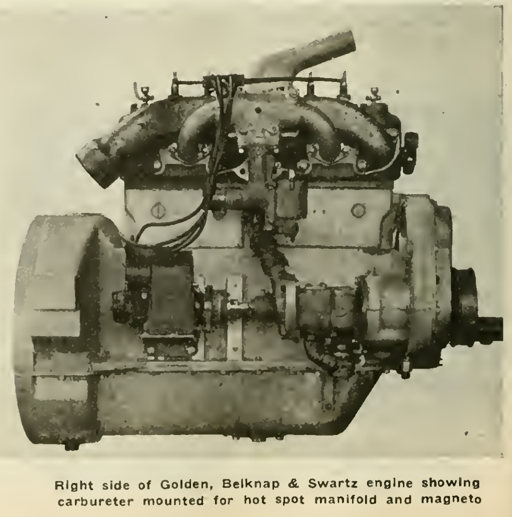
The three bearings for the camshaft are die-cast babbitt. The main and connecting rod bearings have the new Muzzy-Lyon babbitt adjustment in place of shims. This is a solid piece of babbitt metal of the thickness of the ordinary group of shims, but has the advantage that it can be inserted beyond the inside of the bearing and then burnished out to form a part of the true bearing surface, eliminating the ordinary outlet for the oil which exists in the shimmed bearing. When necessary to adjust the bearings the babbitt can be filed down to any amount, permitting very accurate settings of the bearings.

The main bearings are supported in the crankcase, the center bearing being very heavily ribbed to give the desired stiffness and continuity of alignment. Each of the main bearings is held in place by four alloy steel stub bolts with castellated nuts, cotter-pinned into position. The timing gears are helically cut and are steel against semi-steel. The camshaft is on the right side of the engine and is an integral forging with exceptionally large bearings.

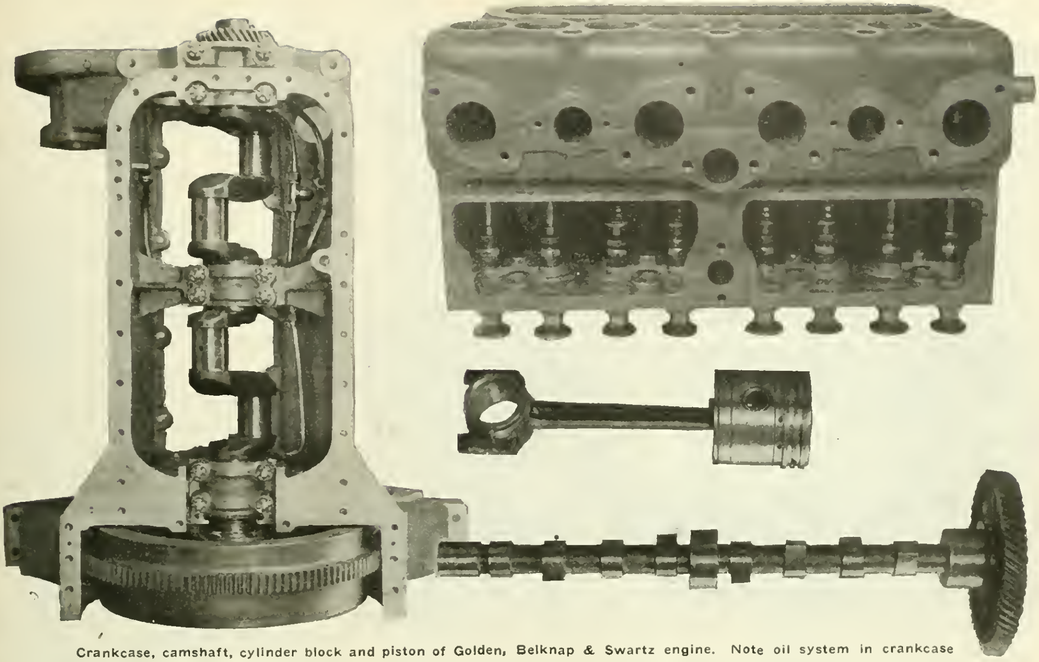
The valves are driven through mushroom tappets, the tappet guides being locked by spiders bolted to the crank-



Carbureter mounting on left side of Golden, Belknap & Swartz engine. Note detachable flange cover



Right side of Golden, Belknap & Swartz engine showing carbureter mounted for hot spot manifold and magneto



Crankcase, camshaft, cylinder block and piston of Golden, Belknap & Swartz engine. Note oil system in crankcase

case. Adjustment is made by means of a stud screwed into the end of the tappet and locked by a locknut. The valves have a port diameter of 1 11/16 in., and have a lift of 23/64 in. The valve passages are clear and of ample size.

The course of the intake gases depends on the side of the engine on which the carburetor is mounted. When the mounting is on the right side, the hot spot manifold is used with the intake partially integral with the exhaust, securing the necessary pre-heating effect. If the carburetor is mounted on the other side, the intake passes between the cylinder blocks. It then is carried around by an elbow to the upper inlet passage and thence into the cylinders. Practically all the intake manifolding is contained within the castings.

No accessories are furnished with the engine, but the engine itself is designed to take all that usually is mounted on the truck and tractor powerplant. The mounting is three-point suspension, and the over-all dimensions are 34 1/16 in. long by 31 in. high by 23⅛ in. wide.

The engine is produced with three S. A. E. bell housings as standard. The starting motor is provided for in that the flywheel is equipped with cut teeth for the starter pinion. There is a generator mounting of the timing gear housing on the right side of the engine, if the magneto is used, or, if the magneto is not used, the generator can be mounted on the shelf in place of the magneto. These locations for mountings of the auxiliaries give the engine a very elaborate and elastic make-up for truck and tractor purposes.

The general power characteristics of the engine from tests on the fan dynamometer give 42 hp. at 1600 r.p.m., with the maximum torque at 800 r.p.m. The governed speed is 1400 r.p.m. The weight of the engine without the ignition system and the carburetor is 410 lb.

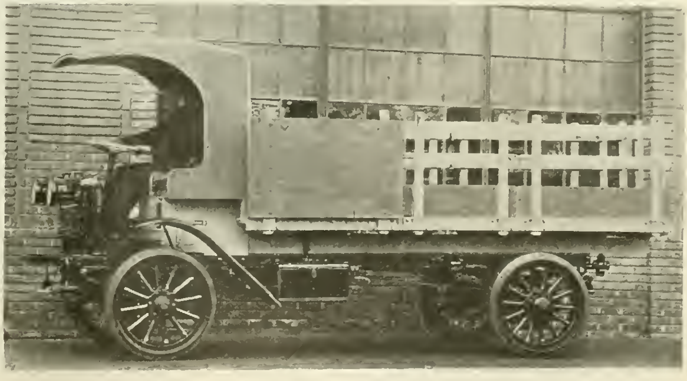
New Long Wheelbase Autocar

THE Autocar Co., Ardmore, Pa., has added a 120-in. wheelbase chassis costing $2,150. This compares with $2,050 for the standard 97-in. wheelbase chassis. Both are rated at 1½ to 2-ton capacity. The shorter wheelbase will accommodate bodies up to 10 ft. in length and the longer, bodies up to 12 ft.

The new chassis is identical in construction with the standard chassis except that longer frame members, brake cables and driveshaft are used, and an extra cross member added at the front end of the rear side springs.

The two-cylinder, horizontal double-opposed engine is mounted under the seat as before and is of the same dimensions, 4¾ by 4½ in., developing 18.1 hp.

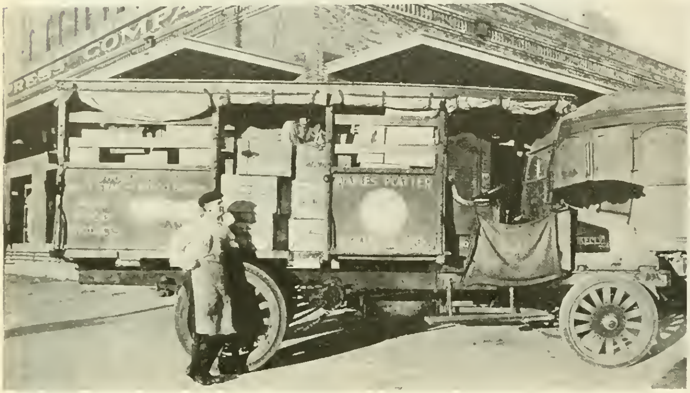
The accompanying illustration shows one of the new chassis equipped with a stake body.



New 120-in. wheelbase Autocar

Southwest Wholesale Grocer Doubles Delivery Radius by Installing Motor Trucks

Better, Quicker and Cheaper Service Secured by Discarding Horses



The Kelly-Springfield 3½-tonner used mostly in hauling goods between the freight terminals and the Waples-Platter warehouse. Note that a side-door body is fitted for easy loading and unloading

WHEN the business of the Waples-Platter Grocer Co. increased, the company found it impossible to handle the additional orders by means of its horse-wagon equipment. It then tried hiring horse-wagons to do its work, but this too did not meet the conditions of the work satisfactorily so that it finally motorized its deliveries by purchasing trucks of its own. It now maintains four trucks in addition to three two-horse wagons, the latter being used for nearby deliveries. The trucks have replaced twice the number of horse-wagons and have taken care of the new business by making it possible to approximately double the delivery radius.

The Waples-Platter company is located in Dallas, Tex., and is engaged in the wholesale grocery business. It does not sell to the consumer but to the retail grocer, to whom its trucks deliver all sorts of groceries.

The Fleet Make-up

The company's truck fleet is made up of three 2-ton trucks and one 3½-tonner. The 3½-ton truck is a Kelly-Springfield. One of the 2-tonners is an Acme and the other two, Republics.

The Kelly was the first truck purchased, having gone into service in 1913. The two Republics are now 3 years old and the Acme a little over 1 year old.

The work of the Waples-Platter company may be divided into two parts. One is the haulage of groceries from various Dallas railroad terminals to the company's warehouse. The other work is the delivery of groceries in smaller quantities to the various retail grocers as ordered. Because of its large capacity as compared with the other trucks of the fleet, the Kelly 3½-tonner is employed for the freight haulage work and for getting shipments of perishable food products from the cold storage warehouses in East Dallas, 3 miles away, and in South Dallas, approximately 2 miles away. It is in this haulage from the cold storage plants to the company's warehouse that the trucks have shown their greatest superiority over the horse wagons. This is due to the fact that no stops are made on the trips, they being simply a matter of picking up the complete load at one end and delivering it at the other end.

Trucks Reduce Cost of Work

In the haulage from the cold storage plants, the company's Kelly truck had handled the increased business at one-third of the cost as compared with the horse transfer and in one-third of the time.

The company's 2-ton trucks are used for the city delivery. They run on no specified routes but are sent wherever orders are obtained. These orders are generally received by telephone and the goods made up into truck loads which can be delivered on one trip without an excess of empty mileage. The trucks each average about three loads a day and cover approximately 50 miles in completing the three trips. None of the deliveries near the company's warehouse are made by the trucks, the close-in work being reserved for the company's two-horse wagons, of which three are still retained in addition to the truck fleet.

The roads in the suburbs south and southwest of Dallas are very muddy and the trucks are not sent into the worst of this muddy territory except when the horse-wagon falls down too badly.

Delivery Radius Doubled

With horse-wagons, the company's delivery radius was approximately 4 miles. By trucks it has been practically doubled and deliveries are made as far distant from the company's warehouse as Record Crossing or White Rock, each approximately 8 miles away.

On the city and suburban deliveries made by trucks, each of the vehicles averages about twenty stops to the trip. While this large number of stops would seem to call for the use of a helper on the truck in order to reduce the idle standing time during deliveries and thereby permit the vehicle to cover a greater mileage daily, the Waples-Platter company has found side-door delivery bodies more economical than helpers.

As shown in the three illustrations of the Kelly-Springfield and Acme trucks on this and the opposite page, each is fitted with an eight-post body with high side panels and a permanent top with roll curtains which may be dropped down and buttoned in place during inclement weather.

Side-Door Bodies—No Helpers

The space between the two center top posts on each side is left free to serve as a passageway from which goods may be unloaded directly onto the curb from the side of the truck. This permits the driver to load his body from both ends toward the middle instead of from the front to the rear as is the case when rear-end delivery is employed exclusively. This method of loading the goods and the subsequent unloading in the reverse manner enables the driver to get at each delivery in order without having to disturb the remainder of the load.

The general practice in unloading the body is to place the various boxes and crates directly on the sidewalk in front of the store of the retail grocer from where they are carried into the store by one of the clerks after having been checked with the driver's bill of lading. In this way, the side unloading body, which results in no expense after the initial price has been paid, has been found to be more economical than hiring a helper on each truck. The crates and boxes are prevented from falling out of the side-door openings while the truck is

Another view of the Kelly-Springfield 3½-tonner, showing the side-door delivery body and side roll curtains. The built-in windshield has been removed for the summer months. No helpers are employed

in transit by means of removable vertical side stakes in the case of the 2-ton trucks and by horizontal chains on the Kelly-Springfield 3½-tonner.

While speaking of the truck bodies, it is to be noted that built-in windshields are provided on the trucks with curtains for the cab sides. These windshields were not originally fitted, but have paid for themselves over and over again by the greater comfort afforded the drivers during the cold weather. In the illustration of the Kelly-Springfield truck at the top of page 34, it is to be noticed that the driver has rigged up a bag as a temporary side door at the right side of the cab next the steering wheel to prevent the sweep of the cold air clear through the cab from one side of the truck to the other.

Both of the trucks in the suburban delivery and freight work have given a much more satisfactory service than was possible with the horse wagons previously used. This has been especially the case in the freight work, where the Waples-Platter company had to assume its own responsibility for breakage even when the horse wagons doing the work were hired from an outside company. The breakage of goods handled by the company's own trucks has naturally been less than was the case when an outside concern handled the goods, since they are under the company's own authority from the time they are picked up at the railroad terminal until they are delivered to the company's own warehouse or to the retail grocer when large shipments on one order are received.

Trucks Give Better Service

The Waples-Platter company has also been able to secure a far better service from its own vehicles than from those of another company since the former can dispatch its own trucks to do the work whenever desired and does not have to wait until somebody else's work can be completed.

Aside from these advantages of better service and a reduction in breakage, the company's trucks have been able to reduce the cost of the haulage. When horse wagons were used, the company had to pay at the rate of 25 cents a package, and this rate, together with the large number of miscellaneous packages comprising a grocery shipment, made the cost comparatively high in relation to the expense of doing the work on a bulk or cost per day basis as with the company's own truck.

The trucks are garaged in one of the Waples-Platter buildings where all minor repairs and adjustments are made. When repair work of any magnitude has to be done, it is performed by the service stations of the three makes of trucks in the Dallas territory.

The Waples-Platter 2-ton Acme used for city and interurban deliveries. It too is fitted with a side-door body for ease in making deliveries since no helpers are employed. Note the built-in windshield and the cab side curtains to protect the driver during the stormy winter weather

Colored drivers are employed on the 3½-ton Kelly-Springfield and on the three horse wagons still retained. White drivers are hired for the remaining three 2-ton trucks used for the city and suburban delivery work. The white drivers are paid at the rate of $20 a week and the colored drivers on the truck used in the freight work at $18 a week. The team drivers are paid $16 a week. All are bonded to the extent of $1,000 each to prevent losses due to theft of goods while in transit on the trucks either from the railroad terminals to the company's warehouse or to the cold storage plants or while being delivered to grocers.

Costs $10.23 Daily

A rough estimate of the cost of operating the 3½-ton Kelly-Springfield truck in the freight haulage work and on an average mileage of 25 a day shows a total daily cost of $10.23. This cost is determined on an initial cost of truck body and equipment of $4,200 with a useful life of 5 years.

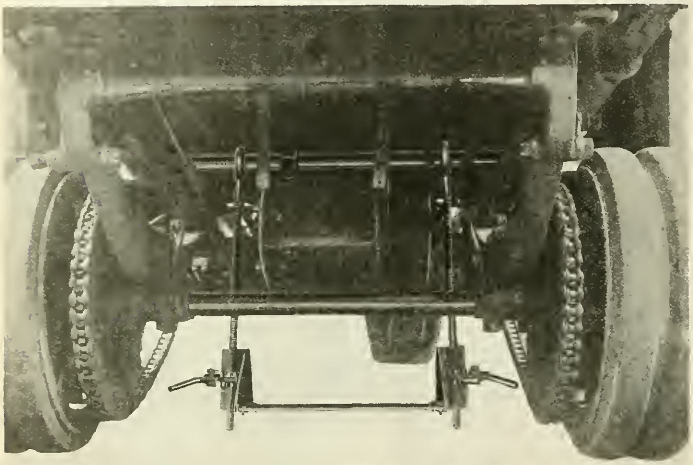
Approximate Cost Figures

The various items of cost total somewhat as follows:

Driver	$3.00
Gasoline, 5 gal. at 25 cents per gal.	1.25
Oil	.10
Repairs, at 2 cents a mile........	.50
Garage	1.00
Tires at 3 cents per mile, 25 miles	.75
Depreciation at 20 per cent.......	2.33
Interest on investment at 6 per cent	.70
Insurance	.50
License	.10
Total	$10.23

Accurate cost records were not maintained by the Waples-Platter company, but the above figures are a good approximation of the cost of operation, which is not extremely low when it is considered that the truck averages only 25 miles a day in the freight haulage work.

Removing Electric Motors and Preventing Tail Light Breakage



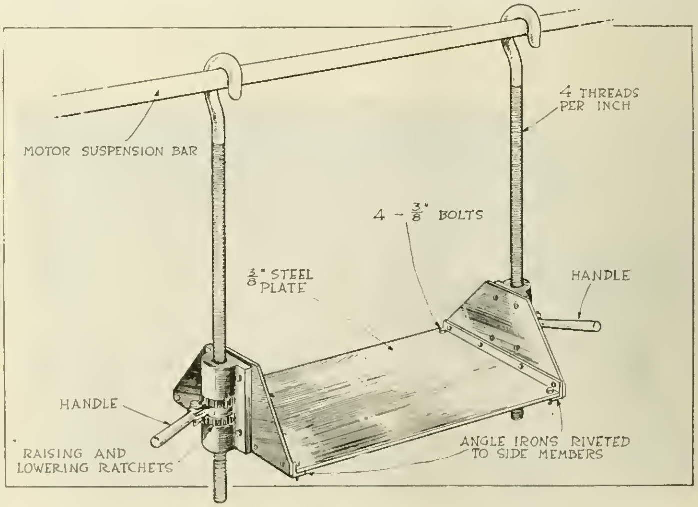
Electric Motor Removed in 10 Minutes

There is no need for dismounting the body or using a block and pulley for motor removal by this method, as this device can lower or lift the motor by means of a simple ratchet arrangement and a steel plate used as a support or cradle. Note how the cradle is suspended on two hooked rods slipped over the transverse bar regularly fitted to support the motor

IN the maintenance of a fleet of electric trucks the motor of a truck must be overhauled about once a year. As these motors weigh from 500 to 1000 lb. apiece, depending upon the size, it is obvious that in removing one for repairs, much time and energy will be consumed if some suitable contrivance is not used in lifting it. In most cases, the body must first be taken off so as to lift it off with a block and pulley. If this is not done, then there must be a trap door arrangement above the motor and the block and pulley used that way. All this takes time, and as a result, C. M. Geiger, superintendent of the motor truck fleet owned by the Peter Doelger Brewing Co., New York City, has designed a device that will enable the repairmen to take down the electric motors without going through all of the above-mentioned trouble.

The motor is lowered to the ground by means of a cradle arrangement hung on the crossing motor supporting bar regularly provided above the motor and attached to the motor casing by two legs, one at each end. The new device consists of two hooked supporting bolts, threaded to within an inch of their hooked upper ends, and a $\frac{3}{8}$-in. steel-plated cradle supported at each end by a ratchet arrangement working on the threaded bolts. The cradle is raised and lowered by the two ratchets in the same manner that a tire jack is worked. The motor is lowered by raising the cradle or resting plate until it is directly under the motor, which is then loosened from the supporting bar above. The motor, being free from its supporting bar, is then ready to be lowered to the ground by means of the lowering ratchets. After it is repaired, it is mounted on the truck just as easily by revising the various steps in the take-off process.

The whole operation, either in taking out or installing, takes little more than 10 minutes' time, as compared with 1 hour or more for the time-consuming method of taking off the body or by using a hook and block and fall through a trap door in the floor above. Though this device is made for one size of motor at the Doelger garage, it is possible to use wider or smaller plates.



Motor Lifter Works Like a Tire Jack

The cradle is lifted by simply oscillating the handle of each ratchet working on the threaded supporting arms. The lowering of the cradle is accomplished by the reverse method, another pair of ratchets being used

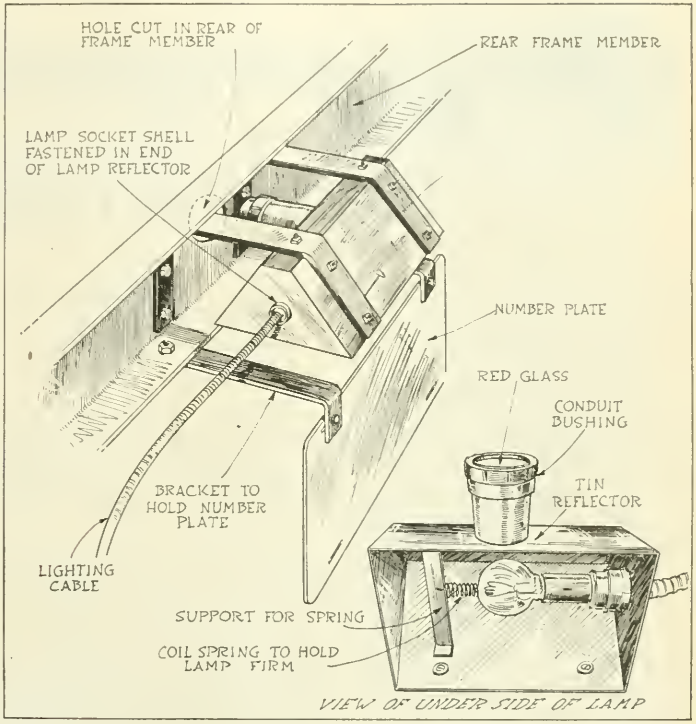
Protection for Tail Lights

Device Prevents Breakage of Lamps When Trucks Are Backed Up to Loading Platforms

ANOTHER device which the Doelger company has found it expedient to install on its electrics, not on account of its being a time saver but because of its insurance against tail light breakage, is the arrangement illustrated on this page. Before it was installed, the repairmen were constantly busy mending smashed tail lights, the accidents occurring when the trucks were being backed up to the loading platform or other places along the drivers' routes. It was found that the location of the tail light beyond the frame made it practically impossible to avoid these accidents, no matter how careful the driver was. As a result, Mr. Geiger devised the scheme of placing the lamps back of the frame, where they were protected.

The device consists of a tin shade which houses an electric bulb and socket and a projecting tin tube for holding the red warning glass. The light from the bulb not only reflects through this tube out through a hole cut in the rear frame member but also throws its beams down on the number plate, a little in back of the shade.

The device costs little and is easy to construct. The number plate is held by two supporting brackets which are bolted to the frame.

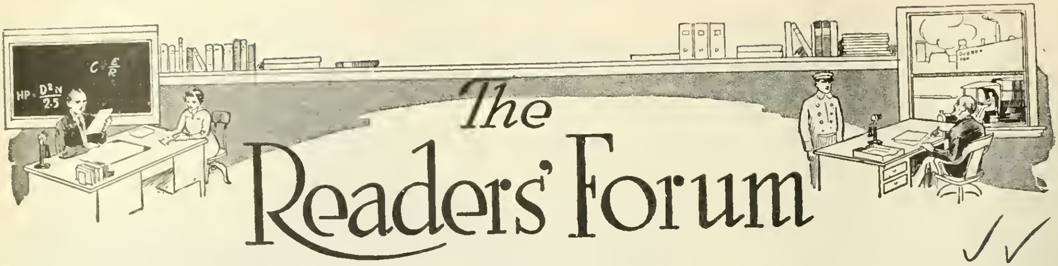

HOLE CUT IN REAR OF FRAME MEMBER
REAR FRAME MEMBER
LAMP SOCKET SHELL FASTENED IN END OF LAMP REFLECTOR
NUMBER PLATE
RED GLASS
CONDUIT BUSHING
TIN REFLECTOR
BRACKET TO HOLD NUMBER PLATE
LIGHTING CABLE
SUPPORT FOR SPRING
COIL SPRING TO HOLD LAMP FIRM
VIEW OF UNDER SIDE OF LAMP

Backing Trucks Can't Break This Tail Light

Protected by the rear frame member, there is little chance of accidents occurring to the tail light when thoughtless drivers back into platforms or other projections. This device costs little and is easy to construct

A Contrast in the Protection of Truck Tail Lights

In one, the tail light is fortified against breakage during the backing up of the truck by the light being placed ahead of the rear frame member. In the other, as shown at the right, the tail light is placed back of and below the frame rear cross member, where it is in an unprotected position. The method of protecting the lamp is clearly shown in the sketch at the top of this page



The Readers' Forum

VERTICAL-LIFTING TRUCK BODIES

Thomas Wright and Myers Machine Co. Have Both Made Such Equipment

To the Editor, COMMERCIAL VEHICLE:

About 1½ years ago the writer noticed a description in THE COMMERCIAL VEHICLE of an elevating body mounted on a four-wheeled trailer. The body was elevated vertically and could be moved to a height of 7 ft. Will you please give us a list of the names and addresses of the manufacturers of such bodies and, if possible, tell us whether they manufacture a body which can be mounted on a semi-trailer and elevated from 6 to 7 ft. above the ground.—SCHULER & BAUER CO., Louisville, Ky.

Most elevating truck bodies, or those which are moved vertically upward for unloading instead of being pivoted at one end and moved about the pivot shaft for unloading, are generally made on special order.

However, as described in THE COMMERCIAL VEHICLE for July 15, 1917, the Thomas Wright Co., Jersey City, N. J., built an elevating body mounted on a 5-ton Troy trailer, owned by the C. W. Munson Farm at Roslyn, Long Island, N. Y. That particular body was elevated by means of four screw hoists, two at each end. The two screws at each end of the body are revolved at the same speed by means of suitable gearing and a longitudinal shaft extending from one end of the body to the other. The longitudinal shaft is driven by means of a small one-cylinder 4 hp. New Way air-cooled type of gasoline engine. The body may be elevated for a full height of 7 ft. off the trailer frame in less than 1 minute's time.

The Myers Machine Co., Sheboygan, Wis., maker of the Wisconsin line of motor trucks, is offering a somewhat similar type of elevating body for use on its 5-ton chassis. The Myers body and its method of operation were described in greater detail on page 28 of THE COMMERCIAL VEHICLE for Sept. 1, 1917. The body is lifted vertically by means of a hoist at the front end. As the hoist is operated the ram moves upward out of its cylinder, lifting the front end of the body. The rear end is similarly elevated at the same rate of speed by means of an endless steel cable, the ends of which are fastened to the opposite sides of the front end of the body with take-up screws for adjustment to offset any cable stretch. On each side the cable is run downward to a pulley on the chassis frame directly aft of the driver's seat and thence to two other sheaves at the top and bottom of each rear standard. The cable runs over the top of the rear standard sheave and is then attached to the rear end of the body.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

STEEL TIRE BANDS FOR TRUCKS

One Maker Will Furnish Such Devices for 3½-Ton Truck for $200

To the Editor, COMMERCIAL VEHICLE:

Can you give us the names and addresses of the manufacturers of steel bands and patent clamps such as may be placed over the solid tires of motor trucks so that the vehicles can be used as road rollers for operating over crushed stone, etc., or employed in negotiating sandy roads. For our purpose the steel bands would have to be from 12 to 15 in. wide and fitted with clamp adjustments, permitting their easy attachment and removal.—S. B. HOWARD, Bethlehem Motors Corp., New York City.

The only manufacturer of the type of bands about which you inquire, as far as we know, is George A. Crane, manager of the Garford Motor Truck Co., Inc., Twenty-third Street and Indiana Avenue, Chicago, Ill.

Mr. Crane advises THE COMMERCIAL VEHICLE that patents have been obtained on his equipment, which was described in great detail on page 22 of THE COMMERCIAL VEHICLE for March 15, 1919. He also states that the equipment for any size of truck could be furnished in about 2 or 3 weeks after the receipt of the order, provided it was evident that the device would give satisfactory service in the work to which it was proposed to put it.

The cost of a complete set of removable bands, not installed, for 3½-ton trucks would be $200, f.o.b. Chicago. The bands for the front wheels would be 8 in. wide and those for the rear wheels 18 in. wide. The price does not include cleats.

Mr. Crane further states that he has not attempted to furnish any such equipment for the market up to this time, and retains the privilege of either refusing or accepting orders which might be sent in from prospective purchasers.

DATA ON COSTS AND OPERATION

Determination of Truck Costs Depends on the Particular Installation

To the Editor, COMMERCIAL VEHICLE:

I am desirous of studying motor hauling problems, so that the utmost efficiency can be obtained if a given number of trucks are operating under different conditions of loads and roads. I am particularly interested in the cost of truck operation and will appreciate any suggestions you may make as to useful printed matter and the names of standard books on the subject of motor truck haulage.—SGT. G. S. LINTHICUM, Office Director Motor Transportation, A. E. F., France.

It is most difficult for us to give you any figures regarding motor truck cost of operation since we maintain that each truck installation must be considered as a separate and distinct unit before any worth while cost estimates can be prepared. Actual cost figures on motor trucks employed in different parts of the United States are given in almost every issue of THE COMMERCIAL VEHICLE.

There were two particularly good motor truck cost articles in the April 15 issue of THE COMMERCIAL VEHICLE. The first article, entitled "Big 8 in Truck Operation," shows how the various items entering into the actual cost of maintenance and operation compare with one another, and how the total cost of operation is almost equal to the initial cost of the truck and its body.

The second article mentioned, entitled "How Fleet Owners May Keep Their Motor Truck Costs in a Simple Yet Adequate Manner," gives the average yearly operating costs of six 3½-ton Wilson trucks used in Detroit. It is also brought out that the actual operating costs of the average motor truck engaged in public haulage must be approximately doubled to take care of idle truck time, non-capacity loads, cost of doing business, office rent, etc., in order to enable the owner to make a profit of from 10 to 15 per cent on his capital invested.

THE COMMERCIAL VEHICLE also published a standard cost keeping system for motor trucks.

There are very few standard reference books written exclusively about the use of motor trucks. Several of these are as follows:

"The Motor Truck As An Aid to Business Profits," by S. V. Norton. The book was first published by the A. W. Shaw Co., Chicago, Ill., during the year 1918, and sells at $7.50 net.

"Horse, Truck and Tractor," by H. N. Casson, L. W. Ellis and R. W. Hutchinson, Jr., published by F. G. Browne & Co., Chicago, Ill., in 1913. The price of the book is not known.

"Motor Truck in Business," by Waldemar Kaempffert, published by the McClure Publications, Inc., New York City, during 1917, and distributed gratis.

There is considerable information regarding the design and construction of motor truck chassis and the combination of truck parts in "The Modern Gasoline Automobile, Its Design, Construction, Maintenance and Operation," by Victor Pagé, published by the Norman W. Henley Publishing Co., New York City, in 1918. It sells at $3 per copy.

DATA ON DEMOUNTABLE BODIES

Many Articles Show Use and Benefits of Special Time-Saving Bodies

To the Editor, COMMERCIAL VEHICLE:

We know you have published several articles in your paper regarding the use of removable bodies by wholesale grocers or similar lines, but are writing to ask that you tell us the dates when these were published as we cannot seem to locate them. We would appreciate it if you would also point out any other articles which you have published from time to time on the use of demountable bodies in any line of business.—E. M. STERNBERG, Sterling Motor Truck Co., Milwaukee, Wis.

There are just two articles which treat of the use of demountable bodies by grocery companies, and those appeared in the issues of July 15, 1914, and Feb. 15, 1916.

A short résumé of all of the articles on this subject which appeared in THE COMMERCIAL VEHICLE from time to time is given below:

April 15, 1914, page 23, contains an illustrated article descriptive of the method employed by the Royal Metal Furniture Co., Brooklyn, N. Y. Two demountable bodies are used in connection with one 3-ton Garford truck. The empty body is pulled off the chassis onto one end of an inclined platform entirely within the Royal company's warehouse and the loaded body similarly pulled onto the truck after the latter has run to the other end of the platform. The truck and the two bodies have replaced seven teams of horses formerly used and, in addition, have trebled the delivery radius of the company.

June 1, 1914, page 7, contains Part II of an article descriptive of the motor equipment of the New York City milk dairies, showing how the detachable semi-trailer bodies are employed to save loading and unloading time. While these bodies are not of the demountable type in the usual sense of the word, they nevertheless may be so considered, differing only in the fact that they are equipped with wheels suitable for street service instead of small rollers or other means of mobility.

July 1, 1914, page 14. This article describes the two demountable bodies, two small hand wagons and one 3-ton Packard truck in the service of the Kindel Bed Co., Brooklyn, N. Y. One body is loaded on the hand wagon inside the company's plant and then pulled out on the street and transferred to the truck chassis after the empty body has been removed from it onto the other hand wagon. The latter is then drawn into the plant and the body loaded while the truck is on its delivery route.

July 15, 1914, page 28, gives a short article descriptive of the novel demountable body in use by Brownell & Field, wholesale grocers of Providence, R. I. The body is fitted with rollers and with a special spring attachment for securing it to the truck frame. It is removed from the truck and put on it by means of an overhead telpher system which extends from the edge of the loading platform clear to the far end of the shipping and packing room.

Oct. 15, 1914, page 28, contains Part II of an article describing how the Curtis Publishing Co., Philadelphia, Pa., has been able to make its trucks pay large dividends on very short hauls by means of demountable bodies deposited on and lifted from the truck chassis by means of electric hoists. The demountable bodies are of two types, one with staked sides for the handling of bags of mail and the other of the steel V-bottomed type for the handling of coal. After the truck's work is finished in hauling the mail, the staked bodies are removed and the coal bodies fitted in their stead, thus enabling the same trucks to perform two vastly different classes of work. The hoists are fitted at both ends of some of the routes.

March 1, 1915, page 30, gives a short illustrated article describing the nest lumber body used by the Hawkeye Lumber & Coal Co., Cedar Rapids, Iowa. Transverse rollers are carried on the truck body platform and serve to enable the loaded or unloaded nest body to be pushed on or off the truck and onto an elevated platform of the same height as the truck platform.

June 1, 1915, page 5. The tractor and demountable semi-trailer equipment of the New York City Municipal Asphalt Plant is described in the article under this date. The equipment was the first of its kind and employs semi-trailers, which are loaded at the plant, pulled to the waiting tractors by means of small removable fore-carriages and then attached to the tractors. These haul them to the job, where other fore-carriages are employed and the trailers moved from point to point on the work by means of the steam rollers which finish the street surface. Meanwhile the empty trailers on the jobs are attached to the tractors and hauled back to the plant.

July 15, 1915, page 22. Part V of an article descriptive of the delivery equipment of the Loose-Wiles Biscuit Co., Long Island City, N. Y., in which it is pointed out how the efficiency of some of the company's trucks may be considerably increased by the use of nest bodies, nest loading bins and roller gravity conveyors for transferring the goods from the bins to the trucks.

Nov. 15, 1915, page 5, contains the concluding article regarding the demountable body equipment of the Curtis Publishing Co., Philadelphia, Pa., in which is described the method of removing the demountable bodies of the mail trucks of the company at the Broad Street Station of the Pennsylvania Railroad in that city.

Feb. 15, 1916, page 5, contains a complete description of the demountable bodies used by Haas, Baruch & Co., Los Angeles, Cal., wholesale grocers. The special equipment mounted on the trucks for removing the empty bodies and pulling the loaded ones aboard is shown, together with illustrations depicting the bodies in the course of being removed.

March 15, 1916, page 28. A short illustrated article on the demountable bodies which have practically eliminated the idle loading time of the motor trucks of the A. T. Stearns Lumber Co., Neponset, Mass. Two bodies are employed for each truck, one being loaded at the lumber yard while the other is on the truck making its deliveries. Ordinary four-wheeled wagons are used to transfer the empty bodies around the yard for the loading of the various lengths of lumber, etc. The loaded body is then transferred to a beam device, which is elevated by means of screw jacks so that the truck may back under it. The empty truck body is previously unloaded on a similar device, from which it is deposited on to another four-wheeled hand wagon.

MORE ABOUT ROAD GRADES

Grade of 100 Per Cent Is Equivalent to Angle of 45 Deg.—Data in Table

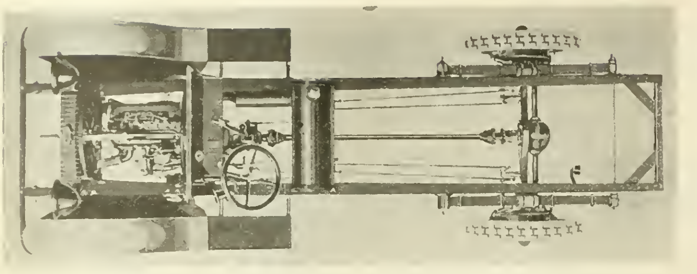
To the Editor, COMMERCIAL VEHICLE:

On page 37 of THE COMMERCIAL VEHICLE for Feb. 1, 1919, there appeared a table giving the difference between degree and per cent of grade as calculated by the Troy Wagon Works Co., Troy, Ohio. The table showed a grade of 100 per cent as equivalent to an angle of 90 deg. Will you kindly tell us if it is customary to consider a grade of 100 per cent as equivalent to an angle of 90 deg. or an angle of 45 deg.? With the definition of the term grade as the vertical rise in feet to every 100 ft. travelled horizontally, it would appear that a grade of 100 per cent would be equivalent to an angle of 45 deg.—D. D., Milwaukee, Wis.

The Troy Wagon Works Co. admits that the table mentioned was not based on the generally accepted definition of the term grade, meaning the ratio between the feet rise vertically in every 100 ft. travelled horizontally. In common practice, a grade of 100 per cent is equivalent to an angle of 45 deg.

The per cent of grade and the equivalent angle in degrees and minutes at the 5 per cent increments from 1 to 100 per cent of grade are as follows:

Per Cent of Grade	Angle of Grade		Per Cent of Grade	Angle of Grade	
	Deg.	Min.		Deg.	Min.
1	0	34	55	28	49
5	2	52	60	30	58
10	5	43	65	33	1
15	8	32	70	35	0
20	11	19	75	36	52
25	14	2	80	38	40
30	16	42	85	40	22
35	19	17	90	41	59
40	21	48	95	43	32
45	24	14	100	45	0
50	26	34			



Plan view of new 1½-ton Commerce truck, internal-gear driven

New Commerce 1½-Tonner Is Equipped with Pneumatic Tires

COMMERCE SPECIFICATIONS

Capacity, tons	1½
Price	$1,895
Wheelbase, in.	126
Tires, front	36 x 6
rear	36 x 6
Bore, in.	3¾
Stroke, in.	5
N. A. C. C. hp	22.5
Speed, r.p.m.	2200
m.p.h.	30
Gear ratio in high gear	7 to 1
Final drive	Int. gear

IN keeping with the development of pneumatic cord tires for motor truck use, the Commerce Motor Car Co., Detroit, is now equipping its 1-ton model with 36 by 6-in. pneumatics all around. The increased cushioning effect of the pneumatic tires has enabled the company to increase the rated capacity of this model from 1 to 1½ tons with a ½-ton overload capacity. The 1½-tonner, with few exceptions, is identically the same as the 1-ton model. The model E 1-ton chassis with solid tires lists at $1,500. This same chassis, with 35 by 5-in. pneumatic cord tires, lists at $1,625, and with 36 by 6-in. pneumatic cord tires, enabling a 1½-ton capacity, the list price is $1,895. The 1½-tonner is known as Model EP, and differs from its predecessors only in the equipment of Eisemann ignition instead of Splitdorf and the dropping of the use of a governor.

The Continental Red Seal four-cylinder engine has a three-bearing crankshaft and is mounted under the hood. The cylinders are cast in block and the valves are placed at the left. The engine is a unit with the Detroit gearset, the power being transmitted by a tubular propeller shaft of nickel steel, which is connected with two Spicer universal joints to the Torbensen internal gear-driven rear axle. The load is carried entirely upon an I-beam axle, the power being transmitted through live shafts. The axle is fitted with Timken bearings. Both the propulsion and torque are taken through the half-elliptic springs made by the Detroit Steel Products Co. These are made of silico manganese and are bronze bushed. The front springs are 36 by 2¼ in. and the rear 50 by 3 in.

Cooling is taken care of by a vertical finned tube radiator, made by the Long Mfg. Co. The radiator case is cast iron and removable. A thermo-syphon system is used for water circulation. A Zenith carbureter is used and fuel is fed by vacuum from a tank under the seat.

Ignition is taken care of by a single high-tension Eisemann magneto with fixed spark control. Starting and lighting are taken care of by a Bijur 6-volt generator and Willard 80-amp.-hr. battery respectively.

The cone clutch, made by the Detroit Gear & Machine Co., is 14 in. in diameter. A 2-ton type of transmission is used. The pitch is 6-8 and the gears have a ⅞-in. face. The shafts are mounted on ball bearings throughout. There is a lubricating cup for the thrust bearings.

A Detroit flexible pressed steel frame is used. The service brakes are external contracting on the rear wheel drums. The diameter is 15 in. and the face 2½ in. The emergency brakes are internal expanding with a diameter of 14½ in. and a face of 2¼ in.

Bimel wood wheels with square spokes are standard equipment. The Jacox steering gear is of the worm and split nut type and with an 18-in. steering wheel. The equipment includes a windshield, horn, tools, bumper, two electric headlights with dimmer lamps, tail-light, front fender, starter, aluminum bound and linoleum covered running boards and a driver's seat. The chassis paint and stripes are included in standard equipment.

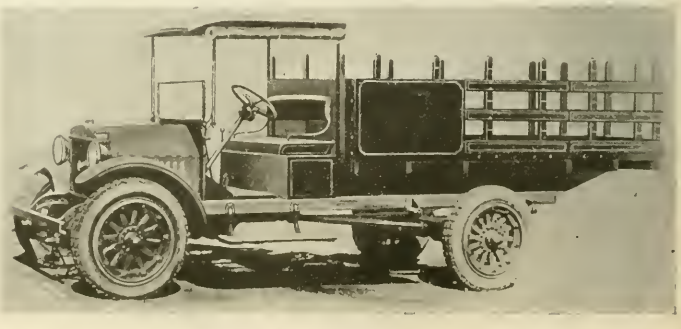
The Commerce company furnishes, if ordered from the factory with the chassis, three types of Highland bodies, the open express, or an express canopy top or a stake body. The prices of these bodies are extra with chassis, the open express body listing for $65, the express canopy top body at $130, and the stake body at $155. Cab tops are supplied as extra.

Rowe 3-Ton Model Has 8-Cylinder Engine and Giant Pneumatic Tires

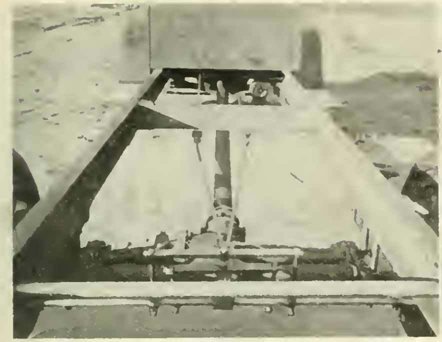
ROWE SPECIFICATIONS

Capacity, tons	3
Price	$4,500
Wheelbase, in.	170
Tires, front	38 x 7
rear	42 x 9
Bore, in.	3¼
Stroke, in.	5
N. A. C. C. hp	33.84
Speed, r.p.m.	—
m.p.h.	—
Gear ratio in high gear	—
Final drive	Top worm

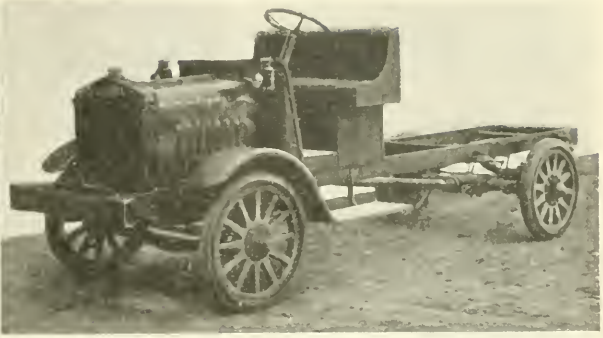
PERHAPS the most conspicuous example of the tendency toward the use of pneumatic tires on trucks is the new 3-ton Rowe, announced at the New York truck show. This new model is equipped with 38 by 7 in. tires on the front and 42 by 9 in. on the rear. It is designed to run 30 m.p.h. with a full 3-ton load. With this in mind the Rowe engineers have installed an eight-cylinder Herschell-Spillman 3¼ by 5 in. engine with an S. A. E. horsepower of 33.84.



New 1½-ton Commerce truck equipped with pneumatic tires



Rear construction of Columbia 1-tonner



New 1-ton Columbia equipped with solids

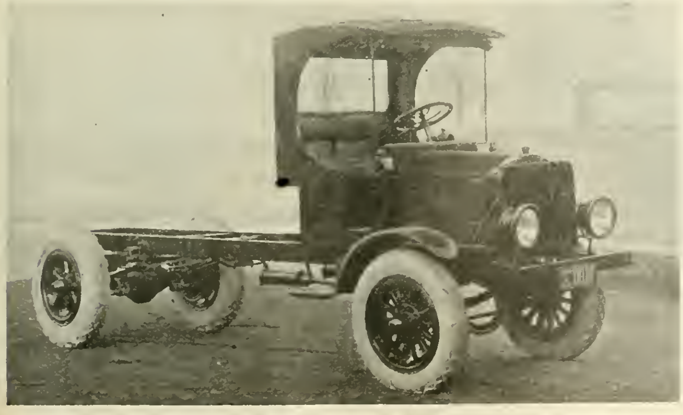
Though worm-driven, as in the previous 3-ton model, the new product differs in a number of respects from its predecessor. Cast steel wheels are mounted on the rear instead of wood, as in the earlier 3-ton model. These wheels are made by the Rowe company. A Mayo cellular radiator is used instead of a Fedders sheet case type. Westinghouse starting and lighting with Atwater-Kent distributor have been added. The earlier model used Bosch ignition and had no electric lighting and starting equipment. The double-jet Zenith carbureter is fed by vacuum instead of by gravity.

Like its predecessors, the new model employs a unit power plant, consisting of the engine; a Brown-Lipe selective gearset and clutch of the multiple-disk-in-oil type; a tubular shaft and a Sheldon top worm-driven rear axle.

Cooling is effected through the use of a cellular radiator mounted on springs and protected with a guard. The radiator case is of sheet brass. A centrifugal pump takes care of the water circulation. The Westinghouse starting and lighting system together with the Atwater-Kent distributor and Willard 6-volt battery takes care of the ignition, etc. The spark control is automatic.

The engine is lubricated by pressure, the oil being fed by pump to the bearings and cylinders and through the drilled crankshaft to the crank-pins. The clutch facing material is Raybestos. The front wheels are made by the Hoopes Bros. & Darlington Co. The propulsion is taken through radius rods. A Ross worm and nut steering gear is used.

Steering is on the left and brake levers and gearshift in the center. The equipment includes two side Adlake oil lamps, two Brown electric headlights and a rear electric light, bumper, cab and driver's seat, horn, short runningboard and fenders.



New Rowe 3-tonner equipped with Giant pneumatic tires and cast-steel wheels

Columbia Adds 1-Ton Model with Gearset in Unit Powerplant

COLUMBIA SPECIFICATIONS

Capacity, tons	1
Price	$1,750
Wheelbase, in.	126
Tires, front	34 x 3½
rear	34 x 4
Bore, in.	3¾
Stroke, in.	5
N. A. C. C. hp	22.5
Speed, r.p.m.	—
m.p.h.	18
Gear ratio in high gear	7.25 to 1
Final drive	Int. gear

THE Columbia Motor Truck & Trailer Co., Pontiac, Mich., has added a 1-ton truck model to its line, which now consists of three sizes, the new model and the 2- and 6-ton types. The 1-tonner, like its two predecessors, is an assembled product. The new model is internal-gear-driven as before, and differs only in the gearset location. The gearset is a unit with the engine instead of being placed amidships as before. The tire sizes are smaller, as is the engine. Pneumatic tire equipment may be had at an extra cost. Delco lighting and Willard battery equipment are extra.

The four-cylinder Continental engine has block-cast cylinders with valves at the left. The crankshaft is carried on three bearings. The new model employs a unit power plant, consisting of the engine; a Covert three-speed selective gearset; a Borg & Beck dry-plate clutch; a tubular propeller shaft with two Spicer universal joints, and a Russel internal-gear rear axle. A Shuler front axle is used.

Lubrication is by a circulating splash system. Cooling is effected by means of a horizontal finned-tube radiator, mounted on springs and made by the Long company. The radiator case with fins is of cast-iron and removable. A centrifugal pump is used for water circulation. The Shakespeare carbureter is gravity fed from a tank under the seat. The Pierce centrifugal governor is driven from the engine.

Ignition is by means of a Splitdorf single high-tension magneto with hand spark control. The torque and propulsion are both taken through the rear springs on the Hotchkiss principle. The half-elliptic springs are made by the Perfection Spring Co.

Though solid tire equipment all around is standard, the new model may be fitted with pneumatics at extra charge. Using solids, the tire sizes respectively on the front and rear are 34 by 3½ and 34 by 4, and with pneumatics they are 35 by 5 on the front and 36 by 6 on the rear. Hayes wood wheels with square spokes are used.

New Hilliard Heavy Duty Clutch for Small Truck Engine

Tillotson Carbureter for Fords—Imperial Air Compressor—B & D Drill—NuPep Piston Ring Expander

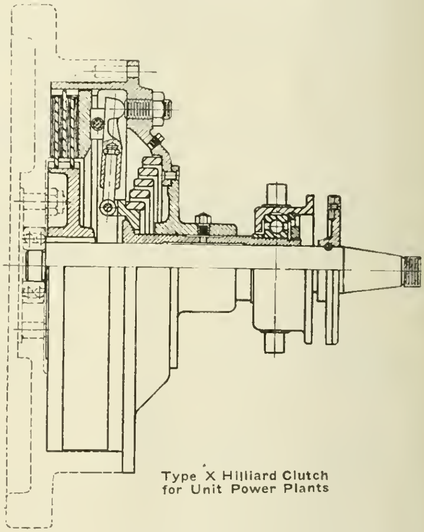
A NEW design of heavy duty clutch for use on trucks and tractors has recently been placed on the market by the Hilliard Clutch & Machinery Co., Elmira, N. Y. This firm has been manufacturing friction clutches for trucks, tractors and stationary power transmission purposes for the past 12 years. Its truck clutches in the past have been of the larger size only, having a rating of 75 hp. and over at 1000 r.p.m. To meet the demand for heavy duty type clutches for use in connection with engines of smaller ratings the firm has now developed its types X and XU clutches. Type X is designed for 3½- to 7-ton trucks with amidship mounting. The other type is for unit power plants.

These clutches are of the dry-disc type, and comprise two driven discs and one central driving disc, not counting the presser plate and the flywheel web, which also serve as friction surfaces. The friction discs are compressed by means of three levers, which are connected to a compensator ring surrounding a sleeve on the clutch shaft. These levers bear against rollers, supported by lugs on the presser ring, and their outer end takes purchase against a set-screw in the housing. These set-screws serve the purpose of adjustment.

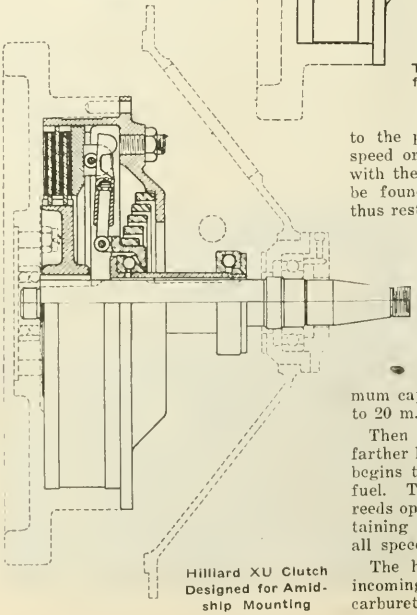
The special feature of the clutch is the compensating ring to which the lever arms are attached. This has a spherical surface which co-acts with a similar surface on a flange on the sleeve on which the shifting collar is mounted. Owing to the use of this compensating ring, if the different adjusting set-screws should be unequally adjusted, or if there should be unequal wear on the discs, this will not affect the perfect operation of the clutch, as the compensator ring will so adjust itself that the pressure will be uniform at all points of the clutch. The clutch shaft is provided with a pilot extension, which, by means of ball bearings, can be mounted inside of the flywheel. The shifter collar is provided with radially extending pins or plungers, adapted to engage with a forked lever. The rear end of the shifter collar is flanged outward, and is adopted to make contact with a disc on the clutch shaft, provided with a friction facing, which serves as a clutch brake. While the compensator ring tends to automatically equalize the pressure on the friction discs, it is recommended to always keep the adjusting screws equally adjusted.

The matter of lubrication of the clutch has been fully attended to. A grease cup is provided for the trunnion bearings, and there is a small oil cup on the shifter sleeve. In order to insure proper lubrication of the pilot ball bearings, a small amount of oil is injected through a plugged filler opening in the housing of the clutch.

These clutches can also be operated with an oil bath, in which case from 1 pint to 1 quart of medium machine oil is poured into the housing.



Type X Hilliard Clutch for Unit Power Plants



Hilliard XU Clutch Designed for Amidship Mounting

Hilliard Clutch Assembly

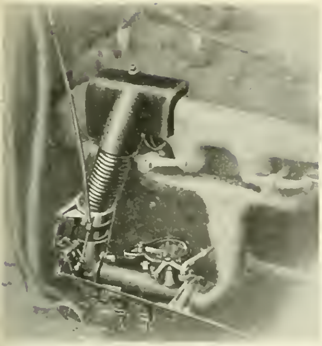
Tillotson Ford Carbureter

THE Tillotson Mfg. Co., Toledo, Ohio, has brought out a carbureter for Ford trucks, which requires only the use of a bicycle wrench and a screw-driver to install. It is known as the Tillotson Type 4. There is only one adjustment, and that is the gasoline adjustment. The air is taken into the carbureter at one point only, direct from around the exhaust manifold. It passes through the air horn unobstructed until it reaches the automatic air valve. This valve is in the shape of a wedge, along the two sides of which are attached flexible reeds. These reeds, of elastic metal, converge to the point where is located the low-speed or primary nozzle, which is fitted with the only controllable adjustment to be found on the instrument. The air thus restricted reaches a high velocity at the primary nozzle, drawing out and breaking up the fuel into a homogeneous mixture.

As the throttle is advanced and a greater quantity of air is required, this nozzle automatically increases the fuel supply to the inrushing currents until it reaches its maximum capacity at a car speed of from 15 to 20 m.p.h.

Then the secondary nozzle, located farther back in the valve, is affected and begins to deliver an auxiliary supply of fuel. Throughout the entire range the reeds open and close automatically, maintaining the highest partial vacuum at all speeds.

The heating arrangement warms the incoming air thoroughly. This type of carbureter sells for $15, f.o.b. Toledo.



Tillotson Ford Carbureter

Imperial Air Compressor

THE Ingersoll-Rand Co., New York City, has placed on the market the Imperial small air compressor, in four sizes, the capacities running from 3 to 45 cu. ft. per minute at pressures to 100 lb. per square inch. These small compressors, however, can be used for pressure requirements up to 200 lb. per square inch, the horsepower needed being, of course, slightly increased.

They are single-acting machines of the vertical type built for belt drive. Where driven from line shaft, tight and loose pulleys are supplied; where the use of an independent engine is planned they are ordinarily furnished as a unit complete with the engine, endless belt and short drive attachment. In the latter case a hardwood base plate is included with the standard equipments.

The smallest size is built with ribbed cylinder for air cooling where the service is intermittent and with water-cooled cylinder of the reservoir type for continuous operation. Larger machines are water-cooled only, employing the reservoir jacket system, except that, in the case of the largest size, a closed jacket for connection to the pressure system is optional. The manufacturer states that a single filling of the water space will suffice for a 10-hr. day's run.

In general design the Imperial compressors resemble internal combustion engine design. There is the same drop forged crankshaft and connecting rod, the die cast renewable bearings and the automatic splash lubrication system.

B & D Electric Drill

THE Black & Decker Mfg. Co., Baltimore, is producing a ½-in. portable electric drill equipped with a ½ hp. motor. Its full load current consumption is about 700 watts and the no load speed 600 r.p.m. The housing is of aluminum alloy, completely enclosing the motor and gears, and the total weight of the machine is 21½ lb.

The most outstanding feature of this drill is its method of control, the pistol grip and trigger switch, which makes it possible to handle it like an automatic pistol; one pull on the trigger turns the current on and the next pull turns it off. This arrangement enables the operator to control the drill practically automatically, without having to change the position of his hands in order to manipulate the switch. An indicator is provided showing when the switch is on and when it is off.

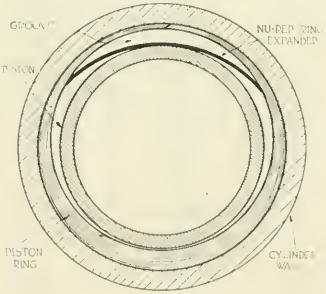
The electric motor is series compensated wound-interpolar type, and uses direct current or 25-, 40- or 60-cycle alternating current, and will operate from any two wires of a three-phase circuit. The motor is air-cooled by means of a centrifugal fan mounted on the armature shaft, which draws air in at one end of the motor and expels it at the other end.

The gears are cut from high carbon steel, mounted on ground shafts, and operate in grease in a separate grease-tight compartment. The drill spindle runs in a long bronze bushing against a ball thrust bearing.

The commutator end cover is entirely separate from the armature shaft bearing, and is, therefore, easily removable for inspection and adjustment of brushes. This also eliminates the possibility of armature shaft binding in bearing in case the end cover is accidentally distorted by dropping the drill or by exerting excess pressure on the feed screw.

The drill is complete with interchangeable space handle and breast plate, No. 1 Cushman chuck for straight shank drills, 15 ft. of duplex electric cable, separable attachment plug, and detachable side handle.

This machine, for 110-volt current, sells for $92; for 220- or 32-volt current the price is $95.

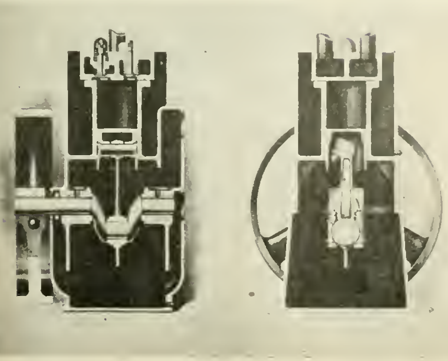


NuPep Piston Ring Expander

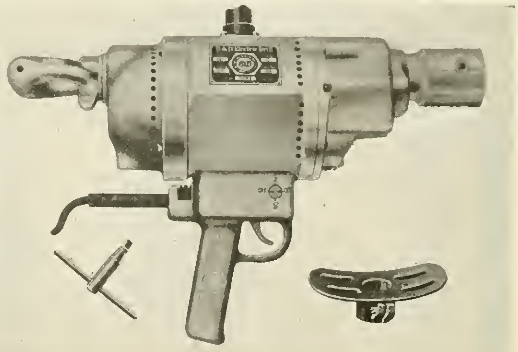
NuPep Piston Ring Expander

A DEVICE that expands piston rings from the inside so that the entire circumference presses with equal force against the walls of the cylinder is being produced by the NuPep Mfg. Co., Chicago. The NuPep piston ring expander is claimed to cure compression troubles and to prevent a large part of the carbon deposit and fouling of plugs.

This device is made of specially tempered spring steel, which is slipped into the groove under the piston ring. The spring, being made of steel, is not affected by heat and all piston rings are made so thick that they would not wear through during the life of the engine. Another feature of the device is that it will expand the rings enough to take up the wear in a badly scored cylinder. It is claimed that the expander will cause the rings to wear into the scores and fit tighter than a new ring could be made to fit. The cost of the device is $2 for a set of twelve and $3 for a set of eighteen. The expanders are made to fit all ring sizes.



Imperial Air Compressor



B & D Electric Drill

The Big 8 in Truck Maintenance

(*Continued from page* 27)

The remedy is drive slowly with as light a load as possible and to attend to cuts as soon as possible. A rough tire surface causes momentary overloads, and the effect is greatly increased if the speed be high or the load be great.

Locking the brakes or skidding is not only unnecessary, but it is also one of the quickest ways in which to destroy a truck tire. Often skidding results from improperly adjusted brakes, causing one of the brakes to lock or bind at regular intervals in the revolution. The remedy is to have the brakes adjusted and never to lock the wheels, for by locking the wheels a less braking effort is applied to the truck and the tread is quickly torn.

As is the case with pneumatic tires, solid tires will wear out quickly if the wheels are run out of alignment. True rolling motion is then impossible and the tread of the tire is quickly ground away by the surface of the road. For this reason the wheels should be lined up from time to time, and if misalignment is present, steps should be taken to correct it.

The following schedule of loads has been found to give satisfactory results by the B. F. Goodrich Co.:

Schedule of Truck Tire Loads

Size, In.	Single Tread, Lb.	Dual Tread, Lb.
3	950	2,500
3½	1,375	3,500
4	1,750	5,000
5	2,000	6,000
6	3,000	8,000
7	4,000	10,000

These loads can only be determined by placing the trucks on scales and weighing the load that each wheel is carrying. It may thus be found that while the truck itself is not overloaded, the load may be so situated that one pair of the wheels is carrying more than its burden. And if this is done consistently, the tires will soon break down, even though proof is present that the total loads carried were not excessive.

A table of proper air pressures has been prepared by the Goodyear Tire & Rubber Co., Akron. This table includes the minimum pressures at which certain loads can be carried on the various sizes of tires. For instance, a 3-in. fabric tire inflated to 40 lb. per sq. in. can carry a load of 335 lb. on each wheel, while a 3½-in. tire inflated at 40 lb. per sq. in. can carry 410 lb. on each wheel.

Maximum Weights Per Tire

Inflation Press. Cord Lb.	Inflation Press. Fabric Per Sq. In.	Tire Section 3 In. Lb.	Tire Section 3½ In. Lb.	Tire Section 4 In. Lb.	Tire Section 4½ In. Lb.	Tire Section 5 In. Lb.	Tire Section 5½ In. Lb.	Tire Section 6 In. Lb.
27	30	250						
32	35	290	360					
36	40	335	410	500				
41	45	375	460	560	675			
45	50	415	515	625	750	875	1000	1140
50	55	460	565	690	825	960	1100	1125
54	60	500	615	750	900	1050	1200	1370
59	65		670	815	975	1135	1300	1480
63	70		720	875	1050	1225	1400	1595
68	75			940	1125	1310	1500	1710
72	80			1000	1200	1400	1600	1825
77	85				1275	1485	1700	1940
81	90				1350	1570	1800	2050
86	95					1660	1900	2165
90	100						2000	2280

TRUCKS FOR CATTLE STEALING

BLOOMINGTON, ILL., May 9—Progressive thieves from Chicago and other metropolitan cities are utilizing motor trucks to steal live stock. John Senesac of near Manteno lost a steer valued at $175. Tracks indicated that a truck had been utilized for the depredation. Similar thefts have been reported to Sheriff Riley of Kankakee County and he is convinced that this theory is correct. It now becomes necessary, apparently, to organize anti-cow thief associations.

LONG ISLAND MOTOR EXPRESS

NEW YORK CITY, May 8—A large number of motor trucks will be operated in daily express service from all points on Long Island to Brooklyn and New York City. The company operating the trucks is the Long Island Rural Motor Express Co., with J. Kent Warden as president and general manager. The company will have its executive offices at 1845 Broadway, New York City, with a large receiving station at Greenwich Avenue and West Twelfth Street, also a central warehouse station in Long Island City. It has already established receiving stations at all places on the north and south shores of Long Island and at points along the center line.

OVERLAND HAULS IN CANADA

TORONTO, ONT., CANADA, May 9—The Automotive Transports, Ltd., started an inter-city service with trucks last summer in rather a quiet way for experimental purposes. The test soon jumped to successful proportions and it was not long before several large manufacturers and distributing companies signed contracts for the delivery of products regularly between the two cities. The trucks make trips on scheduled time every day and, although the delivery company has terminal warehouses in both Hamilton and Toronto, one of the big advantages in the truck service is that goods are transported from the door of the consigner to the address of delivery. It is a noteworthy fact that the service has not been interrupted one day during the past winter on account of the weather.

An interesting detail is that the company has a blanket insurance policy, under which all goods handled by the company are insured against theft, fire and damage by the elements or collision. The 1-, 3- and 5-ton trucks used are loaded to capacity on every trip, both going and coming, and the loads are protected by large tarpaulins. The vehicles are painted a brilliant red, and they have become a familiar sight on the Hamilton-Toronto concrete highway.

The company intends to extend the routings of its service beyond Hamilton to various centers of western Ontario and also to Buffalo, making it the first international motor freight service on this continent.

✓

CANADIAN TRUCKING COMPANIES

WINNIPEG, MAN., CAN., May 7—Realizing the enormous wastage in farm produce between the farmer and the ultimate consumer, which is caused by the high cost of railroad hauling, R. D. Harper, of the road engineering department of the Province of Manitoba; A. R. Boivin and P. W. MacKenzie, have formed Rural Motor Transports, Ltd., which will utilize the highways with a view to bringing farm produce into Winnipeg more quickly by motor truck.

Rural Motor Transports, Ltd., will operate lines of motor trucks, on schedule, over the highways leading out of Winnipeg. There is a demand for this type of transportation in western Canada, and it is generally believed that Rural Motor Transports is but showing the way to a large number of similar lines in other western cities.

The plan has been tried out in Vancouver, B. C., operating up the Fraser Valley, and has proven a great success. In Toronto there are several highway transport companies, the largest of which is the Automotive Transports, Ltd., which operates twenty Sterling trucks over the highways of central Ontario. Rural Motor Transports has standardized Sterling truck equipment and has placed its initial order for two 2½-ton Sterling trucks, which will go in service on the Portage highway, along which farmers, dairymen and truck gardeners have long suffered for want of proper transportation facilities.

MAIL TRUCKS FOR PERSIA

NEW YORK, May 12.—The Persian Government will motorize practically the whole of its mail service. For this purpose an order has been placed with the Fiat Co. for fifty motor mail trucks.

The Commercial Vehicle
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
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U. P. C. Building
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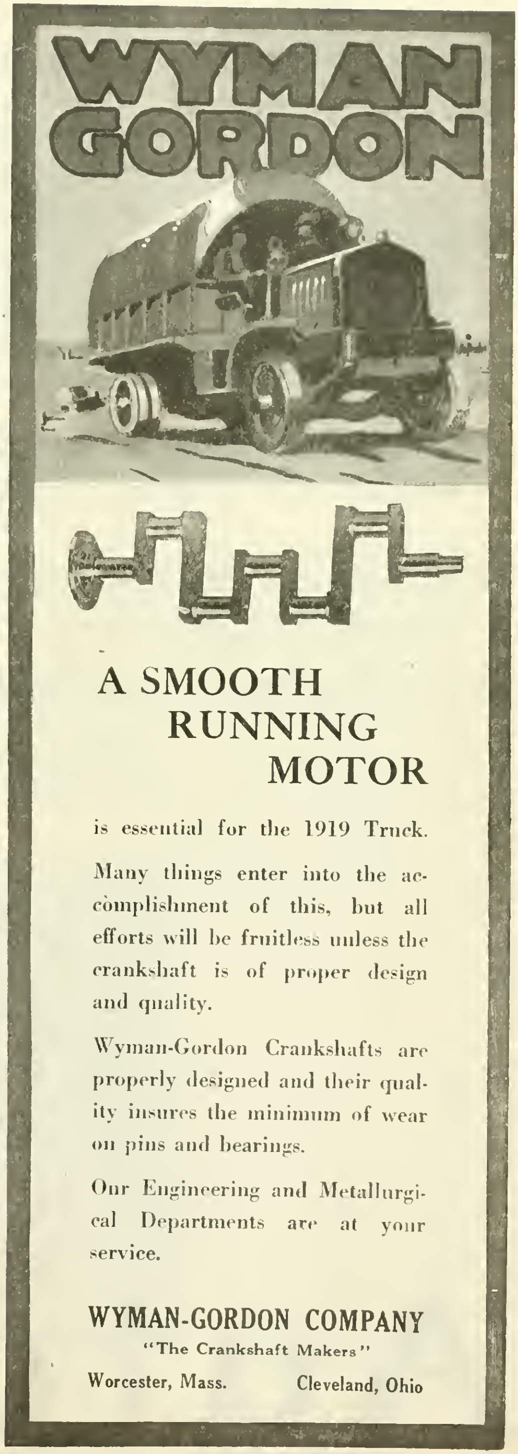

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is essential for the 1919 Truck.

Many things enter into the accomplishment of this, but all efforts will be fruitless unless the crankshaft is of proper design and quality.

Wyman-Gordon Crankshafts are properly designed and their quality insures the minimum of wear on pins and bearings.

Our Engineering and Metallurgical Departments are at your service.

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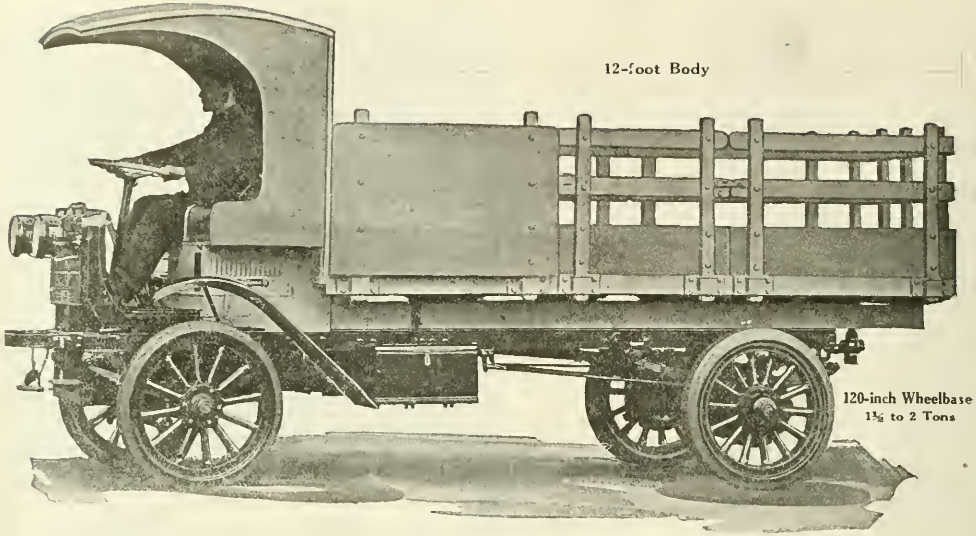

The Autocar Motor Truck Is Now Built With Two Lengths of Wheelbase

97-inch Wheelbase	120-inch Wheelbase
Chassis $2050	Chassis $2150
For bodies up to 10 feet	For bodies up to 12 feet

THE motor under the seat means the shortest possible wheelbase.

This short wheelbase means ease of operation in congested traffic and narrow quarters

—light over-all weight

—balanced distribution of load and equalization of strain.

The patented Autocar *double reduction gear drive* is used in all Autocar motor trucks.

THE AUTOCAR COMPANY, *Ardmore, Pa.* Established 1897

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St. Louis
Atlantic City
Pittsburgh
Baltimore
Washington
Los Angeles
San Francisco
San Diego
Sacramento
Fresno

Represented by these Factory Branches, with Dealers in other cities

Autocar

The COMMERCIAL VEHICLE
Read by Business Men
Vol. XX June 1, 1919 No. 9

Trucks Make Possible Direct Deliveries of Cooked Delicatessen Products

Also Result in Business Increase Due to Big Expansion of Delivery Area—Novel Types of Ice-Box Bodies Devised

GREATER profits resulting from a greater volume of business done have been secured by the Otto Stahl Co., distributer of cooked products such as hams, sausages, etc., through the use of a fleet of twenty-five trucks. This greater business has been made possible by the greater delivery area in which tbe trucks can give a quick and reliable service. The Stahl company maintains its manufacturing plant in New York City and several years ago secured most of its business in New York City, deliveries being made by horse wagons. Now, by means of its trucks, its deliveries cover the entire state of New Jeresy as far south as Trenton, Long Island as far east as the Moriches and Port Jefferson, approximately 60 miles away, and towns in Connecticut as far away as Stamford, 30 miles from the plant in New York City.

The Fleet Make-Up

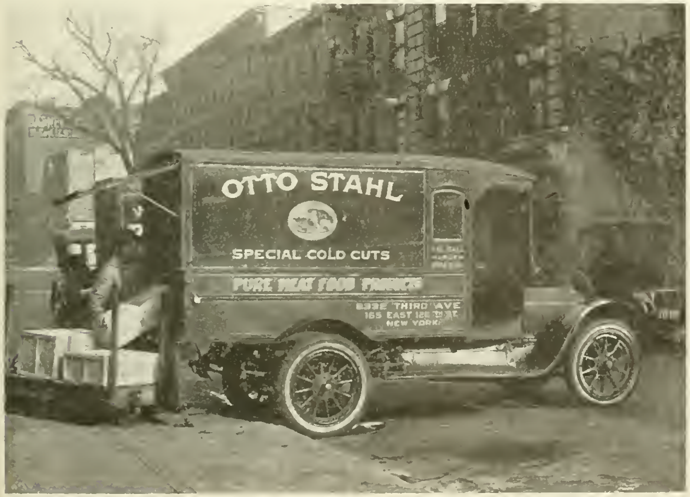
The fleet used to make deliveries in that large area consists of eight ¾ and two 2-ton Whites; one ½-ton Studebaker, one 3½-ton Federal; three 1-ton and one 1½-ton G. V. electrics; one ½-ton G. M. C. electric; one 1-ton Hudford; five 800-lb. Fords, and two Ford runabouts. Most of the gasoline trucks are used for the long delivery trips and the electrics for New York City only. The company also uses horse and wagon delivery for customers near the factory and for collecting the raw products from the refrigerator cars, etc., during the day when the trucks are out on their deliveries.

On account of the wide territory covered, together with the large number of towns visited on each route, it is apparent that in order to make the delivery of its meat products a success, the company had to insall a large fleet of trucks, which could make quick deliveries direct from the factory. The use of railroad service through New Jersey and Long Island was impracticable, because of the time and trouble in delivering from the railroad stations, either by truck or by some other means of conveyance. The great number of stops and starts required per trip in New York City territory necessitated the use of electrics. The two Ford runabouts are used as service cars.

Special Bodies Employed

The fact that sausages and some of the other meat products delivered by the Stahl company are perishable made it necessary to evolve several special types of bodies. All of them are of the panel type, but differ otherwise in the method of storing the loads inside. In all, there are four different types of body layouts used in the Stahl truck fleet, each satisfactorily serving its purpose of protecting the food products from dust and heat and saving the driver as large a number of steps as possible on his routes.

The main feature of the bodies is that there are two entrances to each, one in the rear and one in the front, in back of the driver's seat. These naturally save the driver much time on his routes by enabling him to lift his orders out quickly without the delay of going around



One of the ¾-ton Whites used on the longer city runs. It is shown being loaded over the sidewalk a short distance away from the Stahl company's plant. Small four-wheeled hand trucks are employed to carry the boxes and crates from the plant to the truck tailgate

A ¾-ton White being loaded from small hand trucks moved over the sidewalk from the Stahl plant to the truck tailgate. The truck shown has no side doors but is provided with a two-part door at the front end directly in back of the driver's seat

to the back door and searching through to the front for the particular meat products. All the driver has to do is to swing open two small doors, extending up from the driver's seat, switch on the light, and take out any of the food products which may be within his reach. On the larger trucks the entrance to the inside of the body at the front is by means of doors on the sides of the trucks, instead of in the front behind the drivers' seats. In each case, the side door is large enough to enable boxes to be loaded through it.

Bodies Electrically Lighted

Nearly all of the trucks have electric lights on the inside to enable easy handling of the loads at night or during dark days. In a number of instances, especially on the large trucks with doors on the side, it has been arranged so that the electric lights will automatically go on and off with the opening and closing of the side door. This is accomplished by means of a plunger switch placed on the hinge door jamb so that in closing the door, the plunger will break the contact, and in opening, will close the circuit. One of the 1½-ton White trucks is equipped with a large ice box at the rear, and the opening of the side door at the front also turns on an electric light in the ice box. The lights in the fronts of the bodies are hung from the roofs within reach of the driver.

Bodies Have Ice Boxes

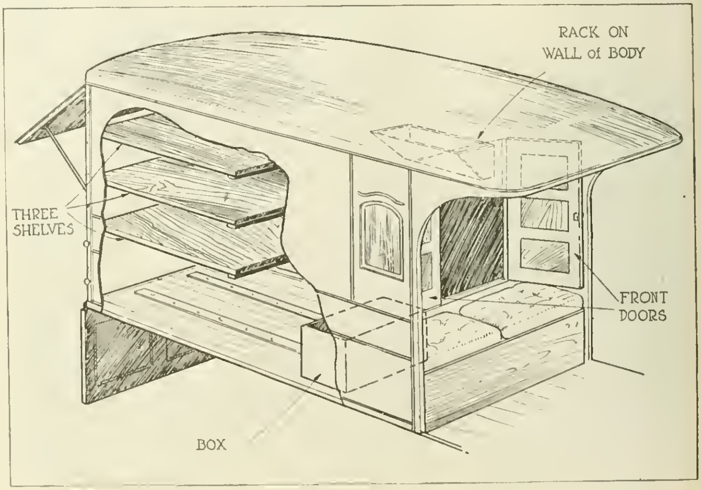
With the exception of one special body mounted on the White 1½-tonner, and shown on page 7, the method of storing the various food products inside of the body is uniform. All food that is chilled, such as hams and bacon, and will last for some time outside of an ice box, is put on a shelf or shelves at the rear of the body. These shelves extend half way forward to the front end of the body. The space at the front is used for the perishable foods that must be placed in an ice box.

These ice boxes are portable and are made of wood. Each box is approximately 2 feet wide, 2 feet high, and 4 feet long and provided with a hinged cover. Each box is lined with either zinc or tin and at the beginning of each trip is filled with chopped ice about 1 foot deep, more or less, depending upon the length of the trip and the time the truck will be out on it. The space between the top of the ice and the cover of the box is utilized to carry the perishable food products, principally sausages and bolognas.

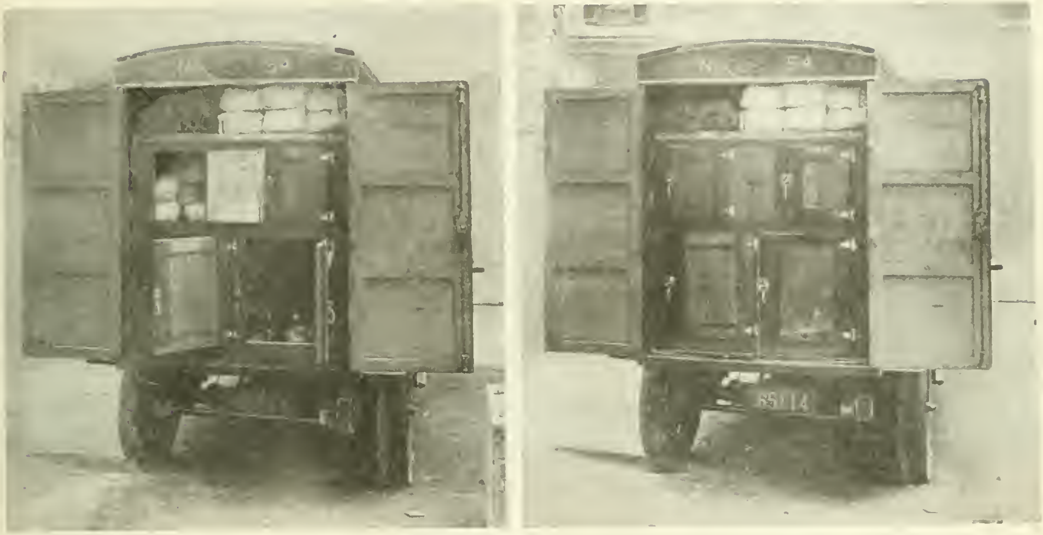
These ice boxes are not built permanently into the truck body as is the case in the special ice box body described directly below, but are set down on the floor of the open part of the truck body ahead of the three rows of shelves as shown in the sketch at the bottom of this page. While these ice boxes are portable, they are generally placed directly on the floor of the truck body so that water collecting in each box by reason of the melting of the chopped ice may be drained off onto the ground. This is accomplished by providing a short pipe, extending out from the bottom of the box and by inserting the end of this pipe through the hole in the truck body provided for the purpose. While these holes in the body floor are situated near the front end of the truck to prevent corrosion of the vehicle's rear axle and springs by a constant dripping of water, it is doubtful whether this plan is a solution of the problem, inasmuch as the water may be sprayed back onto the axle and springs by the action of the wind while the truck is in motion.

Cooked hams and pork and uncooked bacon and other products which do not spoil when out of direct contact with ice are not placed in the ice boxes but are carried on shelves in the truck body. However, these products are chilled before being loaded and this is sufficient to keep them fresh until they are delivered.

The special ice box body is nothing more than a refrigerator car, as over half the space from the rear to the front is taken by a large tin-lined ice box. This ice box opens at the rear of the truck and consists of two small compartments at the top and one large compartment at the bottom with two doors. The space between the upper compartments is used for storing ice, which is filled through an opening on the top of the ice box. When the lid is placed on this opening to the ice chest, that space between the top of the ice box and the roof of the truck may be used as a shelf for storing hams and wrapped products. Another feature of the ice box is that it is electrically lighted within by means



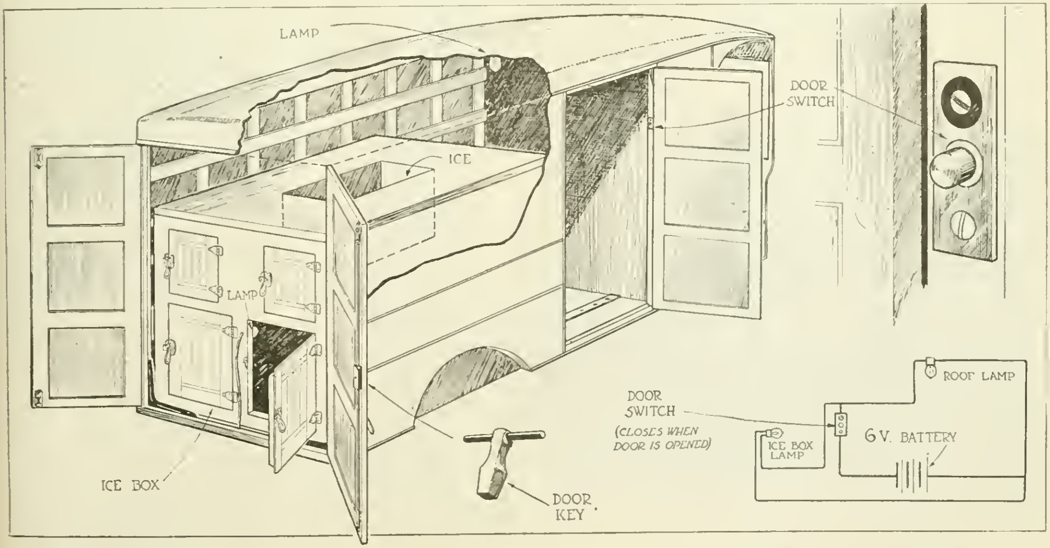
One of the types of bodies used in which doors are provided at the rear end and others at the front end, directly in back of the driver's seat. These doors make for quick deliveries. The goods are carried on shelves as shown. The small box shown in the forward part of the body is filled with cracked ice and is used to carry extremely perishable goods



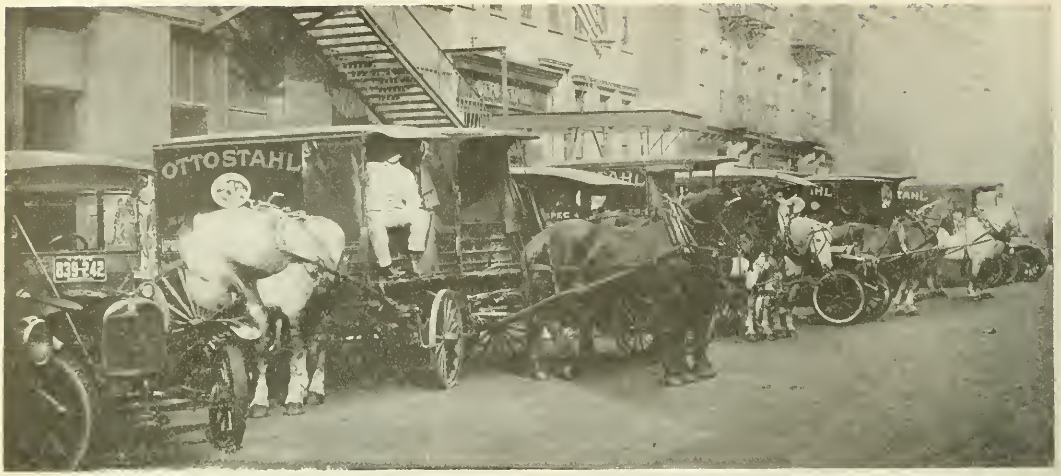
Opened and closed rear-end views of one of the special ice-box trucks, showing the compartments and doors and how the space above the top of the ice-box is utilized for carrying wrapped packages of provisions

of the plunger switch, described above, and operated by the opening of the side door. Access to the front of the truck is by means of the side door having the electric light switch. Any excess loads may be carried in the front end of the body. One of the undesirable features of the electric light inside of the ice box is that the truck side door must be opened to turn it on, no matter whether any goods are to be removed from the compartment in front of the ice-box or not.

Loading of the trucks starts at 7 a. m. All of the delivery vehicles are backed to the curb in front of the factory and the drivers take care of their own loads. As soon as this work is completed, a report of what has been put in the truck is given to the shipping clerk. The drivers then start out on their routes. All of the trucks are usually away by 8 a. m. This is quick loading, when it is considered that all twenty-five trucks and ten horse wagons are loaded across the sidewalk at the same time. It is accomplished because all of the drivers' orders are filled during the night. All each driver has to do is to pick out his particular order and load it onto the truck. Much time is saved by the use of small four-wheeled trucks for hauling the food products from inside the factory to the delivery vehicles. During the day the shipping department uses one of the heavy trucks and the horse vehicles for the collection of raw meats. These are unloaded and carried back to the factory by means of an overhead trolley which



Details of the special ice-box body shown in the illustrations at the top of this page. The sketches show the rear and side doors; the ice-box construction; the type of rear door lock; the interior lights; the automatic type of lighting switch in the jamb of the side door and the wiring diagram of the lights. The side door must be opened in order to light the lamp inside of the ice-box. It would be more convenient if a second switch were fitted in the ice-box door



The early morning line-up in front of the Stahl plant, showing the horse wagons employed for the close-by deliveries. One of the trucks is seen at the left and the other at the extreme right

extends out over the sidewalk and runs direct to the refrigerator doors.

Suburban Territory Served

The territory covered by the trucks and horse vehicles may be divided into eight routes. These are covered as follows: No. 1, New York City, the Bronx and Brooklyn; No. 2, Long Island City and surrounding towns; No. 3, Long Island; No. 4, Mt. Vernon, New Rochelle, Port Chester, up to Stamford, Conn.; No. 5, Jersey City and territory along the New Jersey side of the Hudson River; No. 6, Paterson and surrounding territory; No. 7, Newark and surrounding territory, and No. 8, Elizabeth and all Jersey summer resort towns through to Trenton.

As stated before, the New York City business is taken care of by the electrics, horse vehicles, and several of the gasoline trucks. In all, about twenty of the delivery vehicles are used for the city territory. These include the ten horse wagons, four electrics, and six or seven gasoline trucks. Long Island City trade is handled by one truck, which also covers Astoria, Whitestone Landing, College Point, and Jamaica. One truck is used for the trade further out on Long Island. This truck is out 2 days on each trip, Monday and Tuesday, and Thursday and Friday.

The Long Island Routes

Two routes are covered on Long Island, one extending along the towns on the Atlantic coast side, or South Shore, and and the other the towns on the Long Island Sound side, or North Shore. The first route includes most of the summer resorts, and the second, suburban towns, as well as summer resorts. The first extends down as far as Moriches and the second as far as Port Jefferson.

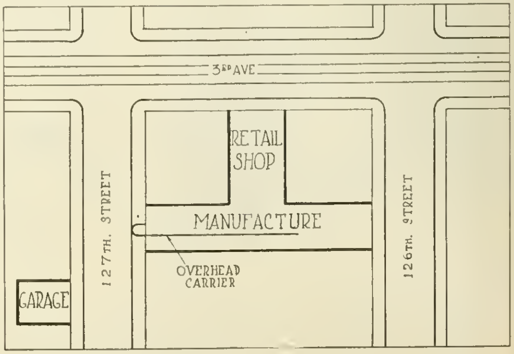
On the mainland, one truck covers Mount Vernon, New Rochelle, Rye, and Port Chester. Occasionally, it is sent as far as Greenwich or Stamford.

One truck is used for a route covering Jersey City, Hoboken and Weehawken. Another truck covers the Paterson territory, including Passaic and Rutherford. Newark, the Oranges, and towns up to Morristown are included in the route of another truck. The last route is that up to Trenton. As in the case of the Long Island routes, the territory covered is so large that 2 days are required to make deliveries and solicit trade. During the summer, much business is procured through the hotels at the various summer resorts from the Atlantic Highlands down to Sea Girt. From the latter place across to Lakewood, more hotel trade is found. From Lakewood through to Trenton there is little business to be had, and as a result, this last stretch is seldom made except on rare occasions. As in the case of the Long Island route, one truck spends Monday and Tuesday and Thursday and Friday out on the road, each trip out to the trade occupying 2 complete days.

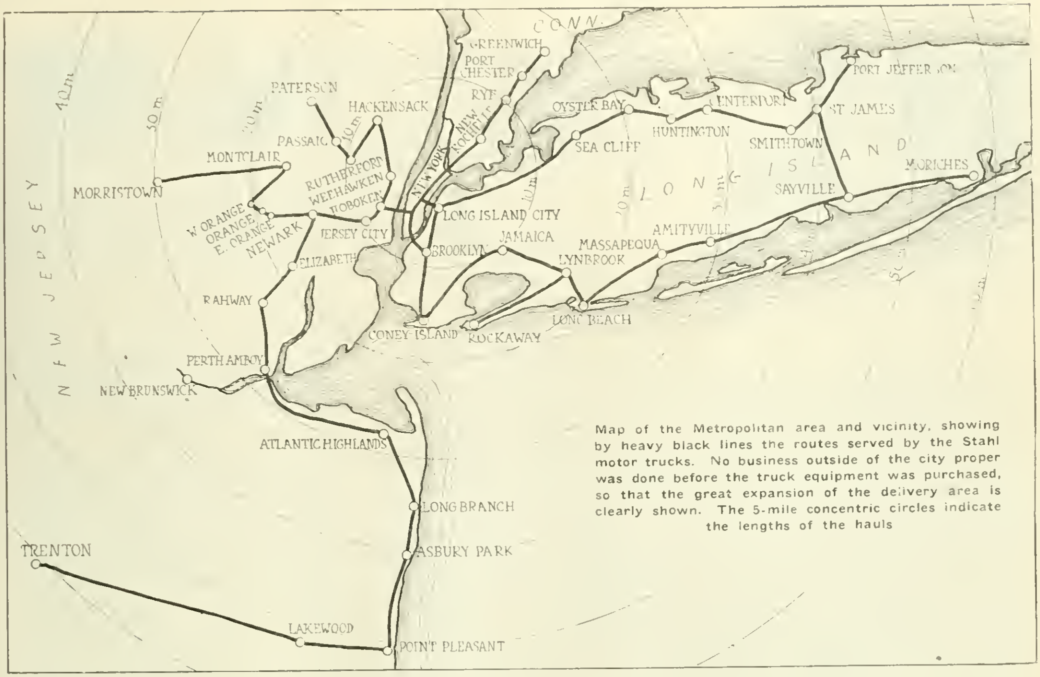
One of the prime requisites in handling meat delicacies of all kinds is cleanliness. Not only must all of the food products be protected by a dust-proof body but they must be handled cleanly. This makes it necessary that the truck driver keep away from all oil and grease as much as possible and do no tampering with the engine, etc. As in the case of the delivery of butter by trucks, the drivers are really more salesmen than operators. They get the orders and deliver the food products from the trucks to the hotels, delicatessen stores and butchers. As a result, the truck driver must be a good salesman first and a good driver second. The drivers do none of the truck repairing or adjustment, this being taken care of by the repairmen in the company's garage, across the street from the Stahl factory.

Drivers Uniformed

Each salesman, or driver, wears a one-piece suit of blue dunagarees or overalls, made of thin white-striped material. These are practical and neat.



Plan view of the Stahl plant and garage, showing the relative location of the two buildings and the overhead crane track or telpher used to carry carcasses directly from the truck tailgates into the interior of the plant without any lifting



Map of the Metropolitan area and vicinity, showing by heavy black lines the routes served by the Stahl motor trucks. No business outside of the city proper was done before the truck equipment was purchased, so that the great expansion of the delivery area is clearly shown. The 5-mile concentric circles indicate the lengths of the hauls

On account of the congested territory in New York City, where the number of customers to be served is so large as to take up a large part of the drivers' time, the company has found it necessary to use other salesmen as route builders. These men are supplied with Ford runabouts, which are also maintained in the company's garage. These special salesmen work on a commission basis, their special trade being the steamship and railroad lines, as well as helping out on routes where the driver's time is all taken up in making deliveries.

The drivers are paid a straight salary of $15 a week in addition to a commission, the latter amounting to 1 per cent of the volume of business done. Some of the drivers make as much as $20 to $25 extra a week on their commissions. The summer resort routes pay the drivers well. This year the company expects to invade the Coney Island territory, where it is expected that business will be heavy.

How Delays Are Overcome

Should an accident occur that is serious enough to delay the truck in its delivery, the driver uses his discretion in seeing that his trade is served. If near the garage he can get help from there, but if too far away to warrant waiting for the company's repairman to arrive, the usual method is to get in touch with the nearest garage and let its repairman take care of the repair work. On the other hand, should the truck be damaged to such an extent that it cannot resume its deliveries for the day, the driver will hire another truck. Much emphasis is placed on the quickness of the delivery. The food products must be delivered the day they are taken from the factory, and if not, the business for that particular period is counted as a loss, with probably a dissatisfied customer.

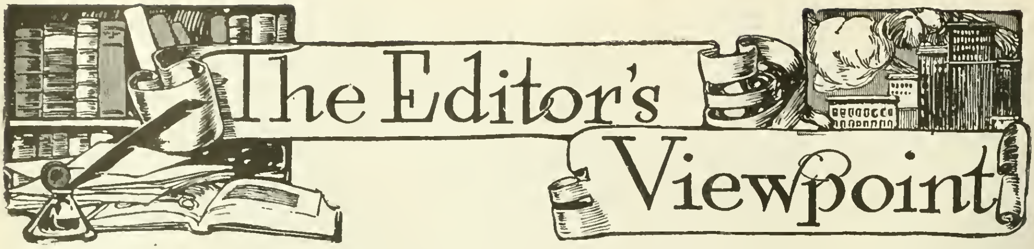
Bought First Truck in 1914

The company started using trucks at the beginning of the war in 1914. That year an Autocar was used. The next year several electrics were purchased and since then the fleet has been increased each year by the addition of a few more electrics and gasoline trucks. As stated before, all of the trucks are maintained in the company's garage across the street from the factory. When the trucks come back from their deliveries at night, they are lined up in front of the factory, unloaded, and are then taken in hand by the garage mechanics, who run them into the three-story garage.

In the same manner, the mechanics take complete charge of running the

(*Continued on page* 19)

Another view of the loading line-up, showing the type of hand trucks employed and, in the background, the overhead telpher used to move whole animal carcasses from the trucks into the plant



Making Your Own Repairs

IN the maintenance of a fleet of trucks there is a point where it may become cheaper for the owner to make all of his own repairs than to have them done in a public garage or in the local service station of the truck manufacturer. Just where this point lies in the scheme of maintenance is dependent upon many conditions, all of which may vary to such an extent that no hard and fast rule may be set.

Generally speaking, however, the larger the fleet the more economical it is for the owner to handle his own repair work. Repairs made by mechanics in a public garage or in a maker's service station cost not only the actual labor and material but an overhead or profit charge to which every concern is entitled. When the amount of the repair work is large, the overhead or profit charges are also large and when this is the case it may be economical for the truck owner to install his own repair equipment and hire a crew of men to operate it.

If this is done the truck owner must do it properly or not at all. A proper repair outfit costs considerable money, yet a proper layout must be made if results commensurate with the cost are to be expected.

There are many advantages in a truck owner making his own repairs and other advantages in having the work done outside. In making a decision between the two methods the cost, convenience and ability to keep the trucks in service for the greatest possible time each year must be considered. In the matter of cost the expense of having the work done outside should be compared with the upkeep of the home shop, including overhead and supervision, the initial cost of the repair equipment and the labor charges for its operation.

Convenience and keeping the trucks in motion for the greatest possible time go hand in hand and are to a great extent interdependent. When the owner's shop is in or near his garage it is most convenient to get his trucks into the shop without delay. There is no waiting for someone else's truck to be gotten out of the way before the new job can be taken in, as is often the case in a public garage or service station. Then, again, the time required to run the trucks from the owner's garage to the outside shop and return is saved and may be employed in making the actual repairs or adjustments. Further, when the work is done under proper supervision and entirely under the authority of the truck owner, there is always that feeling that it is done thoroughly and with no attempt at rushing it through as is sometimes the case with outside repairmen.

When the repairs are done outside the truck owner has no worry about shop help or shop maintenance. He simply sends his truck to the shop, gets it back when the work is completed, puts it to work again and then pays the bill. If the work is done properly and thoroughly, the truck returned promptly and the bill reasonable, the truck owner must balance such a service with the cost of doing the work himself with its necessary overhead and supervision.

The Value of Truck Costs

IT seems that everybody wants motor truck costs. This is not at all unreasonable when it is considered that truck haulage is now assuming considerable importance as compared with other means of transportation. But because rail and water transportation have been more or less standardized insofar as type of carrier and steel rails are considered, but not including terminal handlings, investigators seem to imagine that a standard motor truck haulage cost can be given to include all conditions.

This is impossible with truck haulage because there are so many factors which enter into the cost, as, for instance, the type of roads with their grades; the kind of body used; the kind of tires; the method of loading and unloading; the use of trailers or not and the use of adjuncts for quick loading or unloading at the points where goods are picked up or delivered.

Each truck installation or proposed fleet and its work should be studied as a separate unit in order to estimate the costs with any degree of accuracy. All of the factors mentioned above should be taken into account. Then the trucks' costs will be of some value for comparison with other forms of transport; to determine upon proper rates or to compare with other trucks working under the same conditions.

What a Truck Cost System Will and Will Not Do

Five Items of Information Which Any Proper System Should Give

PHILADELPHIA, May 16—The second of a series of discussions on cost accounting systems for the operation of motor trucks was held Tuesday last by the Motor Truck Owners' Assn. of Philadelphia, in the Bellevue-Stratford hotel. Not only were several cost systems explained for the benefit of members, but the general principles for successful accounting were laid down by speakers with a view of cautioning members against operating at a loss without knowing it.

The meeting was in charge of the committee recently appointed for investigating cost data and was presided over by C. B. Montgomery, of the Union Paving Co., the committee chairman. In outlining the aspect of cost systems, Mr. Montgomery laid down four cardinal principles which, he said, any cost system suitable for recording the operation of motor trucks, should develop. They are as follows:

1—It should show the actual average cost per mile, per day, per ton, or the ton-miles per trip, giving to the owner the desired information with respect to the operations of his trucks.

2—It should show the mileage of the tires and their cost per mile and should demonstrate whether satisfactory adjustments are made and whether the driver is using proper care.

3—It should show the mileage obtained from the gasoline used.

4—It should show the time each truck worked, the time lost in operation, its delays in loading, in tie-ups and in repairs, if any.

What System Will Not Do

Mr. Montgomery made it clear that the cost system is not a cure-all for defects and that it will *not*:

a—Operate the trucks.

b—Collect money.

c—Afford a complete bookkeeping system for the owner, being only a useful auxiliary in that respect.

d—Pay unpaid notes.

e—Tell when money is due the owner.

The time such a cost accounting system takes in preparation, said the speaker, is not more than 2 hours a day for from one to five trucks, the actual cost of maintaining the system being extremely small and its value great.

Rules to Be Followed

Mr. Montgomery then introduced F. B. Weed, of the Packard Motor Car Company of Philadelphia. "We have found," said Mr. Weed, "that there are certain definite rules for truck operation in relation to maximum efficiency, which are nearly as definite as mathematical formulas. All show that no man can operate his trucks efficiently who does not know what they are costing him."

What a Motor Truck Cost System Should Do

1—Show the actual average cost per day, per mile, per ton, per ton-mile, package-mile or stop-mile or other unit mile according to the desire of the owner.

2—Show the tire mileage and the cost of tires per mile.

3—Show the gasoline consumption per mile and the cost of fuel per mile.

4—Show the cost of repairs per mile over a given period.

5—Should enable the truck efficiency to be calculated by showing the total time worked, the time lost in operation due to delays in loading, traffic or other tie-ups or while in the shop for repairs.

What a Motor Truck Cost System Will Not Do

1—Operate the trucks.

2—Collect money.

3—Afford a complete bookkeeping system for the owner.

4—Pay unpaid notes.

5—Tell when money is due the owner.

The following general observations by Mr. Weed, on the subject of cost account keeping in connection with truck operation, were especially pithy:

"You cannot operate a truck faithfully without a knowledge of costs; you want not estimates, but facts of actual operation.

"If you had employed a man at $5,000 a year, you would know what he was doing for you; why not know the same about a truck?

"Among the things you ought to know are: How many hours has your truck wasted? How many deliveries do you make for which you get $1 while each costs you $2? How many deliveries do you make for which you get $2 apiece, but which cost you only $1? Do you know whether it costs you more to operate your truck than you are receiving?

"The only answer to these vital questions is: 'Keep your real truck costs systematically.' The actual usable deduction from cost accounting is the cost per commercial ton-mile. The cost per day does *not* consider the factors of mileage and capacity. The mileage cost does *not* include capacity, either. The commercial ton-mile cost is the important thing. It is based on both mileage and tonnage carried and both are factors entering into the life and usefulness of a truck.

Ton-Mile Basis Desirable

Mr. Weed made the interesting statement that investigation had showed that probably close to 70 per cent of the trucks now in use in Philadelphia are not more than 2 years old. He emphasized the need for a unit to measure truck performance and test operating efficiency. He contended that the basis for a comprehensive study of truck performance is that of the commercial ton-mile, which may, however, be called a "unit ton-mile for capacity," although the rating may not be in tons, but in the particular measure in which the hauling is done for various kinds of business. For instance, there is hauling by package, yardage, gallons, per 1,000 feet, and other units of measurement, but all reducible to the ton-mile basis.

In the absence of Joseph Husson, editor of THE COMMERCIAL VEHICLE, the Philadelphia representative explained to the members the workings of THE COMMERCIAL VEHICLE Cost Keeping System for Motor Trucks, emphasizing its simplicity in that it consists of only two forms, a Driver's Daily Report Card and Monthly Truck Cost Summary, an instruction book coming with each set.

Mr. Montgemery described in outline the system of cost accounting recently supplied free of cost to interested truck owners by the United States Department of Agriculture and sketched briefly points of excellence in one or two other cost accounting systems. The association committee will continue its investigation and study of cost accounting.

All of the requirements of a successful cost system covering the use of motor trucks as brought out by the various speakers at the meeting are met by THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks, which is explained in more detail on page 35 of this issue.

As previously mentioned, THE COMMERCIAL VEHICLE System is made up of but two forms. These include a driver's daily route card and a monthly summary sheet. The driver's route card serves to mark down the mileage and tonnage carried per day; the gasoline and oil consumption and the driver's, helper's and mechanic's time. It also gives the number of trips, from which, with the mileage and tonnage known, the commercial ton-mileage which must be figured for each trip may be found.

Big Fight on Proposed Mass. Truck Fees

One Committee Recommends $300 as License for 7-Tonners

BOSTON, MASS., May 24.—Massachusetts truck owners are thoroughly aroused at the action of the Committee on Roads and Bridges of the legislature for reporting an outrageously high registration bill this week. And now they are going out to fight it to a finish because they feel they have not been given a square deal. The bill seems to be an attempt to tax the heavier trucks off the streets and highways, for with the exception of Maryland, the fees if passed would be the largest in the United States.

The proposed fees begin with $10 for a ½-ton truck and then start climbing up to $75 for a 4-tonner and $100 for a 5-ton truck, with $50 for each additional ½ ton. As an example of what it means one firm in Boston operating fifteen trucks and now paying $327 a year for registrations would have to pay $3,487, more than ten times the present fees. And not one of those trucks ever goes on the State highways.

To Appear Before Ways Committee

There is to be another hearing Tuesday before the committee on Ways and Means at which time there will be a big throng on hand to make a determined fight and voice their opposition.

The fight will not end there. Owners in other sections of the state will be asked to hold meetings and interview their senators and representatives and protest on the bill. The State branch of the A. F. of L. has promised to take up the fight. So has the Boston Central Labor Union and the Teamsters Union.

There is some talk of holding a big mass meeting at Faneuil Hall to protest the measure thoroughly. Now some of the dealers say the only thing to do is to go after the bill and kill it entirely as a lesson to the Highway Commission and those behind the measure. One prominent state official is quoted as saying that this year the truck fees would be raised high enough to last 5 years and next year a drive would be made on passenger cars along the same lines.

The proposed law further provides that all trailers equipped with metal tires shall pay double the above fees and electric trucks and other trucks, trailers, etc., using pneumatic tires, will pay only half the fees. In order that manufacturers may not have a chance to change the rating of their trucks to meet conditions for lower tonnage, the measure specifies that the Highway Commission shall decide the tonnage of all vehicles and its decision shall be final. The table on the right shows the truck fees in force at the present time; what the truck dealers' committee recommended; what the Massachusetts Highway Commission suggested and what the Roads and Bridges committee reported.

DETROIT TRANSPORT DAY

DETROIT, May 19—Motor trucks had the right-of-way in Detroit to-day. The Detroit Transportation Assn. staged its big truck parade with nearly 1000 trucks and seventeen bands in line. Every manufacturer and all of the local truck dealers were represented as well as the army.

The event was staged to drive home the Ship-by-Truck idea, but the message was not carried home with the force that it should have been. Detroit missed a grand opportunity to merchandise the event for the benefit of the truck owners.

The dealers and manufacturers advertised their product but the individual business interests, using trucks in their work and who entered them in the parade, saw in the occasion the opportunity to merchandise their own product and not the truck.

However, from the standpoint of a parade is was a great success. The police did not co-operate in diverting traffic and the result was a breaking up of the parade into small units. It took it nearly 3 hours to pass the reviewing stand.

N. Y.-NEW HAVEN TRUCK LINE

NEW YORK CITY, May 17.—The New York & New Haven Transfer Co. has recently been formed to operate between New York and New Haven for hauling freight and express on regular schedule. The company is to begin operations on June 1. Its main office is at present located in the Smeadley Bldg., Boston, Mass.

Coming Events

June 21......Philadelphia, Pa., Annual Outing Kugler's Mohican Club Motor Truck Assn. of Phila., with the Phila. Auto Trade Assn., Automobile Accessories Business Assn. and the Camden Auto Trade Assn.

June 23-27...Ottawa Beach, Mich., Summer Meeting, S. A. E.

Sept. 22-24...Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.

Interurban Purchases Trucks as Feeders

Milwaukeeans Will Benefit by Getting Fresh Green Goods

MILWAUKEE, WIS., May 16.—Pending the extension of its interurban street railway lines at a time when conditions are more favorable, the Milwaukee Light, Heat & Traction Co. has provided freighting facilities in the Rock River Valley of Wisconsin by the institution of a motor truck package freight and express service between its present western terminus at Watertown, Wis., and Johnson Creek, Jefferson and Ft. Atkinson, three important communities to the southward. The electric company has purchased three 3-ton Packard trucks for exclusive use on the express line. Since the establishment of the service each truck has had virtually full loads going and returning every trip.

Trucks Make Two Trips Daily

Watertown is 50 miles west of Milwaukee; Fort Atkinson is 20 miles south of Watertown, Jefferson and Johnson Creek being intermediate points. The trucks made two trips a day, or a total of 40 miles each. Milwaukee shipments delivered to the electric company's express platform by 6 p. m. reach consignees in any part of the Watertown-Ft. Atkinson truck route before noon the following day.

Perhaps the greatest value of the combination street car-motor truck service is that to merchants in the Rock valley, who trade almost exclusively with Milwaukee manufacturers, wholesalers and jobbers, but have a more or less indirect and infrequent steam railway freight service. Milwaukee people will benefit largely through the ability to obtain fresh garden truck, dairy products, etc.

This is the first installation of combination express and freight service to be made by an interurban railway in Wisconsin.

†Massachusetts Truck Fees at Present

1-Ton	2-Ton	3-Ton	4-Ton	5-Ton	6-Ton	7-Ton
$5	$8	$11	$14	$17	$20	$23

What Truck Dealers Committee Recommended

$10	$16	$22	$28	$34	$40	$46

*What Mass. Highway Commission Suggested

½-Ton							
$10	$20	$30	$40	$50	$60	$160	$260

What Roads and Bridges Committee Reported

1 Ton	1½ Ton	2 Ton	2½ Ton	3 Ton	3½ Ton	4 Ton	4½ Ton	5 Ton	5½ Ton	6 Ton	6½ Ton	7 Ton
$10	$15	$20	$25	$30	$40	$50	$75	$100	$150	$200	$250	$300

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†Truck owners want present fees retained.

*Suggestion made at legislative hearing recently.

Truck Owners Attend Maker's Meeting

Foremen Get New Ideas at Pierce-Arrow Factory

BUFFALO, N. Y., May 28.—For the first time in the history of the motor truck industry, so far as known, owners of small and large fleets of motor trucks, their engineers, superintendents, foremen and mechanics were invited to attend the meeting of the 150 agents' representatives of the Pierce-Arrow Motor Car Co., held here from May 19 to 23. In contrast to previous forms of agents' meetings, this one was not held in the elaborate factory offices but in the service department of the plant, in order to familiarize those in attendance with the construction and methods of maintenance and repair of Pierce-Arrow trucks in all classes of work. The meeting marked a step forward in truck maintenance and indicated its great importance to the fleet owner.

The meeting was divided into two parts, the first 3 days being devoted to the mechanical construction of the truck and the last 2 days to its method of operation, routing, etc., in various classes of business.

HARTFORD-NEW LONDON ROAD

HARTFORD, CONN., May 22.—Now that federal aid has been assured the State of Connecticut, the Highway Department hopes to begin construction of the Hartford-New London road in the near future. This road is the most direct between the two cities and its betterment has been agitated for years. However, the Highway Department has not been able to get to it and do justice to other construction. This road will be of much value for trucking, a considerable amount of which is now done between the two cities. Under present conditions a truck leaving Hartford for New London must travel two sides of a triangle either by way of Willimantic and Norwich or by way of Middletown, Saybrook and Lyme. If the Saybrook route is followed, toll must be paid at the Lyme bridge.

FEDERAL ROAD AID FOR HAWAII

WASHINGTON, D. C., May 22—A provision for the extension of the Federal Aid Road Act to allow the construction of rural post roads in Hawaii was included in a joint resolution introduced in the House of Representatives yesterday.

NEW ROAD TESTS

WASHINGTON, D. C., May 26—The Division of Road Materials Test and Research, of the Bureau of Public Roads, of the Department of Agriculture is making experiments for the purpose of determining the damage done to the highways by different forms of transportation units which travel over the roads under varying conditions. The experiments will cover a wide range and will take into account the factors of speed, type of tire used and the weight of the unit transported.

In addition to the tests for the above mentioned factors, the department will also make experiments with different types of road surfaces to determine their wearing qualities when subjected to heavy traffic.

CONN. WILL PROTECT BRIDGES

HARTFORD, CONN., May 24—All bridges in Connecticut are required to be marked with signs, conspicuously displayed, setting forth the maximum loads the structures will sustain. Eight tons is the limit on most of them. Efforts in the legislature, which has just adjourned, to reduce the total load of truck and freight were defeated. The governor has signed a bill which provides for the repair by the Highway Department of bridges damaged by trucks.

OHIO ROAD TRUCKS ALLOTTED

COLUMBUS, OHIO, May 26—State officials have received notice from the War Dept. at Washington that the first award of motor trucks for road building purposes has been made. In the allotment Ohio secured 203 trucks and more are to be given out at a later date. Included in the list are 136 Nash four-wheel-driven trucks of 2-ton capacity; four Mack 2-ton trucks; twenty-eight miscellaneous 3-ton trucks and thirty-five heavy aviation 3-ton trucks. The trucks will be distributed to the various counties in the State.

SMITH HEADS K. C. ROADS BODY

KANSAS CITY, MO., May 16—The Good Roads Assn. of Kansas City took on new life with the advent of J. Frank Smith as its manager. Smith had been manager of the Kansas Good Roads Assn. He will have a free hand in his work, the only thing asked of him being that he surround Kansas City with highways.

HIGHWAYS TRANSPORT WORKING

WASHINGTON, D. C., May 24.—The Highways Transport Committee, Council of National Defense, will make an intensive study of short haul problems at Boston, Mass., New York, N. Y., Philadelphia, Pa., Pittsburgh, Pa., Baltimore, Md., Washington, D. C., Atlanta, Ga., New Orleans, La., St. Louis, Mo., Chicago, Ill., Detroit, Mich., Cleveland, Ohio, Omaha, Neb., Denver, Colo., Dallas, Tex., San Francisco, Cal., Los Angeles, Cal., Portland, Ore., and St. Paul, Minn.

The survey will be as complete as possible and the committee asks the co-operation of all manufacturers and dealers so it may secure the maximum amount of data. Any information relative to the names and addresses of operators, number and capacities of trucks in use, routes and schedules and rates with copy of the tariff when it is available is desired. Such information should be sent directly to the Highways Transport Committee, Council of National Defense, Washington, D. C.

Federal Highway Body in Controversy

Townsend to Bring Up New Bill—Houston Opposes Idea

WASHINGTON, D. C., May 20.—The re-introduction of a bill providing for the establishment of a Federal Highway Commission to take over the control of the national highways, the distribution of funds under the Federal Road Aid Act and to co-operate with the state highway departments was forecast by a meeting held here to-day by Senator Charles E. Townsend, father of the bill, with members of the motor truck and highway industries.

The bill, which takes over the present duties and authority of the Bureau of Public Roads, Department of Agriculture, and which greatly enlarges the scope and duties of the road authorities, is designed also to lift highway control from its present position as a relatively unimportant part of a large department and give it the prominence it merits.

Agriculture Department Opposes Plan

Opposition to the plan by the Department of Agriculture, under which the Bureau of Public Roads operates, developed yesterday when Secretary of Agriculture sent broadcast a statement in which he opposes at this time the creation of a Federal Highway Commission. He believes that the injecting of new machinery into the highway situation at this time would cause confusion that would result in much harm. At present, the Secretary says, the Federal and state organizations are being dovetailed into an organization that will work out the best solution of the present problems.

However, the Secretary's statement does not explain how a through route across states can be built without breaks or maintained at a proper state of repair even if it were built. Nor does it offer any suggestions as to why the present uncentralized road control will get us any better system of co-ordinated highways than we have at present.

RURAL MOTOR TRUCK ROUTES FOR HOOSIERS

INDIANAPOLIS, IND., May 19.—The Hoosier State Automobile Assn. has established a motor truck division with W. C. Kreis, of the Kreis Transfer Co., who is president of the Indiana Transfer Assn., as chairman, and Tom Snider, secretary of the same body and also secretary of the wholesale trade division of the chamber of commerce, as secretary. The new division will work in conjunction with the highways transport committee and will aid in the establishment of rural motor express routes. It will gather information on rural motor express routes, roads, routings and all matters of general interest in this line.

$823,300,000 in Sight for Good Roads

$177,800,000 Authorized in Seven States—More Pending

WASHINGTON, May 17—Prospects for road construction continue bright, for all told twenty-six states have planned or approved bond issues to a total of $823,300,000 for highways. Of this amount $177,800,000 has been authorized in seven states, $411,500,000 is being referred to the vote of the people; $135,000,000 is being considered in four states and three states have voted against measures totaling $85,000,000. The issues ratified include:

Illinois	$60,000,000
Pennsylvania	50,000,000
Michigan	50,000,000
Oregon	10,000,000
Utah	4,000,000
Wyoming	2,000,000
Nevada	1,000,000

Bond issues will be considered shortly by the following four, for the amounts noted:

Georgia	$60,000,000
Virginia	50,000,000
Alabama	25,000,000
Florida	10,000,000

The people of thirteen states will vote on the following highway bond issues:

Minnesota	$75,000,000
Texas	75,000,000
Missouri	60,000,000
Oklahoma	50,000,000
West Virginia	40,000,000
California	40,000,000
Washington	30,000,000
New York	20,000,000
Maine	10,000,000
Colorado	5,000,000
Oregon	2,500,000
Idaho	2,000,000
New Mexico	2,000,000

The Forest Service plans to construct 1643 miles of roads this year, at an expenditure of $12,000,000.

In addition a committee of state highway officials has been appointed to cooperate with the Federal Bureau of Public Roads to carry out the provisions of the Federal Aid Road Act. The members were named by A. R. Hirst, president of the American Assn. of State Highway Officials, and are as follows: George P. Coleman, state highway commissioner of Virginia; S. E. Bradt, state superintendent of highways of Illinois; Charles J. Bennett, state highway commissioner of Connecticut; W. S. Keller, state highway engineer of Alabama, and Ira R. Browning, state road engineer of Utah.

The Secretary of Agriculture May 1 had approved 1057 project statements for Federal Aid roads, involving the improvement of 10,580 miles at an estimated cost of $92,933,000.

TO FINISH DETROIT-FLINT ROAD

PONTIAC, MICH., May 24—A request was received May 23 by the County Road Commission from the State Highway Department that work be started this summer to complete the unfinished portion of the Detroit-Flint turnpike. This is a stretch of approximately 10½ miles, and is the only bad portion of the route. The United States Government will pay 40 per cent of the cost of the improvement, the state 25 per cent, while the rest will be paid by the county.

N. Y. TO SPEND $16,000,000 ON ROADS

ALBANY, N. Y., May 23—The expenditure of over $16,000,000 for roads is contemplated by New York State this year. The state is to receive from the License Bureau in 1920 over $8,000,000 to be spent for maintenance and repair of highways as against $2,700,000 from the same source in 1918. In addition, the various towns and counties will spend over $5,000,000 for the same purpose.

INDIANA ROAD LAW

INDIANAPOLIS, IND., May 18.—Indiana is to have a State Highway Commission, according to a law passed at the last legislature. The commission will take charge of the establishment of a system of state highways, the construction, maintenance, repair and control of public highways, the creation of a state highway fund, the violation of the provisions of the act, and will cooperate with the Federal Government in the construction of rural post roads. The new act repeals the act entitled "An Act Creating a State Highway Commission, Etc.," approved March 7, 1917.

252 TRUCKS FOR PENNSYLVANIA HIGHWAY DEPT.

HARRISBURG, PA., May 24—The State Highway Department of Pennsylvania early in June will receive 252 motor trucks gratis from the Federal Government to be used in connection with the work on the roads to be improved in the State under the Federal Aid Plan. Colonel William D. Uhler, chief engineer of the highway department, has arranged all details of the transfer with the Washington authorities.

CANADIAN TRUCK LAWS

TORONTO, ONTARIO, CAN., May 23. —Among the amendments which the Ontario Motor League was successful in having made to the Motor Vehicles Act was the act to regulate the load of vehicles operated on highways to permit the operation of trucks having a width of not more than 96 in. instead of 90 in. as at present. An amendment was also passed requiring the wider motor trucks to carry lights on each side of the widest part of the truck visible from the front. This does not mean that trucks will have to carry additional lights, but simply that the front lights of the wide trucks must be attached to "each of the sides of the widest part of the truck and be visible from the front."

Canadian Truck Owners Form Association

Toronto Truckmen Get Together for Better Roads

TORONTO, ONT., May 21—The Ontario Motor Truck Owners' Assn., the first organization of its kind in Canada, was inaugurated Saturday evening, May 17, at a meeting held at the Ontario Motor Car Co.'s plant, with about sixty firms The following officers were elected: Chairman, Gordon Balleon; vice-chairman, Joseph Wright; secretary-treasurer, W. C. Robertson.

The Ontario Motor Truck Owners' Assn. will be province-wide in scope and activity, as is the Ontario Motor League, with which it is affiliated, and of which it is a branch. The objects of the new organization are, briefly: 1—To promote the construction of good, permanent, all-year roads—high efficiency highways, capable of carrying the rapidly developing rural and interurban motor express; 2—To secure salutary legislation and to combat adverse regulations and laws; 3—To facilitate the development of efficient and economic motor trucking by co-operation, co-ordination and standardization.

CO-OPERATION GETS RESULTS

GRAND RAPIDS, MICH., May 26.—Quick freight service from Grand Rapids and all central Michigan points, reached by the Michigan railway to points in Wisconsin and Illinois, is the purpose of traffic arrangements just completed between the Michigan Railway, the Muskegon interurban, the Crosby line and the Chicago, North Shore & Milwaukee Electric Railway.

The motor truck will be the deciding factor. Freight originating on the Michigan railway will be delivered by truck to the Muskegon interurban, and will be rushed through with the Grand Rapids shipments to Muskegon to catch the Crosby boat for Milwaukee. Motor trucks will deliver the freight from the steamboat to the electric terminal and two trains daily will take it to Racine, Kenosha and other points along the Wisconsin shore. The truck service rates will be somewhat higher than ordinary freight, but will be considerably less than freight rates.

FIRESTONE PHILA. BUREAU

PHILADELPHIA, PA., May 20—A Ship by Truck Bureau, one of a chain already established in seven large eastern cities and soon to spread all over the United States, has been opened by the Firestone Tire & Rubber Co., Inc., at 312-314 North Broad Street, Philadelphia, Pa. Other centers in the eastern territory in which the plan is already operating are New York, N. Y., Newark, N. J., Scranton, Pa., Baltimore, Md., Washington, D. C., and Harrisburg, Pa.

100 St. Louis Trucks in 1-Week Convoy Trip

Route 370 Miles in Two States —Dates Are June 2 to 9

ST. LOUIS, MO., May 24.—The Commercial Car Bureau of the St. Louis Automobile Mfrs. and Dealers' Assn. has completed plans for the 1-week truck expedition which is to be run out of St. Louis June 2 to 9, over a proposed route of approximately 370 miles. The route of the expedition will be from St. Louis through the following Missouri towns: St. Charles, Louisiana, and Hannibal; then across the Mississippi River through the following towns in Illinois: Quincy, Rushville, Beardstown, Jackson, and Alton, from which the trucks will return to St. Louis.

The purpose of the trip is to show the farmers of Missouri and Illinois and the merchants in the smaller towns that the motor truck is as practical a commercial vehicle on country roads as on city streets. L. H. Amrine is chairman of the committee in charge of the expedition. Indications are that more than 100 trucks will be entered. Any style trucks up to and including 2 tons will be permissible. The trucks will be divided into three sections, each section to be piloted by an official observer. Motorcycle sidecars will be used en route and will act as scouts.

Scouts will be sent out several days before the tour to report accurately on road conditions and to make arrangements at the different towns.

The train of trucks will not move faster than 10 miles an hour. Night driving will be barred. Speakers will accompany the trucks and deliver short comprehensive talks on good roads, modern transportation, etc.

ILL. MAIL DELIVERED BY TRUCK

BLOOMINGTON, ILL., May 16—Securing bids that were believed reasonable, the Post Office Department has let a contract for handling of mail between the Post Office at Rock Island, Ill., and all suburban points and depots, to a company which will use motor trucks.

URGE M. T. C. RETENTION

WASHINGTON, D. C., May 20.—With the opening of Congress this week, considerable interest centers about the future of the Motor Transport Corps. the continuance of which as a separate body in control of the operation, maintenance and purchase of trucks, etc., will be urged by army officials. During the last session the army bill provided for the disbandment of the M. T. C. and the return of the old system under which the control of trucks and other motor vehicles would be placed under each separate division. This plan was followed prior to the war when the Quartermaster Department, Signal Corps, Aviation, Engineer and other divisions each purchased and maintained their own supplies of motor vehicles with a certain amount of confusion, conflict and a needless waste of labor.

The consolidation of the M. T. C. as a separate organization eliminates the duplication of effort and tends to insure a standardization of army vehicles. It is planned to introduce a bill in this session which will continue the M. T. C. as a separate division and place the maintenance, design, production, procurement and operation of trucks, automobiles, motorcycles, trailers and bicycles under it and leaving tractors and tanks under the control of the Ordnance Department.

3% OR 5% TRUCK TAX UNSETTLED

NEW YORK, May 22—The Treasury Department ruling covering the tax on motor truck chassis is being reconsidered. Following protests from fifty-seven dealer associations, including the National Automobile Dealers' Assn., Commissioner Roper telegraphed the N. A. D. A. as follows: "Ruling regarding tax on chassis being reconsidered. When decision is rendered you will be notified." The ruling in question classifies a truck chassis as a part and as such requires a tax of 5 per cent. The contention is that a truck chassis is a sales unit and should be taxed as a complete unit at 3 per cent.

IOWA LIMITS TRUCK LOADS

DES MOINES, IOWA, May 18.—The new laws governing motor vehicles, passed by the recent session of the Iowa legislature may cause truck manufacturers to alter construction specifications. The section of the motor vehicle law which may cause trouble is that which refers to the maximum weight which a truck may carry. The section of the law is as follows:

"The total maximum load on any one wheel of any motor vehicle, including the weight of the vehicle and the load it carries, shall be 4 tons, provided the total maximum weight of the vehicle and load shall not in any event exceed 14 tons. The total load on any wheel of any vehicle shall be limited to 800 pounds per inch of tire width in actual contact with the road surface, measured at the narrowest point of the tire, on all highways improved with a rigid surface such as concrete, brick or bituminous pavements on a concrete base; and 400 pounds per inch of tire width in actual contact with the surface, measured at the narrowest point of the tire, on all highways having earth, gravel or similar surfaces.

"The maximum width of any motor vehicle and its load shall be limited to 8 feet excepting loads of loose hay, straw and similar farm products."

NEW DIVISION IN DEALERS ASSN.

ST. LOUIS, MO., May 19—A commercial division of the National Automobile Dealers' Assn. has been formed to handle all problems that arise solely in the truck sales field. N. H. Certinour of the Certinour-Bowman Co., Indianapolis, is commissioner of the division.

Postpone Payments of Truck User Tax

Time for Trucks Competing with Railroads Is June 15

WASHINGTON, D. C., May 26.—An extension of time has been allowed to operators of motor truck freight or express routes for filing return of taxes due under the Revenue Act for the periods from February 25 to March 31, and from April 1 to April 30, 1919, until June 15, 1919. The extension has been granted because of an unavoidable delay in the printing and distribution of the necessary blank forms for making the returns.

The specific section of the act referred to is No. 500, which imposes a tax of 3 per cent on the transportation of goods by freight or express on motor trucks when competing with rail or water lines.

LANE TRUCK SOLD

KALAMAZOO, MICH., May 19—The Kalamazoo Motors Corp. has been formed with a paid in capital of $250,000 to take over the business formerly conducted by the Lane Motor Truck Co., of Kalamazoo. The officers of the new company are: President, H. A. Crawford; vice-president, C. J. Johnson; secretary, R. N. Gregory; treasurer, W. B. Milham; chief engineer and production manager, L. W. Coppock. The company has already taken possession of the building formerly used by the Lane Motor Truck Co.

The truck, which will be made by the new company, will be known as the Kalamazoo, and will come in three sizes, 1½-, 2½- and 3½-ton models. The company plans an output of 1000 trucks a year.

S. A. E. TRUCK PAPERS

NEW YORK CITY, May 27.—Among the many automotive subjects which will be discussed at the summer meeting of the S. A. E. which will be held at Ottowa Beach, Mich., from June 23 to 27, will be several papers on the subject of motor trucks. These are as follows: "Motor Truck Ability and Its Relation to Trend of Truck Design," by L. P. Kalb, assistant supervising engineer, Standard Parts Co.; "Efficiency and Durability of Ball and Roller Bearings in Worm-Driven Axles," by K. Heindlhofer, research engineer, S-K-F Ball Bearing Co.; "Steel Truck Wheels," by P. W. Klinger, chief engineer, Dayton Steel Foundry Co.

MIRRORS FOR N. Y. TRUCKS

ALBANY, N. Y., May 18.—All trucks over 1-ton capacity operating in the State of New York must be fitted with a mirror so that the driver may have a view of the road behind him. The Booth Bill, which makes this law effective, has been signed by Governor Smith.

Maintenance of Trucks by Owners Requires Suitable Equipment

THE Motor Haulage Co., operating forty-seven 5-ton Pierce-Arrow trucks for hire or contract work in New York City, has found that it costs only half as much to maintain its trucks itself as to have the work done at the local service station of the truck maker. This is not because the maker's service station does not give a satisfactory service to any and all owners of Pierce-Arrow trucks in the Metropolitan territory, but that the Motor Haulage Co., with its own crew of men and equipment, is able to get quicker service than even the best public service stations can give. In a public service station each truck must wait its turn, in order that all owners be treated alike. This sometimes causes delays to one truck if several others are in the shop ahead of it. Delays due to this cause are of course eliminated by the Motor Haulage Co. because its repairmen do no other work except on its own vehicles. For a rush job they are ready at a moment's notice. Then again, there are no delays through running from garage to the service station and back again. With a large number of trucks there is always one or more in the shop to keep the men busy. If sent to the service station there is a waste of time in coming and going and also in tieup in traffic.

Trucks Are Centrally Located

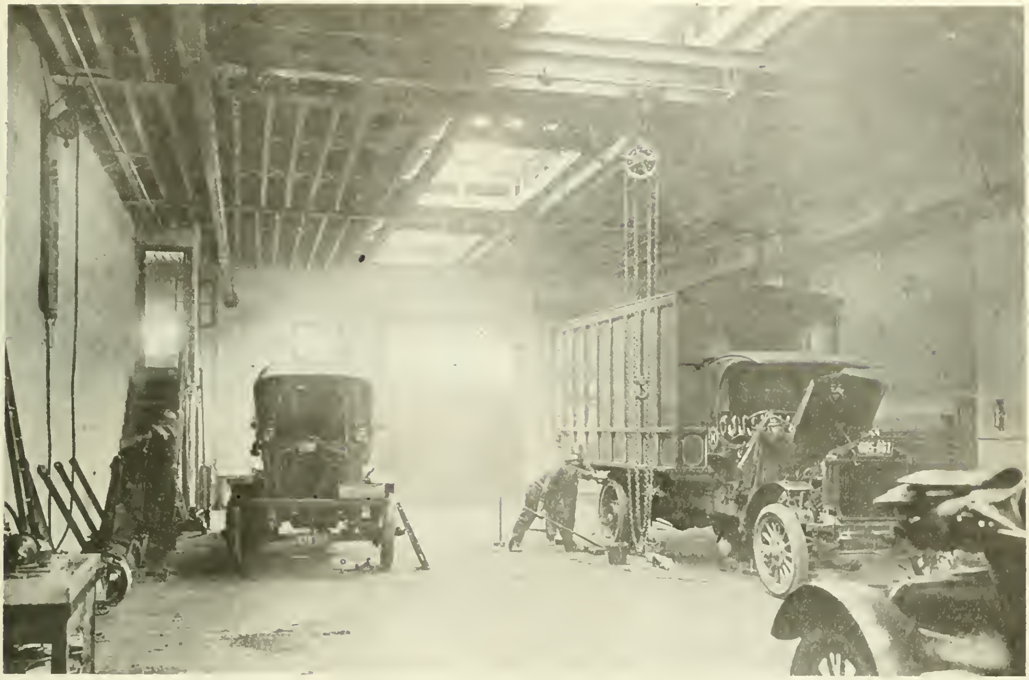
Realizing this difficulty and also other problems which enter into the insurance of delivery schedules without delays, the Motor Haulage Co. has located a service station and garage in Brooklyn. Here the trucks are centrally located near the Brooklyn shipping district, also convenient to the ferry service to New Jersey and to the lower part of New York City, where the big shipping center is located. This company also has a garage in New York City at Nineteenth Street and Avenue B, where about one-half of its fleet is stored. These trucks are used mainly for the yearly contract work where the work is similar day in and day out. In the event of mechanical trouble occurring to these trucks, they are immediately replaced by the extra service trucks from Brooklyn and the truck requiring attention is brought to the service station in Brooklyn.

Garage and Repair Shop Adjacent

The garage, which adjoins the service station in Brooklyn, was designed to accommodate twenty-six 5-ton Pierce-Arrow trucks, thirteen on each side of the building, with an open passageway between. It has a 75-ft. front and a 100-ft. depth. It is well lighted by means of ample window space, there being three double windows in the back wall and three others in the front wall. There are ten skylights evenly distributed in the roof for additional light. It is lighted by fifteen 100-candlepower electric lights, evenly distributed overhead. There are two drains for water, each placed in a straight line in the center of the concrete floor, which slopes toward them. Another feature of the garage is the fact that only four 1-ft. wide roof supports are used. These are placed 25 ft. apart in the center of the floor in the form of a square. The single sliding door is 12 ft. wide. The

This Machine Shop Was Designed for Comfort as Well as Efficiency

A wood floor is mounted on sleepers on the concrete to save the mechanics from the discomforts of a cold and damp concrete floor. The wood section extends from about 20 ft. in from the front entrance to the rear of the shop. The space between the wood floor and the entrance is occupied by a cement floor which is flush with the wood floor. The garage is lighted overhead by five skylights, on the side by four single windows and at the rear by four double windows, one of which is in the blacksmith shop



Only One Operation Needed in Lifting Out an Engine With This Crane

The engine or any other unit can be taken out of a truck and moved to any part of the Motor Haulage Co.'s repair station without the necessity of a second operation. The unit stays on the crane until it is finally placed, either on a lathe, testing stand, or on the washing stand. The crane runs the length of the garage on two tracks at either side of the garage. The crane itself is set transversely or across the building

garage adjoins the repair shop under one roof. Between the garage and the repair shop are located two fire-proof walls between which are located the blacksmith shop, stockroom, oilroom, chauffeurs' room and lavatory. The office is located at the entrance end above the lavatory and is connected to the shop and garage by two stairways leading to these respective departments.

Wood Floors in Repair Shops

The repair shop is 50 ft. wide and 100 ft. deep and was designed for the comfort of the mechanics as well as for efficiency. As the concrete floor is damp at all times and as a result injurious to the health of the mechanics, a wood floor has been laid over the concrete floor up to a point 20 ft. from the single street entrance. In order to accommodate this wood floor, the concrete floor upon which it is mounted is 1 ft. deeper than the concrete space between the wood floor and the entrance. As a matter of economy, one heating plant is used for both the garage and the shop. This plant is located under the concrete floor leading from the entrance to the machine shop. The repair shop is well lighted by means of five skylights and four double windows in the rear and three at the side.

Equipment Complete

The company has arranged its equipment in the repair shop so as to allow for a maximum of efficiency in the maintenance of its trucks. The repair bench runs about one-half of the length of the side wall and is made of heavy planking for lasting qualities and to avoid vibration when hammering and doing heavy work. A table with three deep drawers has been conveniently placed in front of the lathes in order to facilitate the work and to provide space for the small parts belonging to the lathes.

An overhead traveling crane is provided and runs the length of the shop with a capacity of 3 tons. This makes it accessible in all parts of the shop. The crane is as wide as the shop and runs on two tracks. By this method parts may be lifted from the truck and taken directly to the bench or lathe without a second handling.

The machine shop equipment consists of a large and a small lathe, a drill press, arbor press and a grinder, run from an overhead shafting and operated by an electric motor. This same motor provides power for starting engines on the test stand, when they are still too light for hand-cranking.

Testing Stand for Engines

The engine-testing stand allows this company to run in all of its overhauled engines before installing them in the trucks, thus eliminating all leaks or slight adjustments that could not otherwise be detected and making it possible for the drivers to crank their engines without the usual difficulties experienced after an engine has the bearings tightened.

A magneto test stand is provided, consisting of a small table with a small electric motor. A rheostat on the side of the table and a gap-board are provided. The rheostat controls the speed of the motor, so that the magnetos may be tested at all speeds and all necessary adjustments made before being replaced on the truck.

All parts are washed in kerosene on a washing table provided with a trough running around the edge with a flat surface in the middle, as per illustration. A drain is provided in the bottom of the trough and the kerosene changed whenever sufficient sediment has collected to warrant doing so. The trough is 4 in. deep.

All Forging and Ironing of Bodies Done Here

Much time is saved by having all forging work done in its own blacksmith shop instead of sending this kind of work to outside places where delays occur

A Convenient Way of Washing Parts

Kerosene is used in a trough which runs around the outside of this washstand. Large parts are washed on the table inside of the trough: The kerosene is run out through a drain pipe at the bottom of the trough

The company does its own welding with the use of an oxy-acetylene outfit, mounted on a portable two-wheeled carrier.

Box for Scrap Parts

In order to keep scrap parts off the floor, a box was made with two compartments so that different metals could be separated. The men are instructed to throw all parts removed from the truck into this box. These scrap parts are sold for junk and at this time any repairable parts that have been put in the box are picked out by the foreman and laid aside for future use.

The blacksmith shop is located at the rear end of the dividing section between the garage and the repair shop. Here the company does all of its own forging and ironing of metal bodies without delay.

All of the parts are grouped and card-indexed and stored in bins so that the stockroom clerk can provide and charge to the proper truck all parts used in the repair work. A small window is provided in the dividing wall between the garage and the shop, so that any small parts or equipment needed by the drivers may be obtained without their entering the machine shop proper.

A tote-box is provided for the purpose of keeping all parts of one unit together in its progress through the repair shop. This device consists of six metal boxes. These set into a rack provided for that purpose.

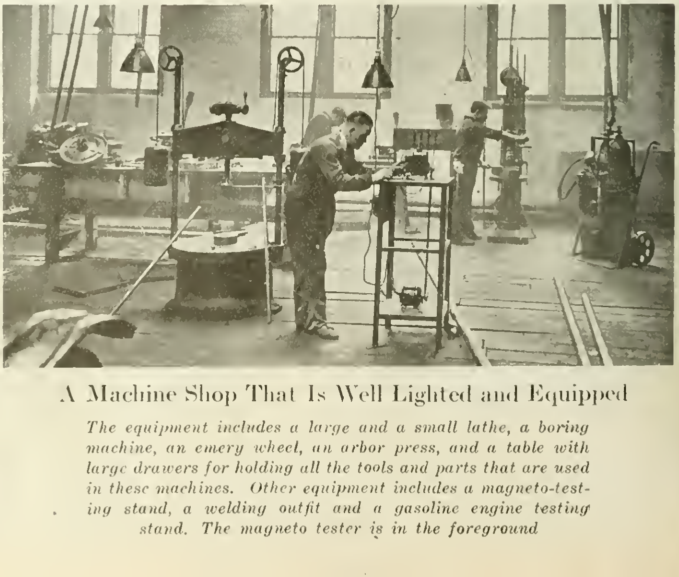
Trucks Inspected Every 6 Weeks

Truck inspection is on a 6 weeks' schedule and 1 full day is given to each truck. Lubrication, adjustment and replacement of small parts or, if necessary, entire units, are included in the inspection. The entire system is on a spare unit basis, so that reserve engines, rear ends, transmissions, radiators, etc., may be replaced at this time. This eliminates the necessity of the complete overhauling of the trucks, as a truck is kept continually in good mechanical condition and 1 day's time is ample to install any new units that may be needed. Due to the fact that the men are taught to specialize, in so far as possible, on different parts of the trucks, all of the different units, such as engines, rear ends, transmissions, etc., might be replaced during an inspection period of 1 day by concentrating the efforts of the entire shop on 1 truck. Inasmuch as it is not necessary to do this, ample time is given to the men to repair the spare units as they come out of the trucks.

Parts on Hand Valued at $6,000

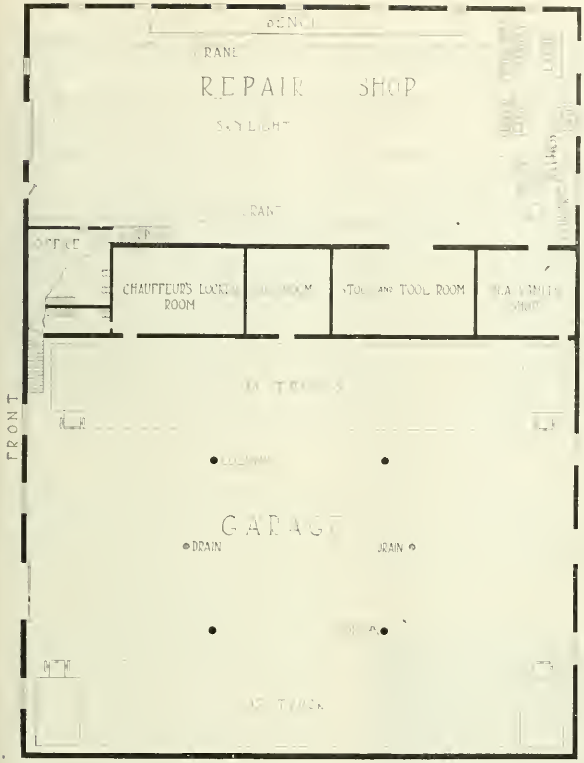
To avoid delays in the inspection system, sufficient parts are kept on hand to take care of all replacements without depending upon the service station for each individual job. The average valuation of the disassembled parts carried in stock is $6,000. The valuation of the spare units, such as engines, radiators, etc., is between $5,000 and $6,000.

Particular attention is paid to the lubrication of the engine. This is so in both the Brooklyn and New York garages. The oil is changed in the engines twice a week, and once each week the engines are washed out thoroughly with kerosene, which is thoroughly drained off.



A Machine Shop That Is Well Lighted and Equipped

The equipment includes a large and a small lathe, a boring machine, an emery wheel, an arbor press, and a table with large drawers for holding all the tools and parts that are used in these machines. Other equipment includes a magneto-testing stand, a welding outfit and a gasoline engine testing stand. The magneto tester is in the foreground



Garage and Repair Shop Entirely Separated

The dividing line consists of two walls in between which are located the blacksmith shop, parts room, oil room, wash room and office. The office is on a balcony right above the wash room and connects both the garage and repair shop by stairways on both sides. The garage is designed to hold twenty-six Pierce-Arrow trucks and the shop four

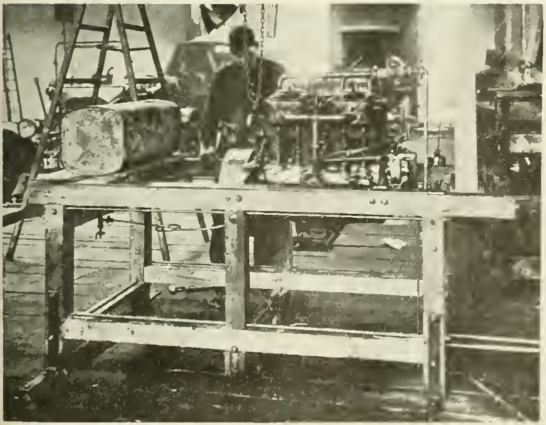
Scrap Box for Discarded Parts

Instead of throwing discarded or worn parts in one pile, they are segregated, the copper and aluminum parts going in one section and the iron into the other compartment

Delicatessen Goods Delivered in Big Area by Motor Trucks

(*Continued from page* 9)

trucks out of the garage the next morning. This work usually starts around 5 a. m. The reason for this is that though the drivers may be skillful enough to handle the trucks in and out of the garage, the possibility of accidents occurring in the cramped garage space is too great to take any chances. And then again, the drivers are usually too tired after a full day's driving on their routes to bother waiting around to run their trucks into the garage. On account of the garage construction, the trucks must be run onto an elevator one by one before any of the three floors can be reached. As a result, much time is consumed, usually from 1½ to 2 hours.



Repaired Engines Tested on Stand

Here they are run in to eliminate the stiffness that occurs after bearings have been tightened. The engine is belt driven and its speed regulated by means of a stepped cone pulley

All Parts Are Card Indexed

Each part has its own serial number and box or compartment in the stands built for the purpose. Parts and units on hand amount to about $12,000, *enough to build two truck chassis*

Industrial Tractors Found More Economical Than Gravity or Monorails for Cotton Handling

Fleet of Eight G. V. Tractors and Forty Trailers Gives Excellent Service at Modern Warehouse and Compress Plant at Savannah, Ga.

TESTS and investigations carried on by the Savannah Warehouse & Compress Co. before it built its 45-acre plant at Port Wentworth, Ga., showed the use of electric industrial trucks to be more economical than either a gravity or a monorail system of handling baled cotton. Accordingly, the Compress company purchased eight G. V. electric industrial tractors and forty four-wheeled platform trailers manufactured by the Electric Wheel Co., Quincy, Ill. Since this equipment was installed in February, 1917, it has more than paid for itself in the reduced cost of handling the cotton. The equipment and the satisfactory work which it has performed have confirmed the company's original deductions that it would do the work more cheaply than by hand or by a gravity or a monorail system.

The Combined Plant Idea

To understand the work of the electric industrial tractor and trailer equipment most thoroughly it is perhaps best to start in at the beginning and tell of the evolution of the Savannah Warehouse & Compress Co. Until February, 1917, most of the cotton received in Savannah was shipped by rail to the terminals of the six railroads at that time entering the city. The baled cotton was then hauled either to a warehouse to await sale in the Savannah market or moved direct to one of the several compressers where it was further compressed and the bales reduced in size in order to save shipping space in the vessels transporting it to northern ports or overseas.

The eight G. V. industrial tractors lined up before the special garage in which they are maintained at the plant of the Savannah Warehouse & Compress Co. Each tractor works from 10 to 12 hours a day and covers approximately 25 miles

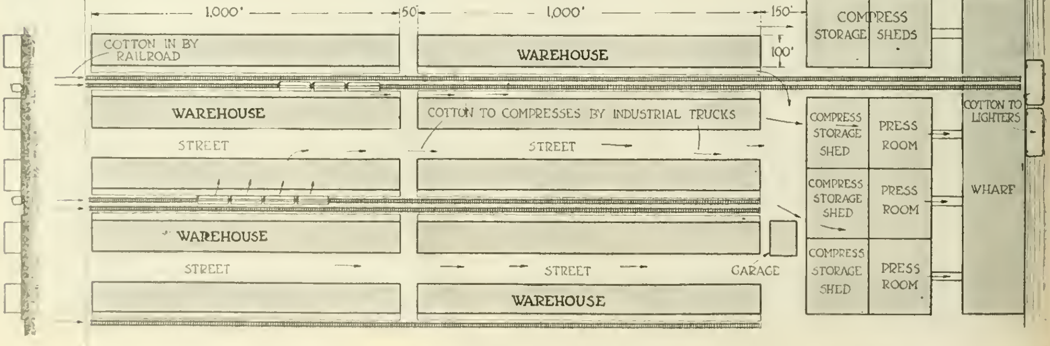
This method was a most wasteful one on account of the many handlings of the cotton from the time it was received until it was again shipped out of the city. It was also a wasteful method because of the many delays which resulted in the large number of handlings.

Plant Land Cheap

To overcome these difficulties, the idea was conceived of establishing a common warehouse and modern compress to which all of the cotton shipped to Savannah could be transferred in the same freight cars in which it was received by means of running spur tracks from each of the railroads to the combined warehouse and compress. The establishment of one of the largest warehouses and compresses in the entire South at Port Wentworth, 5 miles up the Savannah River, expressed the physical completion of the idea. At Port Wentworth land was cheap and the plant could be laid along the most advanced lines with modern facilities for unloading, compressing, storing and loading the cotton directly onto lighters tied up to piers extending out from the company's property into the Savannah River. Once loaded, the lighters were then towed down the Savannah River to deep water where the cotton could be loaded directly onto the ships to carry it to northern or European ports.

Five Railroads Use Plant

When the compress plant and warehouses were completed in February, 1917, all except one of the six railroads enter-



Plan view of the Savannah cotton warehouse and compress plant, showing the size of the unit warehouses and how each is served by a railroad spur for the incoming cotton and by a 100-foot concrete street for the cotton being moved to the compresses. The arrows indicate the direction in which the cotton moves

General view of the compress storage sheds to which the low-density bales of cotton are moved from the warehouses by means of the industrial tractors and trailers. From the sheds shown, the bales are moved to the compresses by hand and from them to the wharf also by hand, from where they are loaded onto lighters

ing Savannah laid special spur tracks, so that cotton could be shipped direct to the compress without a warehouse handling in the city. The Midland Railroad, perhaps the smallest of the six, did not enter into the agreement with the warehouse for tracking privileges on the ground that it had to make a continual fight against the other larger railroads to get its empty cars back so that they could be returned to the cotton-growing areas where new shipments could be loaded.

The fact that the Midland company did not enter into the trackage agreement did not prevent it from delivering cotton to the Port Wentworth warehouses. It employed a new method consisting of the use of a fleet of 5-ton trucks and 5-ton trailers, as described in greater detail in THE COMMERCIAL VEHICLE of Jan. 15, 1915. During 1918, the motor trucks handled 20,000 bales of cotton from the Savannah terminal of the Midland Railroad to the Port Wentworth warehouses. Due to the great railroad congestion in the South and the scarcity of cars, the use of the trucks enabled the Midland Railroad to release its cars more quickly than could be done at the Port Wentworth warehouses, notwithstanding their ideal layout.

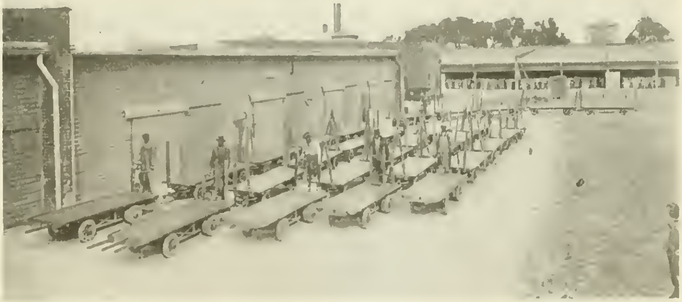
The Warehouse Layout

As shown in the large plan view sketch of the warehouse property at the bottom of page 20, the compress rooms are located directly in back of the lighter wharves, with the compress storage sheds in back of the press rooms and the cotton warehouses in back of the compress storage sheds, so that the cotton as received travels in one direction from the warehouse to the lighters.

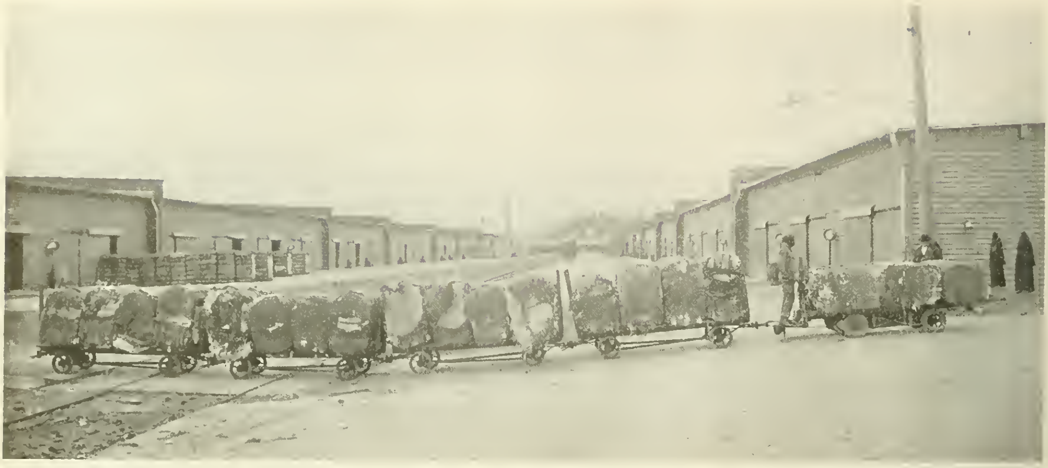
To provide for rapid unloading from the railroad cars, the warehouses are divided up into two groups of four each, each served by two railroad tracks running lengthwise between each group and a third group of two warehouses served by a railroad on one side. Each of the cotton warehouses is 1000 feet long and 100 feet wide. A total of 100 warehouse sections for as many cotton brokerage concerns are thus provided with storage capacity for 150,000 bales at one time. As shown in the illustrations on this and the two other pages of this article, the warehouses are only one story in height and are made of wood fronts and rears with dividing fire walls of brick. Each warehouse is provided with outside sliding doors, those on the sides of the warehouse facing the railroad tracks being employed to put the cotton into the warehouses and those on the other side to take it out and move it to the compress storage sheds, from which it is transferred directly to the press room.

To prevent any lifting of the bales

One of the tractors with its total tractor and trailer load of nineteen bales, which at 500 pounds to the bale gives a total weight of 9,500 pounds or 4¾ tons



A line-up of five of the tractors, each with four empty trailers. Note the extension at the front of each tractor to enable it to carry three low-density bales of cotton



A general view down through one of the groups of four warehouses, showing the two railroad tracks, one for the two warehouses on each side; the platforms level with the floors of the freight cars and a tractor and trailer train passing through one of the concrete cross streets between the ends of the warehouses

in the transference from the freight cars to the warehouses, the railroad tracks are sunk so that the floor of the freight car is level with the concrete platforms in front of the warehouses. These platforms are level except for a short 50-foot space between the ends of the warehouses where their ends are inclined to permit movement of the industrial tractors over the railroad tracks from one warehouse unit to another. The space between the adjacent group of warehouses where the railroad tracks are not laid is concreted to form streets 100 feet wide over which the industrial tractors and trailers may operate at their maximum efficiency. In fact, there is no space anywhere on the company's ground over which the industrial equipment operates which is not concreted in order to make the operation of the equipment most economical. If these streets had not been concreted, it is doubtful if the use of the industrial vehicles would have proved so economical as compared with the gravity or monorail systems of transferring the cotton from the various warehouses to the compress rooms and finally to the lighters.

On account of the inflammability of cotton, an elaborate fire protection system has been worked out with hydrants located at convenient intervals in the streets between the warehouses in addition to conical shaped fire pails hung on each side of the warehouses between all doors.

One-Third Handling By Hand

Practically all of the cotton received at the warehouses, with the exception of the 20,000 bales handled in 1918 by means of motor trucks, is received direct in freight cars. Approximately 300,000 bales of local cotton are received by rail at the compress. The total normal receipts at the warehouse are 1½ million bales yearly, some small percentage of which is received on lighters.

Only approximately two-thirds of the cotton handling is done by the industrial vehicles, the remaining one-third being done by hand. The industrial vehicles are used to unload the cotton directly from the cars and carry it into the interior of the warehouse, where it is piled by hand. The tractors run inside of the freight cars as soon as sufficient cotton in the central sections of the cars in the way of the doors has been removed. This saves moving the cotton out by hand and then loading it on to the vehicles. The cotton then remains in the warehouse until such time as it is sold and reloaded or carried to the compress for the high-density compression.

The Vehicle Work

The tractors and trailers are used for the transference of the low-density bales of cotton from the warehouses to the compress storage sheds. As the total length of each warehouse is 1000 feet with a 50-foot street between, and a 150-foot street between the warehouse nearest the compress storage shed, the maximum distance over which the vehicles operate is approximately 2500 feet or about ½ mile, when the runs are made direct from the warehouse down the nearest street or platform to the compress storage shed. It is this ½ mile maximum haul which has enabled the industrial vehicles to make such a good showing as compared with what it would cost for the same transfer by means of gravity chutes or a monorail system. The minimum hauls are anywhere from 100 to 500 feet.

Once placed in the compress storage sheds, the cotton is then handled by means of hand trucks to the compress machines and from them to the wharf, from which it is loaded onto the lighters.

Each of the tractors is capable of carrying three bales of low-density cotton, each weighing approximately 500 pounds. When the long hauls from the warehouses to the compress storage room are made, each tractor hauls four of the four-wheel trailers, each of which carries four bales. This gives a total tractor and trailer load of 1½ tons on the tractor and 2 tons on each trailer, or 9½ tons in all.

Only One Man Needed for Tractor Train

All of the tractors and trailers are loaded by hand with negro labor, which is also employed for operating the tractor. Only one man is required for the train of tractor and four trailers, as shown in the illustration at the top of this page.

Each of the tractors averages about 25 miles a day and operates from 10 to 12 hours, depending upon the season. All of the equipment is maintained in a special garage built between the compress sheds and the ends of the adjacent warehouses. There complete charging apparatus, extra batteries and battery equipment are provided so that all of the tractors are available for use during the working day. Both the tractors and trailers are fitted with metal wheels mounted on solid rubber tires to give greater speed and at the same time protect the concrete pavement. Neither the tractor nor the trailers are of the self-elevating type. The bales are loaded and similarly unloaded by hand. This is no difficult task, since both tractor and trailers have very low frames, approximately 1½ feet off the ground.

When cotton is hauled to the plant by means of motor trucks, the vehicles enter the plant grounds at the same end as the railroad tracks. They then operate over the well-paved streets by the shortest route to the storage section of the concern whose cotton they are delivering. The cotton is then unloaded onto the pavement outside of the warehouse and later moved inside either by hand trucks or the industrial vehicles, depending upon the distance.

Republic All-Purpose Truck Body for Farm Work

Offered in Two Lengths, Each of Which May Be Converted Into One of Eight Forms for Variety of Farm Haulage

AN all-purpose farm body has been brought out by the Republic Motor Truck Co., Inc., of Alma, Mich., for use with Republic trucks. The body is designed to give the farmer a wider range of use for his truck. Eight types of bodies are combined in one, and so designed that one man can adjust it to any desired type in a few seconds.

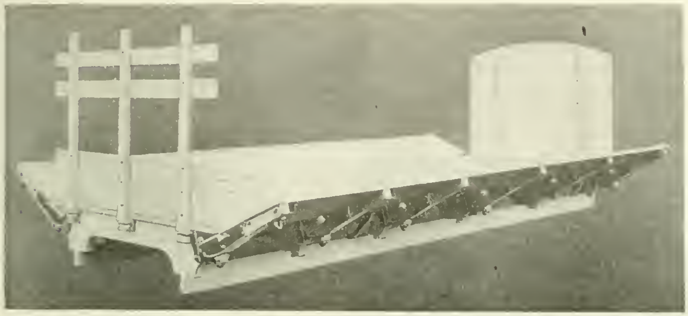
The body is made of kiln-dried hardwood lumber and well ironed so as to prevent rattles. It is made in two sizes, known as Nos. 1 and 2. The No. 1 body is 9½ ft. long and is a combination platform and wagon box, as illustrated. The bare body sells for $115.

No. 2 body is 11½ ft. long and is a combination platform and wagon box, as illustrated, selling for $135.

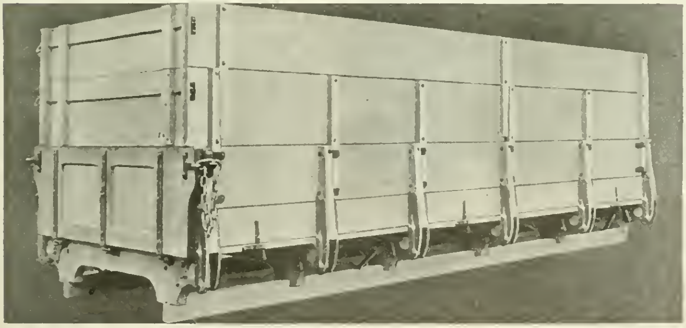
The extra side racks to convert the body into grain, fruit and cattle type are $33 on the No. 1 size and $36 on No. 2. The weight of the No. 1 body, combination platform and wagon box only is 500 lb., and of No. 2 600 lb. All the paint work on these jobs is standard green with light green stripes.

Some of the different types of bodies are illustrated and the purposes for which they are intended are outlined.

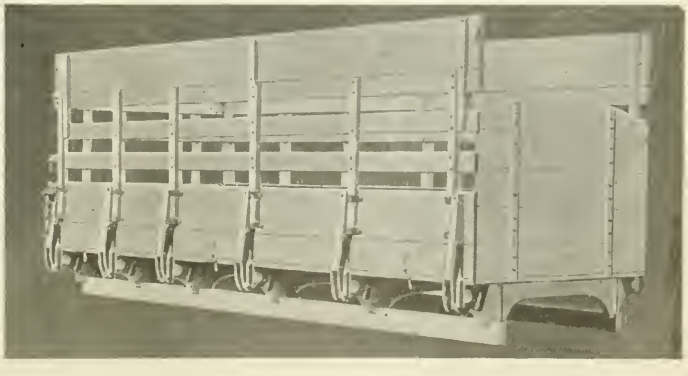
This is but another one of the attempts to solve the truck-body problem from the standpoint of the use of motor trucks on the farm. Loads of such wide variety have to be transported in this service that convertible bodies are really essential.



Platform hayrack useful in hauling hay, wheat, oats, cornstalks, etc. By using a different set of supporting stakes we obtain a platform with level extension side boards, head board and end gate, suitable for hay, grain in bags, cement in bags, fertilizer in bags, fruit produce in crates, poultry in crates, farm machinery, dressed meats, fence posts, etc. Entirely removing the extension boards makes a platform type truck with head board and end gate adapted to stone hauling and other heavy duties



Three-section tight removable side box for barnyard fertilizer, cabbage and bulky produce. Removing top side boards makes a combination grain, apple and potato box with two-section tight removable sides. Removing the remaining side boards gives a regulation wagon box with removable sides and end gate arranged for hauling loose materials such as coal, dirt, gravel, grain, etc.



Cattle rack type adapted for hauling cattle and also transporting cotton and similar materials requiring a rack enclosed body. Removing the side boards converts this into a combination stock and basket rack box suitable for hauling hogs and sheep and crated goods

One of the Big 8 in Truck Operation

GASOLINE

Fifth Avenue Coach Co. Reduces Cost of Gasoline and Oil Consumption by Keeping Drivers Interested in Work and Awarding Prizes for Results

One of the Ace drivers with his bus, showing the Ace flag indicating that the driver has run his bus during the previous week with the lowest gasoline consumption per mile. The Ace method of attempting to reduce gasoline consumption was replaced by a bonus system and again by a baseball game

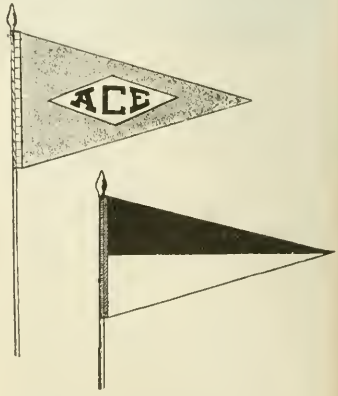
"GASOLINE is money, boys. Save it as though it were your own." This motto appears on a small plaque set up on the windshield mounting of every Fifth Avenue bus. It is short and to the point but has more behind it than appears on the surface, for as a result of its use the Fifth Avenue Coach Co. has saved approximately $6,000 on its gasoline bill from July to Dec. 1918. This is a reduction of 4 per cent. This large saving and its method of attainment are of the utmost importance to every motor truck owner in the United States, no matter whether he operates one truck or 100. Its importance increases directly as the size of the fleet. As told in THE COMMERCIAL VEHICLE of April 15, the cost of gasoline is one of the Big 8 of truck operation. Next to drivers and tires, gasoline is the most important item in the cost of running a motor truck.

Last summer the Fifth Avenue Coach Co. made a concerted attempt to reduce the cost of gasoline consumption. To that company, even a small reduction means a great saving in the aggregate since its 285 trucks run a total of 693,052 miles a month and consume a little over 118,813 gal. of gasoline.

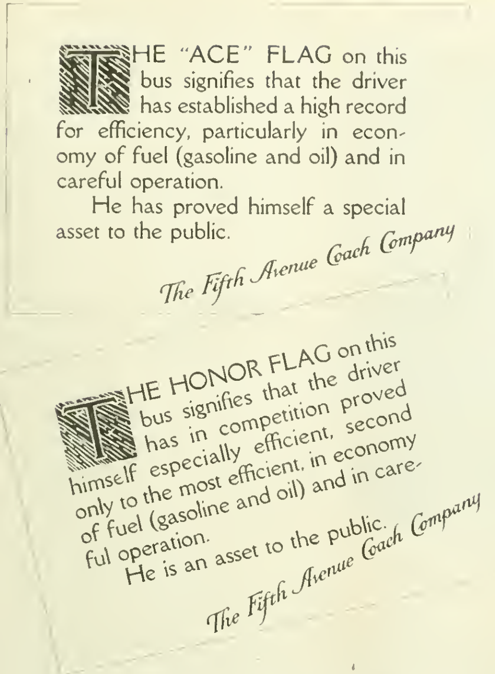
When it is considered that the Fifth Avenue Coach Co.'s charge for its service is on a fixed basis of 10 cents per passenger and not governed like other companies, which may boost their prices to meet higher expenses, it is manifest that this company must rely entirely on the efficiency of every unit in its organization. That is one reason that so much attention has been paid to fuel economy.

All of the company work along this line has been psychological, that is, it has been planned so as to keep up the interest of the men. To keep up their interest, something new had to be put into action before their enthusiasm over one plan waned. As a result, since the inception of the gasoline saving drive last July, no less than three different fuel economy plans have been put into action. The first one was the awarding of pennants to the two leading drivers of each of the three garages and getting publicity in the newspapers on the event; the second plan was a contest open to all of the drivers in which a bonus of $135 in gold was awarded to the leading garage; and the third, now in operation, a baseball game, in which certain fuel mileages count for hits, which in turn are transformed to runs. Each game lasts 1 week or 7 innings, then the runs are added up, and the winning garage posted on the scoreboards.

The first plan, which, as stated before, started last July, created much rivalry between the drivers. Each winner of an "Ace" pennant, as well as the second best man who received



Above, the Ace flag and below the Honor pennant, indicating that the drivers on whose trucks they are flown operated them respectively at the lowest and next to lowest gasoline consumption per mile



THE "ACE" FLAG on this bus signifies that the driver has established a high record for efficiency, particularly in economy of fuel (gasoline and oil) and in careful operation.

He has proved himself a special asset to the public.

The Fifth Avenue Coach Company

THE HONOR FLAG on this bus signifies that the driver has in competition proved himself especially efficient, second only to the most efficient, in economy of fuel (gasoline and oil) and in careful operation.

He is an asset to the public.

The Fifth Avenue Coach Company

The Ace and Honor Man advertising cards placed inside of the buses whose drivers respectively operated their vehicles at the lowest and next to the lowest gasoline consumption per mile

BUS LINES

Vol III No 2 *Open Air to Everywhere* November 1918

BIG GAS SAVING CONTEST

OPEN TO ALL

The Fifth Avenue Coach Company announces its Great Inter-Garage Contest

$100.00 IN GOLD Will be awarded on January 1st to the garage which obtains the highest gas average all types considered, for the four weeks ending December 28th, 1918

Read details below

Front cover of one of the issues of the Fifth Avenue Coach Co.'s monthly house organ, giving details of the bus gasoline and oil consumption contest for a bonus aggregating $135

an honor flag, was allowed to carry these pennants on his bus until a rival driver took the coveted honor away from him.

As long as this driver retained first place and the pennant, he was called an ace driver. The ace flag is a green triangular pennant in the center of which is a gold-colored diamond carrying the word "Ace" in green letters. This flag is carried on the top of the driver's cab. The honor pennant is two-colored, one half being blue and the other half yellow.

The first day of the fuel economy system the drivers averaged 6 m. p. g. In less than 2 weeks under the ace system the average was brought up to 6.75 m. p. g. The winning ace averaged 9.8 m. p. g. for his bus for the entire week. Up to the closing of the contest in December and the inception of the bonus scheme, the buses averaged between 6 and 6.5 m. p. g., an increase of about 20 per cent over the 5 m. p. g. averages maintained before the ace system was put into effect in July. At the beginning of the contest, that is, when the trucks were averaging 6 m. p. g., the consumption of fuel totalled around 30,000 gal. per week. This was cut to 26,666 gal. for the week when the average was raised to 6.75 m. p. g. This was an economy of 3,334 gal. for the week and for a year meant a saving of 173,368 gal. on one system of buses and by one company. At 22 cents a gallon, this would mean a saving of $38,140.96, providing this average could be maintained for a period of 1 year. There are so many conditions that have to be taken into consideration, such as temperature, traffic conditions, etc., that it is impossible to maintain this fixed average all the year round.

Economize by Coasting

The economy of fuel is accomplished in different ways, some of which are up to the driver and others up to the mechanical maintenance of the Fifth Avenue Coach Co. Drivers economize by coasting more than formerly, which is possible without any reduction in schedule time. There are many hills on the New York streets and long grades where coasting is possible. Recent tests made by that company show a total coasting distance of 31.5 per cent of the round trip during an average traffic. In the afternoon, when the traffic was extremely heavy, this figure was cut down to 28 per cent. The 31.5 per cent coasting figure was made by a bus which started from 181st Street to make a round trip to 22nd Street, via St. Nicholas Avenue. It carried fifty-four passengers south bound and forty north bound. It coasted 62½ blocks, or 3.1 miles south. On the northern trip, it coasted 51½ blocks, or 2.75 miles. The one way mileage of this route is 8.97, therefore the coasting distance was 34.5 per cent south and 29.5 per cent north, or a total on the round trip of 5.67 miles out of the 17.94 miles, or 31.5 per cent.

The 28 per cent coasting figure was made during a run from 168th Street to Washington Square, via Riverside Drive. Eighty-seven passengers were carried on the north trip and eighty-seven on the south trip. The bus coasted fifty-five blocks, or 2.75 miles on the south trip, and forty-seven and one-half blocks, or 2.37 miles on the north trip. The one way mileage of this route is 9.1, therefore the coasting distance covered was 30 per cent on the south trip and 26 per cent on the north trip. The total coasting mileage was 5.12 miles out of 18.2, or 28 per cent.

Not only does the company pay particular attention to the coasting of its buses, but has gone a step further in regard thereto by instructing the drivers to coast at designated parts of their routes.

More sanity in stopping the buses has resulted in gasoline economy. In-

Drawing the individual prizes for the men of the winning garage. The bonus system was open for the bus drivers and conductors and the garagemen responsible for the maintenance of the buses. The total monthly prize was $135 divided up into eighteen individual prizes

stead of rushing up to a street crossing controlled by a policeman and throwing on the brakes to stop in time, the driver now uses a little gray matter and coasts up to the crossing so that little braking is needed. A good deal of economy has been accomplished by the co-operation between the driver and the repair or shop department. Every driver is now more careful to see that no brakes drag, as this is a fruitful cause of gasoline waste. The spark plug points are kept in much better condition. The compression in the four cylinders is watched more carefully. Carbureters have been much more finely adjusted, so that when a cold day comes there is more spitting than usual.

It so happened that the ace pennant scheme for fuel economy was in progress while the United States was at war, and at that time, a country-wide campaign was being waged to cut down fuel consumption. As a result, the Fifth Avenue Coach Co. went a step further in the hope of educating the public to the work it was doing in regard thereto, by carrying good-size posters on each of the pennant buses, explaining the meaning of the flag.

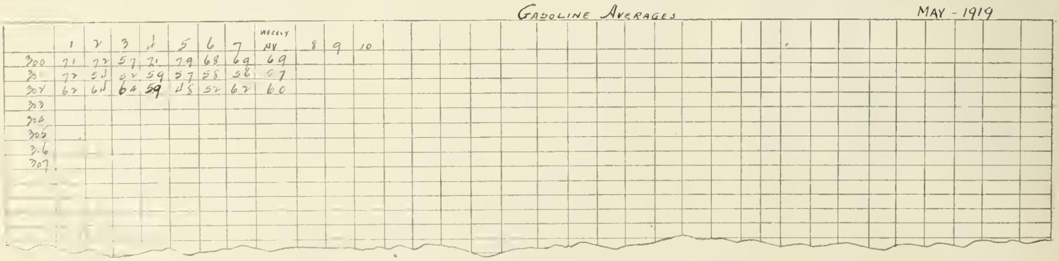
$135 Bonus Offered

The second fuel saving scheme was announced in November. As planned, a prize of $135 in gold was to be awarded on Jan. 1, 1919, to the employees who contributed to the efficiency of the garage which attained the highest mileage per gallon during the 4 weeks beginning Dec. 1 and ending Dec. 28. The governing factor for the garage winning the prize was the highest average miles per gallon obtained. However, other factors were considered, such as accidents, polling leader, dodging freight, particularly at transfer points, not stopping at car tracks and speeding. Any garage leading the race in gasoline average but having an abnormal number of any of these complaints would not stand as good a chance to win the prize as the garage with a good gasoline average and with the number of these complaints against it, much below normal.

Bus Types Considered

Due consideration was made for the various types of buses, as it would have been unfair to expect an old type bus to average the same as the latest A type. The following averages were accepted as being perfect or 100 per cent for each type of bus: A type, 6.75 m. p. g.; N type, 6.00 m. p. g.; D type, 6.00 m. p. g.; and G type, 5.70 m. p. g. Every man in the garage, in one way or another, contributes to the perfection and efficiency of the buses that pass through his hands, whether he be a mechanic, driver, conductor, or any other member of the organization of the garage. The driver does his share by driving his bus economically and the conductor helps by being prompt with the bell and by properly filling out his day card so that his bus gets full credit for all the miles that it travels. The mechanical department contributes its share by keeping the buses in first class mechanical condition.

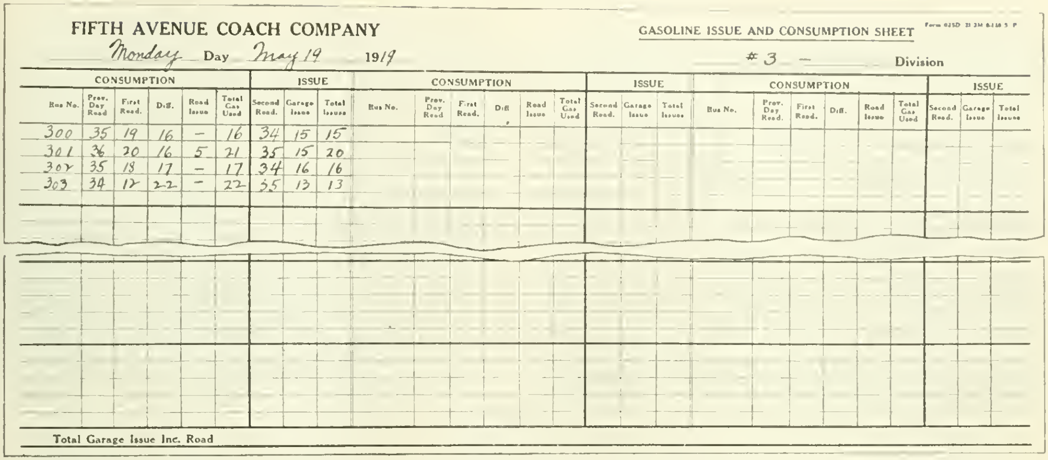
Therefore, in order to give everyone in the winning garage an opportunity to participate in the awards offered, it was decided that each employee of the garage that won the money would join in a drawing contest as follows: On Dec. 30 and 31, each employee was to draw a number at the starter's office. After each employee drew a number, a duplicate set was presented to the president of the company, who was to draw from this lot the eleven prize-winning numbers. The first two numbers drawn by him would pay the winners $20 each,



GASOLINE AVERAGES MAY - 1919

	1	2	3	4	5	6	7	WEEKLY AV	8	9	10
300	71	72	57	71	79	68	69	69			
30	72	54	62	59	57	58	56	57			
302	62	64	64	59	45	52	62	60			
303											
304											
305											
3-6											
307											

The gasoline average sheet, showing the consumption of gasoline per mile run for every day of the week for each of the trucks. The standard which the drivers attempt to reach is 6 m. p. h. When the average drops below that standard, the figures are put down on the sheet in red ink instead of black, so that those buses running with too high a gasoline consumption stand out prominently



FIFTH AVENUE COACH COMPANY

GASOLINE ISSUE AND CONSUMPTION SHEET

Monday Day May 19 1919

#3 — Division

CONSUMPTION						ISSUE		
Bus No.	Prev. Day Read	First Read.	Diff.	Road Issue	Total Gas Used	Second Read.	Garage Issue	Total Issues
300	35	19	16	—	16	34	15	15
301	36	20	16	5	21	35	15	20
302	35	18	17	—	17	34	16	16
303	34	12	22	—	22	35	13	13

Total Garage Issue Inc. Road

A portion of the large gasoline consumption sheet, showing the amount of gasoline issued to each of the company's 200-odd buses. Spaces are provided for gasoline issued from any of the garages or on the road. The total amount of gasoline issued to each truck every day is clearly shown

the next three, $10 each, and the remaining thirteen $5 each.

Full Reports on Bulletin Boards

Full reports covering all of the facts were posted on the bulletin boards each week so that all could follow the race. These bulletin boards were placed in a conspicuous place near the entrances of each of the three garages. All averages below 6 m. p. g. were written in red ink so as to stand out boldly as a challenge to the drivers to do better the next day. As a result, there was a 7 per cent increase in the miles per gallon column for December over the previous month. The average miles per gallon record in December made by the three garages was 5.84, as compared with 5.47 for November. The financial saving amounted to $1,871.24. The records for November and December follow:

	Gas	Miles	Av. M. P. G.
Gasoline, Nov...	109,321	598,082	5.47
Gasoline, Dec....	118,813	693,052	5.84

The detailed figures of the contest, showing the various averages and records made in December and the month previous, follow:

December	No. 3—102d St.	No. 5—132d St.	Nos. 2 and 4—133d St.
Gas consumed..................	24,803 gal.	33,765 gal.	38,408 gal.
Miles operated..................	150,880	190,897	210,569
Averages, m. p. g..............	6.08	5.65	5.48
Involuntary stops..............	7	22	31
Accidents	16	21	17
November			
Gas, m. p. g....................	5.40	5.54	5.40

Therefore, 102d Street was chosen the winner of the contest for the following reasons:

1st—Because they made the highest average for the month.

2d—Because they made the greatest improvement over the month previous.

3d—Because from an efficiency standpoint they were the most efficient.

The following averages were accepted as being perfect or 100 per cent for each type:

	M.P.G.
A type (Moline engines).................	6.75
N type (old style "A" type)............	6.00
D type (De Dion with Moline eng.)......	6.00
G type (De Dion with De Dion eng.)....	5.70

As each garage had more than one type of bus, the 100 per cent figure for each garage became as follows:

No. 3 garage......6.60 m.p.g. for whole garage
No. 5 garage......6.29 m.p.g. for whole garage
Nos. 2 and 4 garage ....5.34 m.p.g. for whole garage

Therefore for the whole month the efficiency of each garage was as follows:

	Per Cent Efficient
No. 3—102d Street................	92¼
No. 5—132d Street................	90
Nos. 2 and 4—133d St............	86½

House Organ Also Holds Interest

Additional interest is given each of the fuel economy contests by the manner in which the events are announced and recorded in the company's monthly house organ, "Bus Lines." The announcements usually occupy the first page, where they will do the most good, and these are followed up during the next issues by complete accounts of the contests.

Pneumatic Tires Increase M.P.G.

Not only has the company been working with its drivers for fuel economy, but it has sought other means for cutting down its consumption. For some time it has been experimenting with pneumatic tires, the results of which have shown remarkable decreases in the consumption of gasoline. Tests for 3 months with both pneumatic and solids show increases in miles per gallon with the use of pneumatics. The company has figured that a lowering of only 1 per cent in gasoline consumption for 1 year means a saving of $3,700, so that it is manifest that not only will the company cover the foregoing methods for fuel economy but will also try to ascertain the most economical fuel to use in place of gasoline.

The company has also been experimenting with a 50-50 solution of benzol and kerosene since the middle of May. If it is found to be a success it will mean a fuel cost of 16½ cents per gallon, which is considerably less than the present cost of gasoline, which costs from 22 cents to 26 cents per gallon.

Experimenting With a Kerosene Carbureter

Besides the above mixture of kerosene and benzol, the Fifth Avenue Coach Co. has been experimenting for some time with other fuels and mixtures. The use of kerosene alone as a fuel is also receiving much attention from the company, which is trying out a specially made carbureter for the purpose.

Simple Method of Charging the Department Store Delivery Cost to Various Departments

Standard Package Cost Determined Monthly—Some Packages Cost More to Deliver Than Others—Panel Bodies Costing $500 Prove Profitable

A NOVEL method of charging the cost of motor truck delivery to the various departments of a department store has been worked out by Block & Kuhl Co., Peoria, Ill. That department store operates a fleet of fourteen motor trucks and delivers from 150,000 to 200,000 packages a year exclusive of the furniture deliveries. Peoria itself is a city which has grown from a population of 72,000 in 1916 to about 100,000 by the end of 1918. The deliveries in the city proper are all made within a radius of approximately 3 miles. Deliveries to East Peoria, from 2 to 2½ miles away to Prospect Heights, about 4 miles away, and to Bartonsville, about 5 miles away, are made once a week on Fridays.

The Block & Kuhl store is modern in every respect and compares favorably in its layout and appointments with the finest in large cities like New York and Chicago. In keeping with the store, the management employs motor trucks exclusively for all of its deliveries and has used motor equipment and no other for over 9 years.

Delivery Costs $25,000 a Year

The company's truck delivery fleet costs about $25,000 a year to operate and it was not long before it was decided that some method would have to be devised for charging the respective departments of the store with the cost of the deliveries made for those departments. This was brought about first by the fact that each of the store's departments is operated as a unit and must show a profit. It is evident that the cost of delivery is a charge which should be made against each department because in most cases the goods of any one department are not really sold until they are delivered to the customer's home. At first it was thought that the delivery charge might be pro-rated for each department by proportioning the total cost of delivery to the various departments on the ratio of the business done by that department to the total business done.

Some Deliveries Cost More

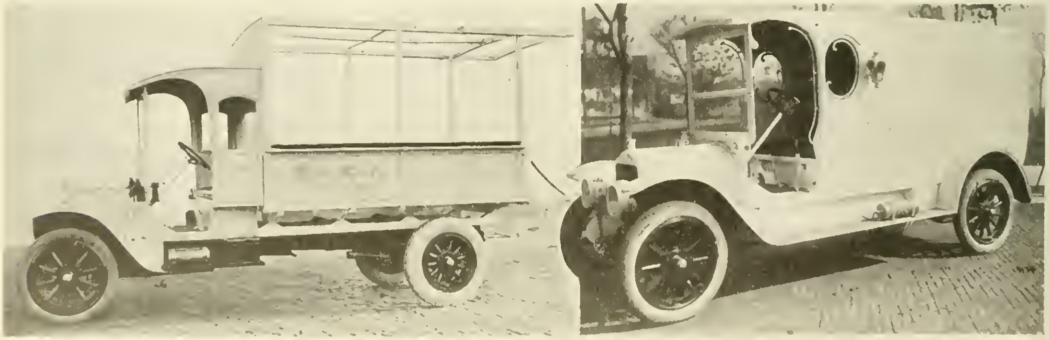
This did not prove entirely satisfactory or equitable because it was found that it cost more to deliver one class of package than another. For instance, bulky house furnishing goods cost more to deliver than jewelry, stockings or other small items of wearing apparel. Similarly, millinery, ladies' ready-to-wear suits and men's clothing which have to be delivered in some cases at special times, also cost more than the average package on account of the special service rendered.

As a result of these investigations, it was finally decided to adopt a new plan of charging the various departments with the cost of their deliveries. First of all, the cost of delivery of a standard package is determined monthly by dividing the total cost of delivery by the number of packages delivered in that month. The total cost of delivery includes the sorting of the packages from the time they reach the shipping room until they are placed into the route bins and eventually delivered to the customer. The delivery cost does not include a charge for package wrapping or for transferring the wrapped packages from the wrapping desks on each floor to the shipping room.

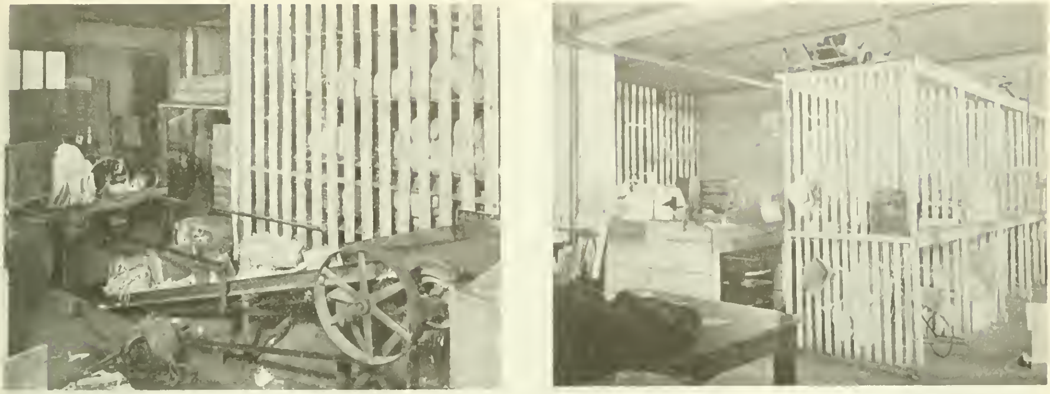
A Standard Cost Determined

Once this standard cost per package delivered is determined for any one month, the cost per package for departments whose goods are more difficult to handle are determined by multiplying the cost of the standard package delivery by certain ratios. For instance, the charge per package delivered from the crockery department is 1½ times the standard cost. Similarly, the cost per package for household furnishings is also 1½ times the regular cost. Millinery, ladies' ready-to-wear suits and dresses and men's clothing, rugs, linoleum, carpets and like materials are considered as still more difficult to deliver and are charged against the several departments at twice the cost of the regular package. On the other hand, dress patterns and similar small articles like spools of thread, etc., are charged for at half the rate of the standard package, principally on account of their low intrinsic value and especially small size.

In this way, the Block & Kuhl management considers that each department is made to pay its own proper share of the cost of the delivery equipment. Because of the fact that the total delivery cost, including the items mentioned above, is figured each month, the cost per



The two types of bodies used on the White trucks of the Block & Kuhl fleet. That at the left is the furniture body mounted on the White 1½-tonner. That on the right is the high-class panel type employed on the ¾-ton Whites. Each of the panel bodies cost $500 and the Block & Kuhl company says they are worth it because they have developed no rattles and have had to undergo but few repairs. All the trucks and bodies are painted snow white for the advertising value, since the Block & Kuhl structure is famous as the Big White Store. Its exterior is faced with white glazed tile, and painting the trucks white gives the color connection between the store and its exclusive motor truck delivery fleet



Two views of the shipping room, that at the left showing the Lamson conveyor on which the wrapped packages are brought up from the basement of the main building. At the right are shown the sorting table in the center and the double-decked drivers' route bins in the right foreground. The conveyor is operated by a small electric motor on the floor and the conveyor opening is protected by a pipe railing around three of the four edges

standard package and for those of the other departments varies from month to month according to the total number of packages delivered. Generally, the larger the number the packages delivered in any month, the smaller the cost per package for each department, since the vehicles have been purchased for more nearly maximum deliveries than minimum deliveries, so that peak loads can be successfully handled without hiring outside vehicles. In this calculation of the total cost of delivery, the cost of operation of the two furniture trucks is not included, since those two vehicles do not deliver any packages but work exclusively for the furniture department.

As an example of the number of packages delivered per month, the following totals of packages delivered for a period of 4 months in 1918 is interesting:

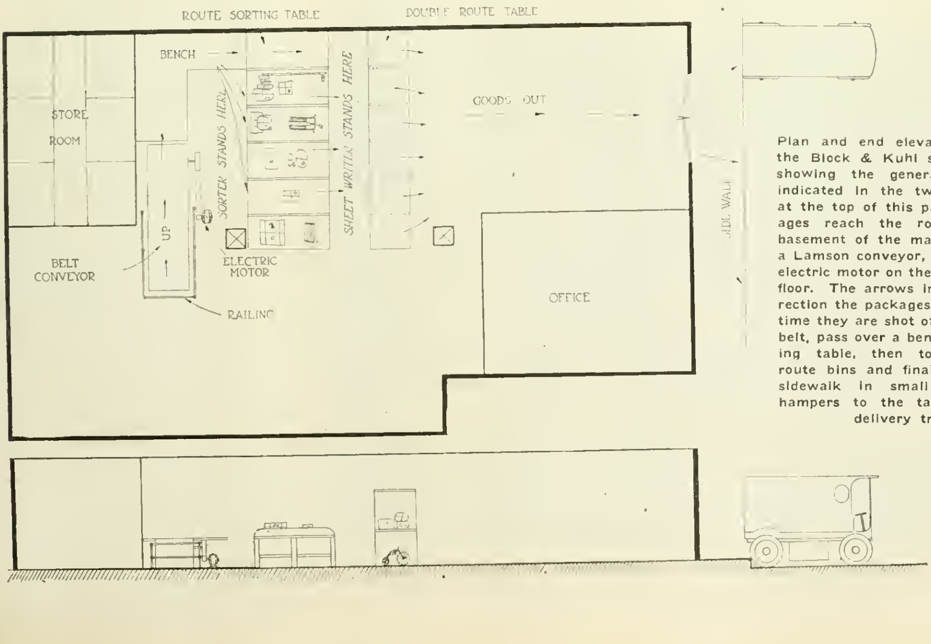
Month	Packages Delivered
November, 1918	12,138
October	11,001
September	12,385
August	11,025
Total delivered in 4 months	46,549

Average packages delivered per day . . 446
Average packages per truck per day . . 223

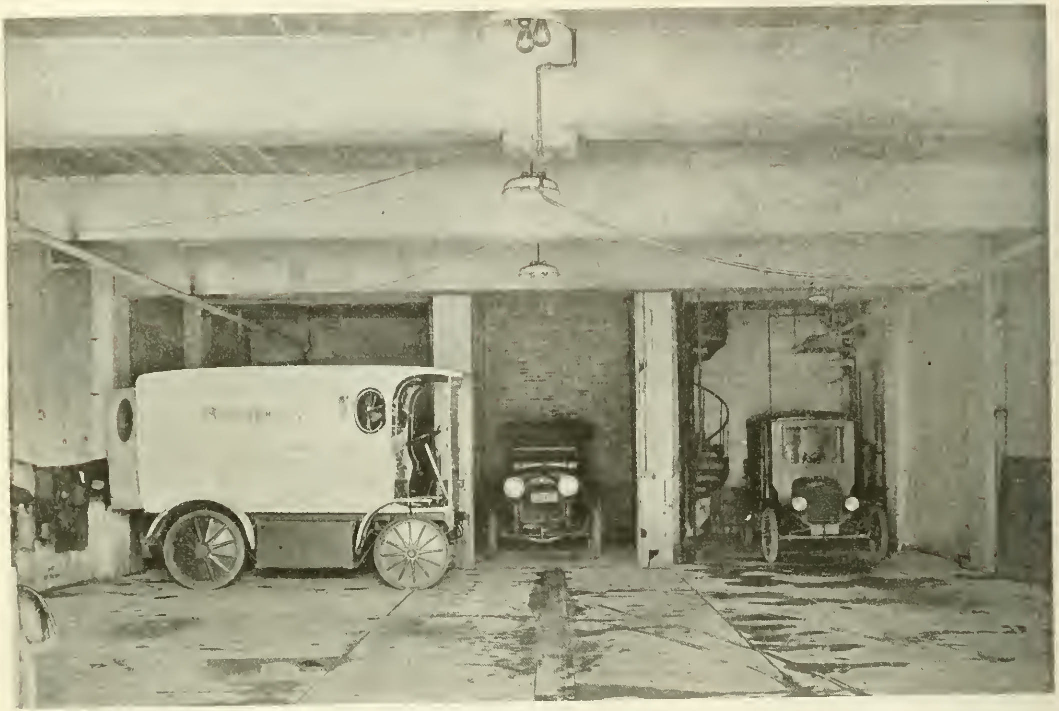
In the period covered by the above figures, only one trip per day over each route was made due to the one-delivery-a-day regulation in force on account of war economy measures. The total number of packages, 46,549, were delivered by two regular trucks and a special delivery vehicle, the latter averaging about twenty special deliveries a day.

Cost 23½ Cents for Delivery

In another month a total of 7,807 regular packages and 181 specials were delivered by the same number of trucks. The cost of delivering the regular packages in that month was 23½ cents. In another month, a total of 8,568 regular or standard packages were delivered and 662 specials. In the latter month the



Plan and end elevation views of the Block & Kuhl shipping room, showing the general layout. As indicated in the two illustrations at the top of this page, the packages reach the room from the basement of the main building on a Lamson conveyor, run by a small electric motor on the shipping room floor. The arrows indicate the direction the packages take from the time they are shot off the conveyor belt, pass over a bench to the sorting table, then to the drivers' route bins and finally out on the sidewalk in small four-wheeled hampers to the tailgates of the delivery trucks



View of the Block & Kuhl garage from the front door, showing the wide center drain; the overhead washing apparatus; the elevator in the center at the rear; the stairway to the second floor in the right corner and the Walker electric truck having its battery charged from a special wall set

regular packages cost 10.6 cents each and the specials about 19 cents each. The average cost of special deliveries, which are calculated separately from the regular deliveries, is from 20 to 25 cents. The great variation in the average prices for the regular packages in the 2 months just cited was due in part to weather conditions, but more particularly to the fact that in the high cost month, more of the packages were delivered in the outlying territory than within the city limits.

Charge for Basement Store Packages

The Block & Kuhl Co. maintain a basement store in which the goods are very reasonably priced but from which no deliveries are made without an extra charge. These charges per package are fixed so far as the customer is concerned. Goods bought in the basement store are charged for at the rate of 10 cents a package for C. O. D.s, for credit deliveries, for paid deliveries and for calls for packages to be brought back to the store. For especially difficult packages to handle, a maximum charge of 20 cents is made. These charges are kept constant so far as the customer is concerned. If the actual cost of delivery is over 10 cents in any case, the store absorbs the excess cost above the 10-cent amount.

Aside from the efficient delivery which the Block & Kuhl trucks have provided, the company has also secured what it considers a great advertising value from its vehicles. The Block & Kuhl Co. began business in Pekin, Ill., 30 years ago and moved to Peoria about 14 years ago, when it erected the first steel building in Peoria. At that time it realized the great value of advertising, and as a means of attracting attention first of all to its excellent store and then to the goods carried, it faced its entire building with white tile and named it the Big White Store. To carry out this idea of color, all of the company's trucks were painted white so that when people saw a delivery truck draw up to a house they instinctively knew that it was one of the units of the Big White Store's delivery fleet.

6-Year-Old White Still Running

When Block & Kuhl first moved to Peoria, they still used horses, but the last of these were disposed of 9 years ago. At that time the company installed a fleet of Glides, none of which are now in service. One 6-year-old ¾-ton White is still in service and giving a satisfactory account of itself.

The fleet as it now stands is composed of eight ¾-ton Whites; one 1½-ton White, used as a furniture truck; one Vim ½-tonner, employed almost exclusively by the Victrola department; three Fords for special deliveries, and one Walker electric of 1500 pounds capacity for close-in city deliveries. The present fleet has been secured by the addition of one or two vehicles from year to year, the last two being ¾-ton Whites bought in August, 1918.

Have Two Spare Trucks

Before the war, a total of five trucks were used on four city routes with one truck for special deliveries. Two other trucks were used exclusively for furniture deliveries, making seven trucks in use in addition to the electric and exclusive of the Vim Victrola truck, which is not used on any regular route but is employed both to get Victrola orders and to deliver and set up the instruments wherever sold. This gives a total of nine trucks exclusive of the special delivery vehicles, three Fords, which were used regularly on fixed routes. Counting the Fords, twelve of the fourteen trucks were used on regular routes, thus leaving two spare vehicles for emergencies should any of the other vehicles have to be laid up for repairing of any kind.

When the war economy regulations were put into force, the two trips which were usually made on each route were cut to one trip a day on each route. Two instead of four trucks were employed on the four routes, each truck making one route in the morning and the second route in the afternoon. At this writing, the one-delivery-a-day plan is still in effect, although when this article appears in print conditions may be such that the two deliveries per day on each route may have been resumed.

Aside from the novel manner of charging the cost of deliveries to each of the various departments of the store, the second outstanding feature of the Block & Kuhl trucks is the type of White body employed. Each of the bodies on the White ¾- and 1½-ton trucks and that on the 1500-pound Walker electric cost $500 apiece. They were manufactured by William Erby & Sons, Chicago, and are made with aluminum sides and nickel trimmings. Each body is substantially built and the oldest has been in use for 3 years and has developed no rattle. The Block & Kuhl Co. considers that the cost of $500, which is excessive as compared with the average price of a panel body, has been money well spent. In the first place, the bodies are very attractive in appearance as may be judged by the illustration on page 28. Again, the absence of rattle and the sturdiness of construction have resulted in a minimum of upkeep charges and made it unnecessary to take the trucks out of service for body repairs. But the greatest advantage of all is that of advertising, since the high-class body has given the company's trucks a mark if distinction in keeping with the spot-white appearance of the store. Each body is provided with a dome light inside to aid in picking out packages at night or on dark days and with electric and oil lamps on the outside. The bodies are kept in excellent shape not alone by the company's own service crew, but by the fact that a representative of the Erby company calls at the Block & Kuhl garage on an average of four times a year and inspects each of the bodies carefully. By this means, any necessary repair work is discovered while it is still of minor importance, and as a result can be fixed before it becomes serious.

Company Has Own Garage

All of the Block & Kuhl trucks are maintained in the company's own garage That structure is two stories high and was built 7 years ago, or 2 years after the last of the horse equipment had been discarded. All of the trucks are garaged on the main floor of the building, an illustration of which is shown on page 30. One of the features of the main floor is a wide 12-inch drain which runs the clear length of the building from the front door to the rear end. The floor is drained downward from the sides of the building to this center drain, so that each of the trucks may be washed in their respective places on the floor and does not have to be moved to and from a special washstand. The washing equipment is mounted on the ceiling in the center and is provided with a revolving arm and a long length of hose which may be conveniently swung around to reach each truck, no matter what its position on the floor.

Tools in Garage

An elevator is provided at the rear end of the building for transferring the trucks to and from the second floor where all of the repair work is done. The repair floor is extremely light by reason of wide windows in the front, under which a work bench extending clear across the floor is provided. The equipment installed for the repair work on the trucks includes a lathe, a drill press, a tire press, an emery wheel, an Allis-Chalmers air compressor operated by an electric motor, a Weaver engine or repair part hoist, and a Weaver tire tool for changing pneumatic tires quickly and economically.

Unless repair work is to be done on the trucks, all are backed into their positions on the main floor. A battery-charging equipment has been provided for the company's one electric truck which is not employed as much as formerly except in the rush seasons on account of the comparatively slow speed as compared with the gasoline vehicles.

One machinist paid at the rate of $125 a month and one helper are employed to keep the fleet of fourteen trucks in condition. As in the case of the bodies, the White trucks are inspected about four times a year by a traveling representative from the White company's home office in Cleveland. On each visit he goes over the trucks thoroughly and suggests any repairs or minor adjustments which seem necessary.

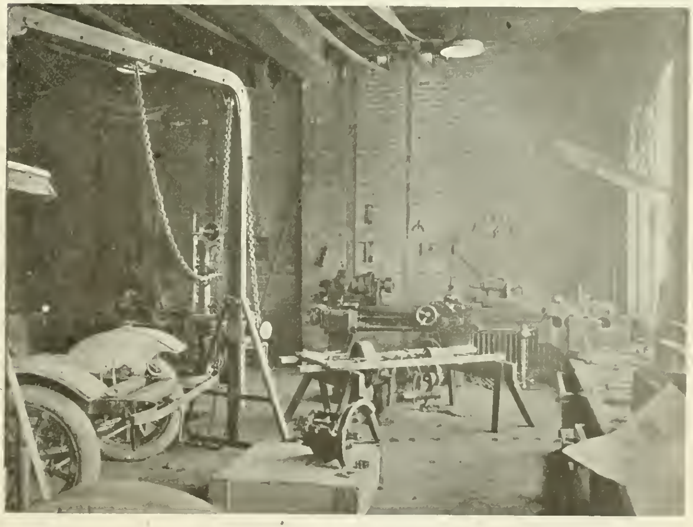
Each of the trucks is provided with a helper in order to reduce the time of delivery. The helpers are paid from $7 to $8 a week, while the drivers receive $20 a week. No bonus systems are offered for either drivers or helpers, but both are given 1 week vacation each year with full pay.

The Block & Kuhl Co. sells Ajax tires in the sporting goods department of the store and uses that make of tire on its trucks. Seven-inch Goodrich pneumatics, however, are used on the rear wheels of the 1½-ton White employed for furniture delivery. The oil and gasoline used in the trucks are bought on a contract basis.

Although the slow and inefficient sidewalk loading is carried out because no provisions were made otherwise when the store structure was originally built, the interior shipping room facilities are well worked out, as shown at the bottom of page 29 and in the two illustrations at the top of the same page. The shipping room is at one corner of the main store structure and receives its packages from the basement store of the main building by means of a Lamson belt conveyor which comes up through an opening in the floor. It is suitably railed off as shown in the illustration at the top of page 29 to prevent persons from unconsciously walking onto it or falling onto it. The conveyor is operated by a belt drive from a small electric motor placed alongside of it on the floor.

Sorting Table Layout

The packages coming up on the conveyor are shot off onto a wide bench when they reach the top; from the bench they are thrown onto a sorting table by a sorter who stands between the bench and the table. The sorting table is divided off by short partitions about 6 inches high into five tables, each corresponding to the routes covered. Directly back of the sorting table is a line of double route bins, the lower portion of each unit being reserved for bulky articles like blankets, boys' velocipedes, etc. There is a two-part route bin for each one of the five routes and the route bins are directly in back of the similar divisions on the sorting table. A man standing between the sorting table and the route bin does the sheet writing and then transfers the packages from the sorting table to the route bins, from which they are taken directly by the drivers in small wheeled hampers pushed out of the shipping room and across the sidewalk to the tailgates of the trucks.



One corner of the repairshop in the Block & Kuhl garage, showing the lathe, overhead belting, Weaver engine hoist over the front end of one of the trucks and a home-made engine stand in the foreground

Philadelphia Owners Find Average Operating Cost of 5-Ton Dump Truck to Be $26.09 a Day

Averages Obtained from Over a Dozen Users With More Than 100 Motor Trucks

Thirty-seven Questions Asked in Form—Average Mileage Found About 40.5 a Day

ANSWERING a challenge made some time ago by an official of the Motor Truck Transportation Division, Bureau of Markets, U. S. Department of Agriculture, that "You don't any of you know how much it costs to operate a 5-ton truck here," the Motor Truck Owners' Assn. of Philadelphia prepared and sent out a comprehensive questionnaire of thirty-seven queries to motor truck owners, aimed at obtaining just that information. What the association learned, as reported by the chairman of its investigating committee, C. B. Montgomery, transportation expert of the Union Paving Co., which operates a large fleet of dump-body trucks, is as follows:

1—The average daily cost of operation for a 5-ton truck, so far as could be ascertained from the sources called upon, amounts to $26.09, this applying to the dump-body type working under the conditions obtaining in the Philadelphia district.

2—Fixed charge costs should be based on a 265-day year and not a 300-day year, as usually is the case.

3—The general supposition prevailing in the territory that 50 miles a day is the average mileage for such a truck is erroneous, the actual average as worked out from the means at hand being only 40.5 miles a day.

4—The sinking fund idea is apt to be a pitfall in making out truck operation costs.

5—No one answering the questionnaire knew the speed of his truck on the day's work.

6—The Government official who issued the challenge was largely right.

The items summarized in finding the daily average cost of operation are as follows: Depreciation, Interest, Insurance, License Fee, Gasoline, Oil and Grease, Repairs, Garage Fees, Overhead Expense, Driver's Pay and Tires.

The questionnaire and investigation are valuable for the general bearing they may have on other groups in different localities who desire to secure for themselves the same kind of information as that derived by the Motor Truck Owners' Assn. of Philadelphia.

Here is the form of the questionnaire:

OPERATING CONDITIONS

1—In what kind of business are you engaged?

2—Describe the nature of work done by your trucks.

Average 5-Ton Dump Truck Costs Per Day in Philadelphia

Depreciation	$5.29
Interest	.76
Insurance	1.25
License	.11
Gasoline	3.42
Oil and grease	.42
Repairs	5.11
Garage fees	.74
Overhead expense	1.74
Driver	4.96
Tires	2.29
Total cost per day	$26.09

3—What type of body is fitted—van, platform, or dump, etc.?

4—Is the truck loaded one way, or both ways?

5—What is the average weight of load?

6—What is the average miles per round trip?

7—What is the average pavement conditions encountered—city streets, city and suburban streets, country roads, good, fair or poor?

8—What cost is most desired—the cost per day, hour, mile, ton-mile, package or package-mile?

INSTALLATION OR INVESTMENT

9—How many 5-ton gasoline trucks do you operate?

10—When were they purchased?

11—If not purchased new, give the age in months; miles run; condition?

12—What was the purchase price?
  Chassis (without tires)
  Body
  Cab
  Tires
  Freight
  Extras
  TOTAL
    Estimated salvage value
    Tire value
    Sinking fund basis
    Depreciation basis, months......
      (miles)......

PERFORMANCE DATA

13—Number of days worked?

14—Number of hours worked?

15—Number of hours down for repairs?

16—Number of hours available but not used?

17—Number of trips?

18—Number of miles run?

19—Number of miles per day?

FIXED COST PER DAY

20—Depreciation?

21—Interest?

22—Insurance:
  Fire and theft?
  Liability?
  Property damage?
  Damage sustained?

23—Garage (owned or rented)?

24—License:
  State?
  Driver?

25—Supervision (describe)?

26—Overhead (describe)?

27—Expenses (describe)?

VARIABLE COST PER DAY

28—Depreciation?

29—Driver?
  Per hour?
  Bonus?

30—Tires:
  Average miles, front?
  Average miles, rear?

31—Gasoline:
  Cost per gallon?
  Miles per gallon?

32—Oil and grease?

33—Repair labor?

34—Repair parts?

35—TOTAL?

36—Are repairs made in dealer's service station or in your garage?

37—Would you be willing to keep your truck costs on forms approved and adopted by the association?

The Answers Received

All answers were, of course, held strictly in confidence. Tolls and ferry charges were not considered an expense of truck operation when paid by the customer, in addition to regular hauling charges. It will be noted that the item "Depreciation" appears in both Fixed and Variable Charges. This is because some operators charge depreciation on a basis of time (Fixed) and others on a mileage basis (Variable), while some charge part to Fixed Charges and part to Variable Charges.

Members of the investigating committee of the association called personally to follow up the questionnaires issued and found a willingness on the part of members to tell what they knew of their operating costs, which, in many cases, as had been supposed, was not much of real value.

In this first investigation of the association, no trucks used in long distance or inter-city expressing were taken into consideration, for the reason that the majority of members have trucks in the contracting line where dump bodies are a necessity. Other types of trucks will be considered in further investigations by the organization.

Of fifty truck owners interviewed in connection with the association questionnaire, this number representing 300 vehicles, only twelve or thirteen were able to state to the committee's satisfaction what was required to fill out to a reasonable extent the sets of questions contained therein. This, for the most part, was because, as the challenging Government official suspected, most of the members have not been keeping thoroughly businesslike records of their truck operations.

Three Trucks Smallest Fleet

The owner having the smallest fleet was one who uses three trucks, while some have more than forty. Owing to the nature of the replies, it was not possible to make out all the questionnaires in full, but enough, even with a limited number of owners answering, was obtained to strike a fair average for the main items and suffîcent to be of value should other associations care to follow the example.

Average Cost of 5-Tonner, $5,213

From six owners operating seventy-three trucks all told, it was learned that, taking the individual costs, complete except for tires, of the various trucks, the average yearly costs were as follows: $4,500, $4,900, $5,628, $4,500, $5,700, and $3,800, making a final average of $5,213.

For tire sets on these trucks, the following costs were given: $260, $300, $458, $500, $200, and $400, making the average cost $278.

Six concerns operating trucks used them on an average of 265 days in the year, the individual days of use being as follows: 257, 217, 280, 282, 220, and 246.

Eight owners with 114 trucks gave satisfactory answers on the item of depreciation. These were as follows: $4.61, $4.48, $5.75, $4.15, $3.33, $2.33, $7.15, and $4.39, making an average of $5.29 per day.

Seven of the owners replied satisfactorily to the question on the cost of interest per day, but they figured it in different ways.

Some figured it as long as they were paying interest on the truck and others for the entire life of the vehicle. Here is the result: 16 cents, $1.54, $1.21, 49 cents, 60 cents, $1.40 and 36 cents. The average struck was 76 cents.

In the matter of insurance daily costs, seven operators with 113 trucks replied as follows: $1.06, 37 cents, $1,08, $1.15, $1, $1.75 and $1.21, with an average of $1.23.

As for license fees, the same seven owners reported as follows: 12, 12, 10, 9, 10, 9, and 12 cents, with an average of 11 cents. Two of this number paid a license fee for the driver of $2.50 a year, and figuring the number of days in the year the trucks actually were used, it was regarded as a cost of 1 cent a day. This was added to the proportion of the usual $25-a-year state license fee.

In the item of gasoline, subdivided into miles per gallon and cost per gallon, only one out of eight operators was found who included the service of the men who did the filling in the cost of the gasoline. An average of 3.91 miles per gallon of gasoline was struck from the following individual accounts: 3.49, 4.5, 3.5, 3.4, 4.3, 4.3, 3.84, and 4.25.

The cost per day, figured the same as the foregoing, was found to average $3.42, divided among the operators as follows: $3.06, $3.50, $3.70, $2.32, $3.34, $3.61, $3.57, and $2.56.

The cost of oil and grease, with seven operators owning more than 100 trucks showed the following costs in cents: 16, 50, 20, 18, 50, 77, and 85, with an average of 42 cents a day.

Repairs or maintenance presented more difficulties than was supposed, chiefly because only four operators included both labor and material in the daily costs. These four men interviewed gave answers, thus: Labor item, $2.90, $5.82, $2.89 and 10 cents with an average for labor cost per day of $2.90. Material items were $2.16, $4 05, $3.09 and 29 cents with an average of $2.21.

Taking the general repair report as answered, this is the result, from interviewing eight operators owning 127 trucks: 75 cents, $4.49, $5.06, 39 cents, $5, $4.72, $6.94, and $8.91.

The apparent discrepancy in the individual costs of repairs is accounted for by the fact that some paid for repairs outside while others had the drivers do the repairing and because while some of the trucks were in their first year of usage, others were in their fourth year of work. Repairs made in accidents are included in the figures given.

Garage Average Daily Cost, 74 Cents

Nearly all the seven owners of 113 trucks who answered the questions rented their garages instead of owning them. The average daily cost in cents amounted to 74, divided as follows: 55, 70, 96, 85, 50, 95, and 76 cents.

The item of overhead expense, including office costs, superintendence, billing and outside men worked out as follows for seven operators of 113 trucks: $1.85, $1.38, $2.12, $6.38, $1.25, $1.20, and $4.77 with an average of $1.74.

The driver's pay worked out in two ways—per day and per hour, according to method of payment. Forty-five cents an hour was found to be the average rate among four owners, as follows: 50, 45, 45 and 42 cents. The cost per day per driver among seven owners of 113 trucks averaged $4 96, the accounts per day running thus: $4.61, $5, $5.90, $5.53, $4.50, $4.60, and $5.

Tire Costs and Mileage

In the matter of tire costs and other tire data, it was learned from four operators using twenty-three trucks that the average mileage on the front wheels was 12,080 per year, divided among them as follows: 15,000, 10,000, 9,842, and 14,902; and on the rear wheels, an average of 7980 per year, divided thus: 7419, 10,000, 5890, and 10,340.

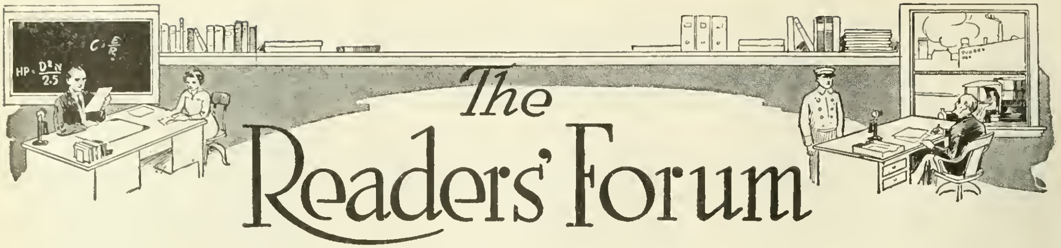
Tire costs per day, submitted by eight operators using 114 trucks, were as follows: $2, $2, $1.75, $2.22, $3, $2.01, $2.14, and $2.18. The average cost per day was $2.29.

Some owners interviewed said their tires were new and as yet there had been no expense and thought there would be none till they had to buy others. It was brought out that the approved way is to deduct tire expense from original cost and carry it as a separate item.

Estimates made of the probable salvage value at the end of such trucks' useful life showed that the average is $200, or $5,013 in depreciation from the average complete cost, except tires, of the 5-ton dump-body truck, of $5,213, as mentioned at the begininng of this article.

The average life of such a truck in the general contracting business was found to be 4 years, with a high mark of 6 years and the lowest but 3.

Cleveland hoboes travel between Cleveland and the Warrensville Farm in this de luxe pneumatic-tired United States truck



The Readers' Forum

MAKERS OF ROAD SCRAPER DRAGS

List of Such Devices for Use Behind Motor Trucks or Farm Tractors

To the Editor, COMMERCIAL VEHICLE:

Can you give us the names of manufacturers who make rôad scrapers or drags which are suitable for use with motor trucks and Fordson tractors?—ARTHUR BROWN, W. M. Brown & Son, Walhalla, S. C.

Below is a list of companies which manufacture road scrapers or drags suitable for use with trucks or tractors:

Fresno Agricultural Works, Fresno, Cal.
Holt Mfg. Co., Stockton, Cal.
Western Wheeled Scraper Co., Aurora, Ill.
F. E. Kohler Co., Canton, Ohio.
Austin Mfg. Co., Chicago, Ill.
Herschel Mfg. Co., Peoria, Ill.
Baker Mfg. Co., Springfield, Ill.
J. D. Adams & Co., Indianapolis, Ind.
Des Moines Bridge & Iron Works, Des Moines, Iowa.
Corrugated Metal Mfg. Co., Emporia, Kan.
Wyatt Mfg. Co., F., Salina, Kan.
Road Supply & Metal Co., Topeka, Kan.
Ames Plow Co., Boston, Mass.
Belcher & Taylor Agricultural Tool Co., Chicopee Falls, Mass.
Beach Mfg. Co., Charlotte, Mich.
Kalamazoo Railway Supply Co., Kalamazoo, Mich.
Lansing Co., Lansing, Mich.
Donaldson Bros., Mt. Clemens, Mich.
Russell Grader Mfg. Co., Minneapolis, Minn.
Smith & Sons Mfg. Co., Kansas City, Mo.
Holenbeck Mfg. Co., Holdrege, Neb.
T. F. Stroud & Co., Omaha, Neb.
Acme Road Machinery Co., Frankfort, N. Y.
Gowanda Agricultural Works, Gowanda, N. Y.
Climax Road Machinery Co., Marathon, N. Y.
Fairbanks Co., New York City.
Syracuse Chilled Plow, Syracuse, N. Y.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
F. B. Zieg Mfg. Co., Frederickstown, Ohio.
Galion Iron Works & Mfg. Co., Galion, Ohio.
Perfection Road Machinery Co., Galion, Ohio
Ohio Road Machinery Co., Oberlin, Ohio.
American Steel Scraper & Wheelbarrow Co., Sidney, Ohio.
Sidney Steel Scraper Works, Sidney, Ohio.
Slusser McLean Scraper Co., Sidney, Ohio.
Toledo Wheelbarrow Works, Toledo, Ohio.
J. W. Hance Foundry Co., Waterville, Ohio.
Jackson Mfg. Co., Harrisburg, Pa.
American Road Machinery Co., Kennett Square, Pa.
Good Roads Machinery Co., Kennett Square, Pa.
Geo. S. Comstock, Mechanicsburg, Pa.
Chattanooga Wheelbarrow Co., Chattanooga, Tenn.
Smalley Mfg. Co., Manitowoc, Wis.
Case Threshing Machine Co., J. I., Racine, Wis.

BOOKS PUBLISHED ON TRUCKS

The Commercial Vehicle Has Much Data on Truck Upkeep and Design

To the Editor, COMMERCIAL VEHICLE:

Can you refer us to books on the construction and operation or both of motor trucks and storage battery tractors?—KILBOURNE & JACOBS MFG. CO., Columbus, Ohio.

THE COMMERCIAL VEHICLE during its life of 12 years has published more information on the construction and operation of gasoline and electric motor trucks and tractors than any other one publication. In fact, that is the only kind of information which it has published, since THE COMMERCIAL VEHICLE is devoted exclusively to the subject of motor trucks and motor trucking problems. Bound volumes of THE COMMERCIAL VEHICLE would undoubtedly give you more information on the subject of trucks and truck use than any other one publication which we know of.

There are very few books written on the same subject. Those that we know of include the following:

"The Motor Truck as an Aid to Business Profits," by S. V. Norton. The book was first published by the A. W. Shaw Co., Chicago, Ill., during the year 1918, and sells at $7.50 net.

"Horse, Truck and Tractor," by N. H. Casson, L. W. Ellis and R. W. Hutchinson, Jr., published by F. G. Browne & Co., Chicago, Ill., in 1913. The price of the book is not known.

"Motor Truck in Business," by Waldemare Kaempffert, published by the McClure Publications, Inc., New York City, during 1917, and distributed gratis.

There is considerable information regarding the design and construction of motor truck chassis and the combination of truck parts in **"The Modern Gasoline Automobile, Its Design, Construction, Maintenance and Operation,"** by Victor Pagé, published by the Norman W. Henley Publishing Co., New York City, in 1918. The book sells at $3 per copy.

PRICES OF TRUCKS FOR 6 YEARS

Table Shows Variation of Costs of Six Prominent Makes of Vehicles

To the Editor, COMMERCIAL VEHICLE:

Will you give me the prices on the following trucks for the years of 1914 to 1919 inclusive: Federal, Garford, Mack, Pierce-Arrow, Packard, White?

I am anxious to have the prices on all sizes of trucks in each line.—P. J. D., Atlanta, Ga.

Below is a complete record of the prices of all sizes of Federal, Garford, Mack, Pierce-Arrow, Packard and White trucks for the past 6 years. The figures given are those which appeared in the COMMERCIAL VEHICLE annual specification tables for the years of 1914 to 1919 inclusive.

Name	Tons Capacity	Price 1914	1915	1916	1917	1918	1919
Federal	1	....	....	....	....	$1,750	$1,900
	1½	$1,800	$1,800	$1,800	$1,800	2,200	2,350
	2	....	....	....	2,100	2,450	2,600
	3½	....	....	2,800	2,800	3,150	3,350
	5	....	....	....	....	4,200	4,400
Garford	¾	....	....	1,350	....	....	....
	1	....	....	1,450	1,450	1,750	2,500
	1½	....	....	1,800	1,800	2,100	3,000
	2	2,800	3,000	2,300	2,300	2,600	3,300
	3	3,500	3,500	....	....	....	....
	3½	....	....	....	3,400	3,700	4,300
	4	3,850	3,850	....	....	....	....
	5	4,500	4,500	4,300	4,300	4,500	5,000
	6	4,850	4,850	4,500	4,500	4,700	5,300
Tractor	4½	....	....	....	....	2,700	3,400
Tractor	7	....	....	....	....	5,800	4,400
	10	....	....	....	....	4,600	5,100
Mack	1	2,000c	....	2,000w	2,000	2,400	2,400
	1½	....	....	2,350w	2,350	2,800	2,800
	2	....	....	2,700w	2,700	3,000	3,000
	3½	....	....	....	3,400	4,250	4,600
	5	4,000	....	....	....	3,100	....
	5½	....	....	4,000	4,000	4,750	5,250
Tractor	7	....	....	....	3,400	4,250	4,600
	7½	....	....	1,500	4,500	5,000	5,500
Tractor	11	....	....	....	4,000	4,750	5,250
Tractor	15	....	....	4,000	4,500	5,000	5,500
Pierce-Arrow	2	....	3,000	3,000	3,000	3,300	3,750
	5	....	4,500	4,500	4,500	5,000	5,500
Packard	1	....	....	2,200	2,200	2,450	2,650
	1½	....	....	2,500	2,500	2,800	3,000
	2	2,800	2,800	2,800	2,800	3,200	3,400
	3	3,400	3,400	3,400	3,400	3,900	4,100
	4	3,550	3,550	3,800	3,800	4,375	4,450
	5	4,500	4,150	....	....	4,900	5,150
	6	4,650	4,300	....	....	5,100	5,400
White	1½	3,000	3,000	3,000	3,000	3,300	3,300
	3	3,700c	3,700c	3,700c	3,700c	4,100c	4,100d
	5	4,500c	4,500c	4,500c	4,500c	5,000c	5,000d

Blank spaces indicate that the particular model was not offered on the market for that year; w indicates a worm-driven truck; c indicates a chain-driven truck, and d indicates a new double-reduction-driven model.

✓ ✓

OUR MOTOR TRUCK COST SYSTEM

Simple System Includes Items on Two Printed Forms

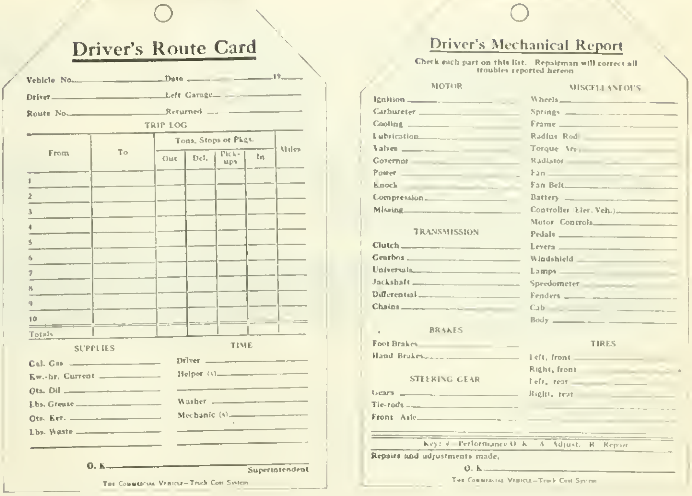
To the Editor, COMMERCIAL VEHICLE:
Will you kindly let me have all the information about your cost keeping system for motor trucks, such as forms used and the price of the system? Can you refer me to any articles published in THE COMMERCIAL VEHICLE which show how this system works when in actual use?—J. J. L., Cleveland, Ohio.

THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks was described in full in the June 1, June 15 and July 1, 1916, issues of THE COMMERCIAL VEHICLE. The monthly sheet and the driver's daily route card were illustrated and their use explained.

THE COMMERCIAL VEHICLE for October 15, 1917, contained on pages 6-9 an article showing exactly how the cost system was applied by the Buffalo *Evening News*, Buffalo, N. Y., to keep the cost records of its Ford delivery vehicles and sixteen Stewart 1500-pound trucks. On pages 24 and 25 of the same issue is another story telling how the owner of a Reo 2-ton truck in the moving business in Dowagiac, Mich., used the cost form figures for calculating his truck operating costs. These forms are shown filled out in the accompanying illustrations. Reproductions of both sides of the driver's daily route card are given.

The main feature of the system is its simplicity. It was devised after several years' experience in endeavoring to keep motor truck operating costs, and we know that it contains all of the necessary items which should be included.

In brief, the system is composed of two forms, a driver's daily route card on which operating data such as gasoline, oil and grease consumed, and the mileage and tonnage delivered per trip are written down, and a monthly cost summary to which the operating data are transferred and on which are also placed the fixed and maintenance charges, so that the total cost of operation can be indicated on one form.



Driver's Route Card

Vehicle No. ____ Date ____ 19__
Driver ____ Left Garage ____
Route No. ____ Returned ____

TRIP LOG

	From	To	Tons, Stops or Pkgs.				Miles
			Out	Del.	Pick-ups	In	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
Totals							

SUPPLIES
Gal. Gas ____
Kw.-hr. Current ____
Qts. Oil ____
Lbs. Grease ____
Qts. Ker. ____
Lbs. Waste ____

TIME
Driver ____
Helper (s) ____
Washer ____
Mechanic (s) ____

O. K. ____ Superintendent

The Commercial Vehicle—Truck Cost System

Driver's Mechanical Report

Check each part on this list. Repairman will correct all troubles reported hereon

MOTOR
Ignition ____
Carbureter ____
Cooling ____
Lubrication ____
Valves ____
Governor ____
Power ____
Knock ____
Compression ____
Missing ____

TRANSMISSION
Clutch ____
Gearbox ____
Universals ____
Jackshaft ____
Differential ____
Chains ____

BRAKES
Foot Brakes ____
Hand Brakes ____

STEERING GEAR
Gears ____
Tie-rods ____
Front Axle ____

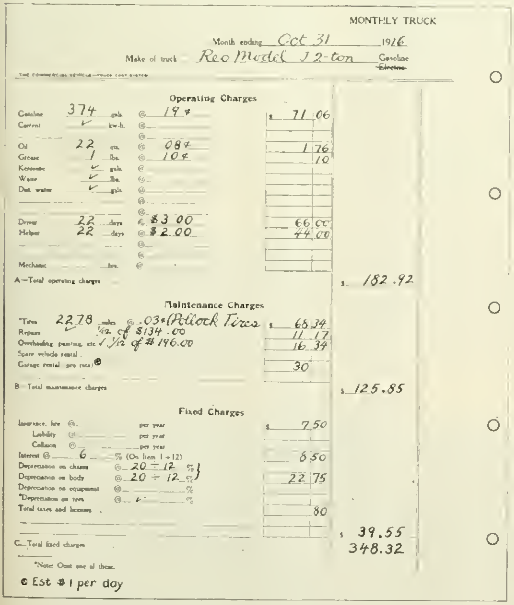
MISCELLANEOUS
Wheels ____
Springs ____
Frame ____
Radius Rod ____
Torque Arm ____
Radiator ____
Fan ____
Fan Belt ____
Battery ____
Controller (Elec. Veh.) ____
Motor Controls ____
Pedals ____
Levers ____
Windshield ____
Lamps ____
Speedometer ____
Fenders ____
Cab ____
Body ____

TIRES
Left, front ____
Right, front ____
Left, rear ____
Right, rear ____

Key: ✓ Performance O. K. A Adjust. R Repair
Repairs and adjustments made.
O. K. ____

The Commercial Vehicle—Truck Cost System

Both sides of the Driver's Daily Route Card on which the driver notes all the operating data required. The back of the card serves as an inspection and repair reminder



MONTHLY TRUCK

Month ending Oct 31 1916
Make of truck Reo Model J 2-ton Gasoline ~~Electric~~

The Commercial Vehicle—Truck Cost System

Operating Charges

Gasoline	374	gals.	@ 19¢	$ 71 06	
Current	✓	kw-h.	@		
			@		
Oil	22	qts.	@ 08¢	1 76	
Grease	1	lbs.	@ 10¢	10	
Kerosene	✓	gals.	@		
Waste	✓	lbs.	@		
Dist. water	✓	gals.	@		
Driver	22	days	@ $3 00	66 00	
Helper	22	days	@ $2.00	44 00	
Mechanic		hrs.	@		
A—Total operating charges					$ 182.92

Maintenance Charges

*Tires 2278 miles @ .03¢ (Pollock Tires		$ 68 34	
Repairs ✓ 1/12 of $134.00		11 17	
Overhauling, painting, etc ✓ 1/12 of $196.00		16 34	
Spare vehicle rental			
Garage rental (pro rata) ⊕		30	
B—Total maintenance charges			$ 125.85

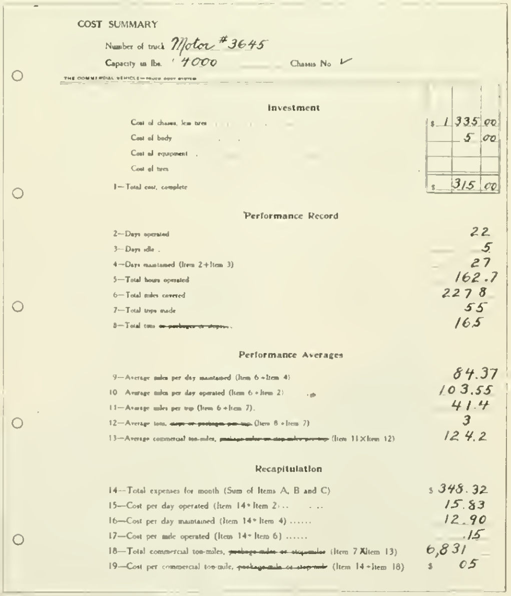
Fixed Charges

Insurance, fire @ ____ per year		$ 7 50	
Liability @ ____ per year			
Collision @ ____ per year			
Interest @ 6 % (On Item 1 ÷ 12)		6 50	
Depreciation on chassis @ 20 ÷ 12 %			
Depreciation on body @ 20 ÷ 12 %		22 75	
Depreciation on equipment @ ____ %			
*Depreciation on tires @ ✓ %			
Total taxes and licenses		80	
C—Total fixed charges			$ 39.55
			348.32

*Note: Omit one of these.

⊕ Est $1 per day

Here is a Truck Cost System that saves money, for it shows a man the operating costs of his truck at a glance. These are the figures for a 2-ton Reo used for long-distance moving from Dowagiac, Mich.



COST SUMMARY

Number of truck Motor #3645
Capacity in lbs. 4000 Chassis No ✓

The Commercial Vehicle—Truck Cost System

Investment

Cost of chassis, less tires	$ 1 335 00
Cost of body	5 00
Cost of equipment	
Cost of tires	
1—Total cost, complete	$ 315 00

Performance Record

2—Days operated	22
3—Days idle	5
4—Days maintained (Item 2 + Item 3)	27
5—Total hours operated	162.7
6—Total miles covered	2278
7—Total trips made	55
8—Total tons ~~or packages or stops~~	165

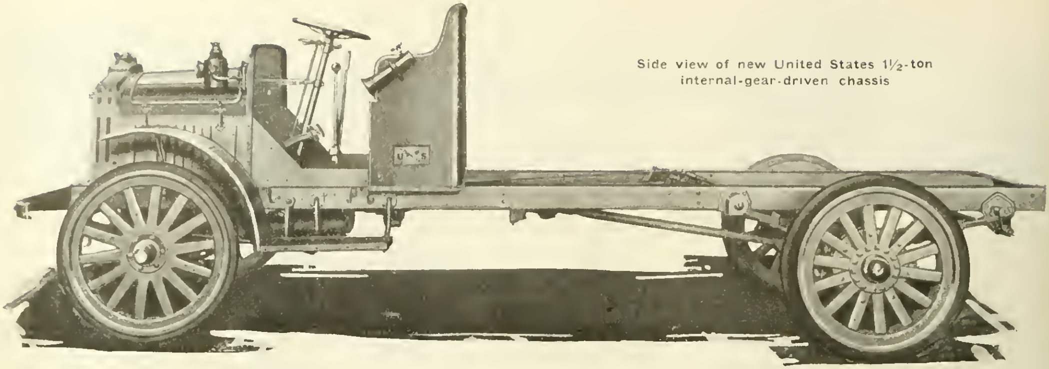
Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)	84.37
10—Average miles per day operated (Item 6 ÷ Item 2)	103.55
11—Average miles per trip (Item 6 ÷ Item 7)	41.4
12—Average tons, ~~stops or packages per trip~~ (Item 8 ÷ Item 7)	3
13—Average commercial ton-miles, ~~package-miles or stop-miles per trip~~ (Item 11 X Item 12)	124.2

Recapitulation

14—Total expenses for month (Sum of Items A, B and C)	$ 348.32
15—Cost per day operated (Item 14 ÷ Item 2)	15.83
16—Cost per day maintained (Item 14 ÷ Item 4)	12.90
17—Cost per mile operated (Item 14 ÷ Item 6)	.15
18—Total commercial ton-miles, ~~package-miles or stop-miles~~ (Item 7 X Item 13)	6,831
19—Cost per commercial ton-mile, ~~package-mile or stop-mile~~ (Item 14 ÷ Item 18)	$ 05

What performance is your truck giving you, more or less than the above, and why? If your commercial vehicle is not paying for itself, keep your records after this system and find the leaks



Side view of new United States 1½-ton internal-gear-driven chassis

New United States Model a 1½-Tonner—Internal-Gear-Driven

U. S. SPECIFICATIONS

Capacity, tons	1½
Price	$1,995
Wheelbase, in.	144
Tires, front	36x3½
Tires, rear	36x5
Bore, in.	3¾
Stroke, in.	5
N. A. C. C. hp.	22.5
Speed, r.p.m.	1400
Speed, m.p.h.	20.7
Gear ratio in high gear	7.25 to 1
Final drive	Int.-gear

THE United States Motor Truck Co., Cincinnati, Ohio, has added a 1½-ton internal-gear-driven model to its line of trucks, which includes capacities of 2½, 3½ and 5 tons. Like its predecessors, it is an assembled product of standard units, such as Continental engine, Schwarz wooden wheels, Long radiator, Eisemann magneto, Stromberg carbureter, Brown-Lipe clutch and gearset, Shuler front and Clark rear axles, Sheldon springs, Lavine steering gear, and Blood universal joints.

The cylinders of the four-cylinder power plant are cast in block with the valves at the right. The crankshaft is mounted on three bearings. The engine is a unit with the gearset, the latter being of the three-speed selective type. Cooling is effected through the use of a vertical finned-tube radiator with cast tanks and frame. The water is circulated by means of a centrifugal pump. Gasoline is fed to the carbureter by vacuum from a 20-gal. tank under the seat. Engine lubrication is by means of a force feed and splash system. A horizontal plunger pump driven by an eccentric from the camshaft forces the oil through copper tubes direct to the timing gears and over the rear main bearings. It then drains back into the oil pan, thus maintaining a proper level for the splash lubrication of pistons, connecting rods and middle crankshaft bearing. Provision is made for proper draining of the oil and removal of the strainer for cleaning.

The drive is taken from the gearset through a two-piece propeller shaft to the springs. The driving torque is also taken through the springs, which are half-elliptic. These are specially heat-treated, the front springs being 38½ by 2½ in. and the rear 54 by 2½. The propeller shaft is equipped with three universal joints and has a center bearing housing, containing a self-aligning bearing. A special oiler disc feeds the oil from a reservoir to the bearing. The clutch is of the multiple disc type, alternating steel and asbestos.

Ignition is by means of a single high tension magneto, hand controlled. A combination Eisemann magneto-generator is supplied at extra cost, as is electric lighting. The hand brakes are internal expanding on the rear wheels and the service brakes are external contracting.

The wheels are equipped with single solids all around. Pneumatic equipment is optional at extra cost. The company offers pneumatic tire equipment in sizes of 35 by 5 in the front and 38 by 7 in the rear. The Lavine steering gear is semi-irreversible, of the worm and split nut type. The steering wheel is 18 in. wide. The frame is of pressed steel, with all spring hangers and cross-members hot-riveted. The United States Motor Truck Co., which manufactures its own frames, has equipped them with diagonal braces for the rear member, thus providing additional strength. The spring shackle bar runs clear through the frame at the rear. Steering is on the left, with control in the center.

The equipment includes a driver's seat of steel, steel bumper, three oil lamps, tool box and kit, horn, front fenders and a short running board.

New Oldsmobile ¾-Ton Model Now in Active Production

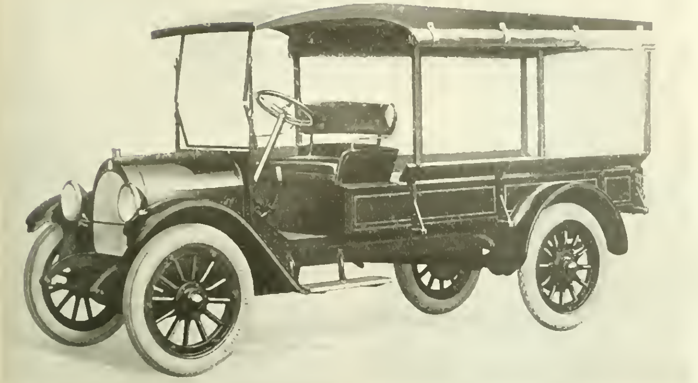
OLDSMOBILE SPECIFICATIONS

Capacity, tons	¾
Price	$1,250
Wheelbase, in.	128
Tires, front	35x5
Tires, rear	35x5
Bore, in.	3 11/16
Stroke, in.	5¼
N. A. C. C. hp.	24
Speed, r.p.m	2000
Speed, m.p.h	22
Gear ratio in high gear	6½ to 1
Final drive	Int.-gear

THE Olds Motor Works, Lansing, Mich., which announced last July that it would enter the truck field with a ¾-tonner, is now in active production on the new line, known as the Oldsmobile Economy truck. It is internal-gear-driven and an assembled product of standard units such as Remy distributor, U. S. L. battery, Auto-Lite starting and lighting equipment, Monarch governor, Zenith carbureter, Warner gearset, Torbensen rear and front axles, Perfection springs, Jacox steering gear, and Hartford universal joints. The engine and clutch are made by the General Motors Co. and the radiator by the Oldsmobile factory.

The cylinders of the four-cylinder valve-in-head engine are cast in block with the crankshaft mounted on three bearings. The engine is a unit with the gearset. Cooling is effected through the use of a square tube honeycomb radiator with a pressed steel case. Water is circulated by a centrifugal pump.

The Zenith carbureter is fed by vacuum from a tank under the seat and the governor is of the suction type. Engine lubrication is by means of a splash-pressure system in which the oil is led from a pump to the distribution chamber and then to the three main bearings. From the bearings the oil goes through leads to the troughs. Electrical equipment consists of a Remy distributor, Auto-Lite starting and lighting and U. S. L. battery.



New $^3{}_4$-ton Oldsmobile, internal-gear-driven

The clutch is of the cone type with leather facing material. Both the drive and torque are taken through the half-elliptic springs. The gearset is of the three-speed selective type. The hand brakes are external, contracting on the rear wheels, and the service brakes internal expanding. The rigid frame is of pressed steel and the wood wheels are equipped with pneumatic tires all around. Steering is on the left and control in the center.

Huffman Bros. Trucks in Production —First Model a $1\frac{1}{2}$-Tonner

HUFFMAN SPECIFICATIONS

Capacity, tons	$1\frac{1}{2}$
*Price	$1695
Wheelbase, in	140
Tires, front	34x$3\frac{1}{2}$
Tires, rear	34x5
Bore, in	$3\frac{3}{4}$
Stroke, in	5
N. A. C. C. hp	22.5
Speed r.p.m	2000
Speed, m.p.h	18
†Gear ratio in high gear	7.75 to 1
Final drive	Worm

*Model C, internal-gear-driven lists at $1495.

†Model C is 8 to 1.

THE Huffman Bros. Motor Co., Elkhart, Ind., a newcomer in the commercial vehicle field, has started production. Deliveries are being promised to the dealers. The Huffman factory covers thirteen city blocks and has a floor space aggregating 100,000 sq. ft. The company is financed by a group of Omaha men, its capitalization being $1,000,000. Though production now amounts to two a day, the company contemplates an increase in the near future to six to eight per day. The officers of the company are: President, W. L. Huffman; vice-president, F. Huffman; vice-president and general manager, R. S. Wiltrout; treasurer, LeRoy Huffman; secretary, V. C. Cawley, and N. L. Kuhnen, sales manager.

The company is concentrating on one model of 1½-ton capacity with a choice of a Standard worm-drive or Torbensen internal-gear-drive. Model C, which lists at $1,495, is equipped with the Torbensen axle, and Model B, listing at $1,695, with the Standard worm-driven axle.

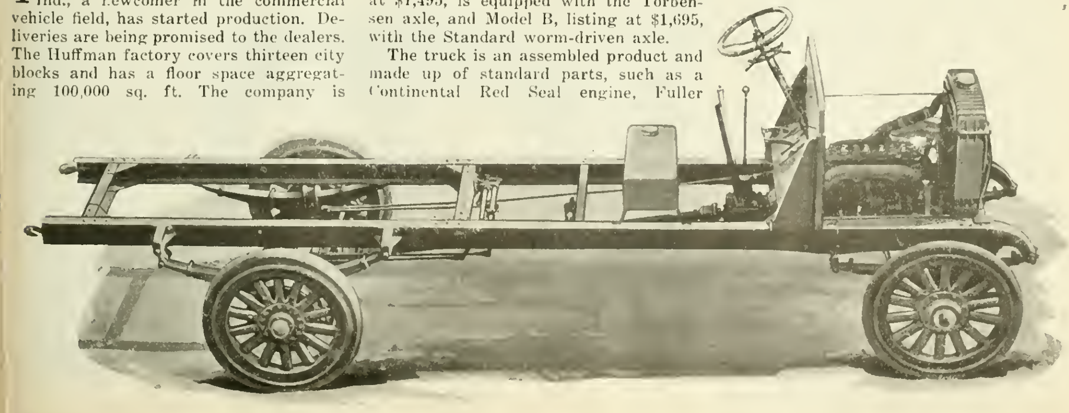
The truck is an assembled product and made up of standard parts, such as a Continental Red Seal engine, Fuller clutch and gearset, Perfection springs, Lavine steering gear, Livingston radiator, Shuler front axles, Dixie magneto, Zenith carbureter, Hydraulic frame, Royer wheels and Kisler-Bennett universal joint.

The four-cylinder Continental engine's cylinders are block-cast with the valve location on the right. The engine is a unit with the gearset. Cooling is effected by a square tube radiator with a demountable cast iron case which is finned for cooling at the top and also at the bottom sides. The radiator is mounted on cushions with floating spring suspension and the front is provided with triangular steel protection guards. Water circulation is effected by means of thermo-syphon system.

The carbureter is equipped with a hot air quick starting device and is fed by gravity from a tank under the seat. Ignition is taken care of by the Dixie single high-tension magneto, with spark controlled by hand. Engine lubrication is effected through the use of a force feed pump to the timing gears and over the rear main bearing. The rest of the engine is oiled by splash from the connecting rods.

The Fuller clutch is of the multiple-dry-disk type with asbestos facing material. The three-speed selective gearset is a unit with the engine. The driveshaft is tubular and 2 in. in diameter, with both the drive and torque taken through the springs, the latter being of the half-elliptic type. The driving shaft has two universal joints and is supported at the center by self-aligning bearings.

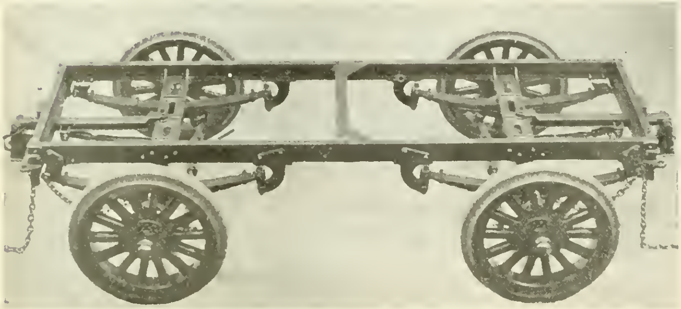
Model C, internal-gear-driven, has internal expanding and external contracting brakes, while Model B, worm-driven, has two pairs of internal expanding brakes. The semi-flexible frame is of the straight-side type, heat-treated and of pressed steel channel, 3/16 in. thick. The length over all is 204 in. and the depth is 5½ in. The frame is equipped with four pressed steel cross members, the front cross member being removable to afford easy access to the engine. Timken taper roller bearings are used throughout.



New Huffman $1\frac{1}{2}$-tonner, sold with a choice of worm-drive or internal-gear drive

Two New Trailmobile Models of 2- and 3½-Ton Capacities

Carsafe Load Governor Makes It Impossible to Start a Truck When It Is Overloaded — Two New Sterling Jacks — Reflex Spark Plug



Model L reversible 3½-ton Trailmobile

TRAILMOBILE SPECIFICATIONS

	2-ton Inches	3½-ton Inches
Wheelbase	88	88
Length of frame....	144	144
Depth of frame......	4	5
Width of frame.....	39	39
Spring size..........	50x2½	50x3
Axle beam...........	2x3¼	2¼x3 7-716
Tires	36x4	36x5
Tread	58	66½

THE Trailmobile Co., Cincinnati, Ohio, manufacturing trailers and semi-trailers ranging in sizes from 1250 to 10,000 lb., has brought out two new models in 2- and 3½-ton capacities. The 2-ton Model K four-wheeled reversible Trailmobile and the 3½-ton Model L four-wheeled reversible trailer are identical in design and construction but different in dimensions.

In both the pull of the propelling vehicle is exerted upon the frame but the steering is done from the axle. This construction eliminates the influence of spring action from the steering mechanism and results in accurate tracking. Sidesway at high speeds is prevented by having the spring shackles fixed at one end and also through the use of a patented steering mechanism, which is controlled by the drawbar. On the lower surface of this drawbar is attached the steering fork socket and the steering fork, the latter leading to the steering plate pivoted at the center of the axle. The steering plate is connected to the steering arms by cross rods which actuate the steering knuckles and thus control the wheels, as in the lighter models of Trailmobiles. The horizontal movement of the drawbar caused in turning a corner is immediately communicated to the wheels through the steering fork, steering plate, cross rods and steering arms. Being hinged at both ends and with a plunger as an intermediary connection, the steering fork is free to move up and down with the frame and follow positively the action of the springs without affecting the alignment of the wheels.

The drawbar is an I-beam casting pivoted at the rear end to the draft beam in the frame by a hardened and ground bolt with a bushing. The pivot point is directly over the center of the axle, which helps to secure a stable equilibrium.

The draw-head is a horizontal bell-shaped steel casting, hinged to the drawbar and fitted with a double pin. In forward running both parts of the pin are inserted through the drawbar and the coupling bar. When backing the forward pin is removed. The shape of the draw-head and the special design of the coupling bar where it enters the draw-head enables the truck to back the trailer from angular positions without prying against the side of the draw-head. The hinging of the draw-head provides for any difference in levels between the trailer and the truck.

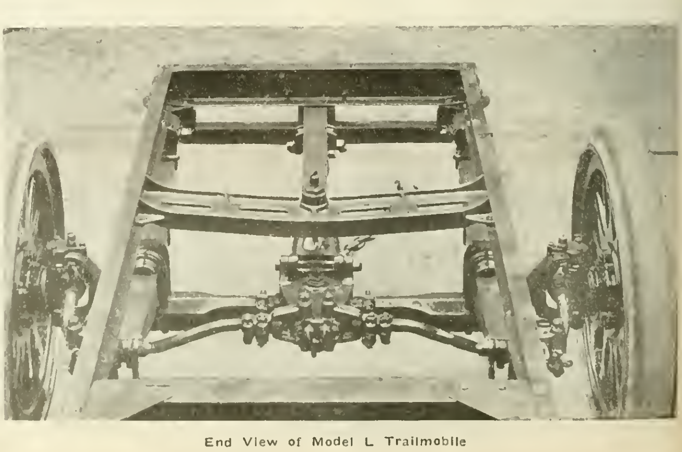
The coupling bar is of steel casting and fits at the rear end into the draw-head and at the front forms a heavy cap which fits around the end of the bar. The housing is built up to contain the shock absorbing compression spring of special alloy steel. The pull rod is made of forged steel and extends from the cap of the coupling bar through the compression spring. The pull rod is forged into an eye at its front to take the coupler on the truck and is free to revolve in its cage. A universal coupler is furnished to attach to the rear cross member of the chassis frame of the truck. This coupler is easily detached and transferred from truck to truck.

The frame is of standard steel channel construction. The ends are riveted to the sides and the corners are bound with heavy iron brackets outside and angle corner plates inside. Cross members consist of two heavy draft beams hot riveted to the side channels and one center cross member. The axles are bushed and provided with oil and grease cups. The springs are semi-elliptic of heat-treated spring steel. There are rebound clips on each spring. The wheels are of the artillery type and the tires are pressed on solids.

The 2-tonner has a body allowance of 1000 lb. additional and the 3½-tonner 1200 lb.

Carsafe Load Governor

A SAFETY device, which makes it impossible to start a motor truck when it is overloaded has been developed by the Cammen Laboratories, 42 West Thirty-ninth Street, New York. It consists of two parts, a registering device (Fig. 1) and a control device



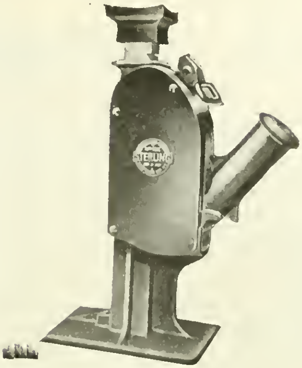
End View of Model L Trailmobile

(Fig. 2). The registering device takes the place of the usual spring shackle and is a casting which has to be designed specially for each make of truck. The upper part A of the registering device is attached to the chassis and the lower part B carries the spring bolt, the two parts being hinged together at the right in Fig. 1. Part A carries an oil reservoir on which pressure is exerted by a plunger through a welded-in bronze diaphragm. This pressure is transmitted to the Bourdon tube in gage C. The diaphragm is of such size that the pressure on it, which is transmitted to the Bourdon gage, never exceeds 500 lb. per sq. in., a reduction in area of 8.1 being used on 1-ton trucks and 30.1 on the 5-tonners.

The gage C is equipped with a circuit closing device so located that it is reached by the pointer when the load on the truck exceeds a safe limit. Let us say that the manufacturer or user desires to have a useful load of not more than 2000 lb. This for a given truck means that the load on each side of the rear axle should not exceed, say, 1600 lb. The circuit closing pin is then set at 200 lb., which is the load registered through the hydraulic transmission by the gage when the load on the truck is 1600 lb. for each side of the rear axle. It is generally sufficient to equip one side of the rear axle with a governor, the load being usually evenly distributed on the truck.

When the load exceeds the safe limit the pointer of the gage reaches the circuit pin D and thereby closes an electric circuit. This energizes an electro-magnet (Fig. 2) and the latter then attracts its armature. This in its turn withdraws the catch E and permits the spring to pull over the bell crank F, thereby opening the ignition circuit so that the engine cannot be run.

At the same time, however, the swinging out of the bell crank draws away the metal plate G against which press contact brushes, which open the circuit around the electro-magnet. In this way both the ignition circuit and the control circuit are automatically opened. The advantage of this is that the electro-magnet may be made to carry quite a heavy current without exhausting the battery.

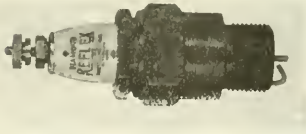


Sterling Truck Jack

When the spring draws back the bell crank the latter strikes a bell (not shown in the drawing), which notifies the driver that the truck is overloaded.

Once the ignition circuit has been opened it will stay open until closed again by the driver. To do this the driver has to pull the rod H as far as it will go.

To prevent drivers from tampering with the governor the pull rod H, which closes the ignition circuit, is made interlocking with the ignition switch. A slot is provided in the rod and the ignition circuit can be closed only when the switch feeds into this slot. But when the rod is in such a position that the ignition does feed into the slot, the cable I is quite loose and the bell crank cannot be held manually against the tension of the spring, which would be the only way to hold it if the truck was overloaded and the circuit through the electro-magnet closed.



Reflex Spark Plug

Sterling Truck Jacks

THE Republic Auto Parts Co., Long Island City, N. Y., is manufacturing two Sterling truck jacks, one for 3-ton capacity and the other for 5-ton. Both are similar in materials and mechanical construction and identical with the No. 60 series Sterling jack for passenger cars, with the exception that all parts are considerably heavier and larger in proportion to the load which the truck is capable of carrying.

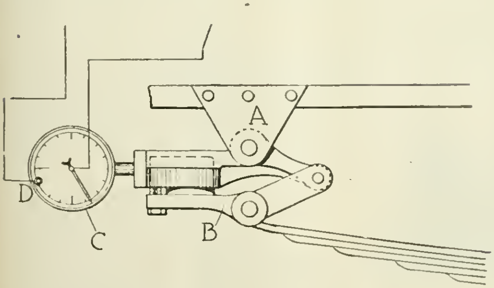
The jacks are single-acting, operating only on the down stroke of the handle. The rack is of extra heavy carbon steel, machine milled and fitted. The pawls are automatically held in place, preventing accidental drop of the load. The direction of movement is controlled by upward or downward position of the tripping lever, conveniently located. The frames are made of carefully selected malleable iron, having a guaranteed tensile strength of 50,000 lb. per square inch.

The operating mechanism is made of carbon steel and malleable iron. Finger loops for convenience in handling are part of the equipment. The heads are notched to prevent slippage.

The 3-ton jack is 12 in. high and can be raised 5½ in. Its weight is 14 lb. and the price is $9. The 5-ton jack is 15 in. high and can be raised 6½ in. It weighs 28 lb. and costs $15.

Reflex Spark Plug

THE Reflex Ignition Co., Cleveland, has added another spark plug to its line called the Diamond. This is applicable to truck use on account of its heavy insulation. The points will not burn off inasmuch as the electrodes are made from special alloys that guarantee complete conductivity of the electrical current. The core is proportioned to resist the action of expansion and contraction and to provide for the intermittent excessive pressure to which it is subjected. Following out the design of its other plug types, the Diamond plug has been made in two pieces. Thus it is not necessary to purchase a new plug when the center only has been damaged.



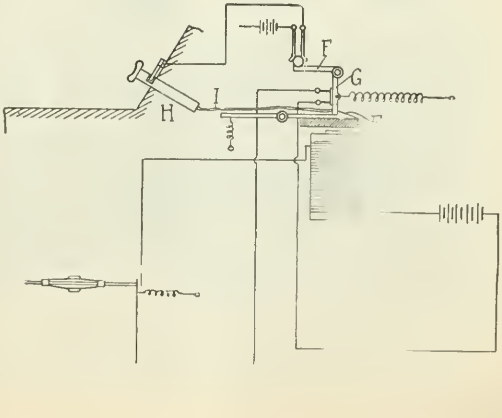


Fig. 1—Above—Carsafe load governor registering device.
Fig. 2—Right—Control device of Carsafe load governor.

Highway Traffic Assn. Has Successful Meeting

NEW YORK CITY, May 16.—Upward of seventy-five attended the first annual meeting of the National Highway Traffic Association, an organization formed last November for the purpose of working for traffic betterment throughout the country. This organization had its inception several years ago as a local traffic organization for greater New York. It soon was expanded into a traffic organization for the State of New York. The demands for solution of traffic problems from adjoining states suggested the desirability of making it a national organization, which was successfully carried out. The membership is now over 300.

The subjects considered at yesterday's meeting had to do with the development of rural motor express. F. W. Fenn of the National Automobile Chamber of Commerce, gave a complete summary of what has been accomplished throughout the country. J. H. Collins, Highway Transport Committee, Washington, outlined the necessary plans for making surveys for rural motor express routes, and James E. Boyle, professor of rural economy, Cornell University, analyzed the situation in New York State. He showed the fluctuating costs of farm products in different seasons due to lack of flexibility in highway transportation. H. G. Shirley, secretary of the Federal Highway Council, Washington, referring to the work of the council, reported that it has 400 members and its work has been endorsed by 800 commercial organizations. The national character of the Federal Highway Council's activity is indicated by the fact that forty-three state highway departments are now co-operating with the council and sixty-eight different highway officials are represented in the council.

George H. Pride, president of the Heavy Haulage Co., New York, an organization engaged exclusively in motor transportation between cities and in practically any field, declared that heavier loads must be permitted on the highways if cheaper transportation is to be obtained. He says it is possible to make money on inter-city hauling between New York and Boston if you are permitted to carry 7½-ton loads, but not possible with 3- or 5-ton loads. His views on the problem of road cost are very practical. If you build expensive highways that will withstand heavy traffic, you lower the cost of transportation; and if you build cheaper highways, that will not carry heavy traffic, you increase the cost of transportation. It is a case of six of one and half a dozen of the other. If you do not pay the bill in road-building, you pay it in higher cost of transportation and vice versa. In either case it is the general public that pays the bill.

SERVICE FOR BUDA ENGINES

HARVEY, ILL., May 24—The Buda Co. plans to establish Buda Engine Service companies all over the country. The first will be opened in Los Angeles, Cal., San Francisco, Cal.; Seattle, Wash., and possibly Portland, Ore. The establishment of a service company in Kansas City will take care of the middle West, and New York City will be the Eastern headquarters.

HAYES NOW WISCONSIN PARTS

OSHKOSH, WIS., May 22—The E. B. Hayes Machinery Corp., maker of Wisconsin axles, has been sold to the Wisconsin Parts Co., a new corporation capitalized at $500,000. W. F. Rockwell, formerly vice-president in charge of engineering and production of the Torbensen Axle Co., Cleveland, is president and general manager of the new concern, and Louis Schriber, vice-president of the Old National Bank of Oshkosh, is treasurer. The Wisconsin Parts Co. will continue the manufacture of Wisconsin worm-driven axles for trucks from 1- to 5-ton capacity. A tractor axle has also been designed and is in process of manufacture. The present capacity of the factory is 500 axles a month, and additions now being made will soon double the capacity.

TRAILER ASSN. MEETS

NEW YORK CITY, May 19—Uniform legislation and the promotion of a better public knowledge of the trailer and its uses were high points in the program outlined at an all-day meeting of the executive committee of the Trailer Manufacturers' Assn. of America held in the association offices, 110 West 40th Street, May 17.

As a first step it was decided to ask all members for suggestions for provisions relating to the regulation of trailers, and to incorporate these in recommendations to be sent to the Highway Industries Assn. with a request that they be embodied in the uniform traffic bill which was drafted by a joint committee representing the Highways Transport Committee of the Council of National Defense, the Association of State Highway Officials, the National Automobile Chamber of Commerce, the Highway Industries Assn. and the American Automobile Assn.

It was also decided to work in conjunction with interested organizations to keep in close touch with proposed legislation, with the object of obtaining proper laws that will afford protection to the highways and their users without unwisely checking the development of economical and expeditious transportation by highway. To this end, it is proposed to arrange for the introduction of a uniform traffic bill embodying reasonable trailer regulations in the various state legislatures next winter and to get prompt advice of all other bills introduced affecting trucks and trailers.

CHICAGO TRUCK CO. COMING EAST

NEW YORK CITY, May 23—The Chicago Pneumatic Tool Co. will build a 10-story brick building at 6-8 West Forty-fourth Street, and will move its general offices from Chicago here.

REPUBLIC DISTRIBUTERS PUT OFF MEETING

KANSAS CITY, MO., May 22.—The first meeting of the Republic Truck Distributors' Assn. will not be held on June 2 and 3 as announced in the May 15 issue of The Commercial Vehicle, but is being postponed to a later date.

Bangkok, Siam, is as up-to-date as many another city in the matter of transportation, as this fleet of electric trucks would indicate. The S. E. C., which is printed on the sides of the two vehicles nearest the reader, stands for Siam Electricity Co.

The
COMMERCIAL VEHICLE
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher.
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building
231-241 West 39th Street, New York City

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PRECISION
BALL BEARINGS
(PATENTED)

To have met the super-demands of war times with credit and success—to have maintained a high standard of quality under production conditions imposed by war—these are achievements of which any American manufacturer may well be proud. And these are achievements which will command the confidence of the trade in time of peace.

The records of performance made by American cars, trucks, tractors, power boats and airplanes, in the Great War, make up a notable chapter in the history of national accomplishment. And "NORMA" Bearings, in the magnetos and lighting generators, contributed their share to this record of achievement.

Be SURE—See That Your Electrical Apparatus Is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA
1790 BROADWAY NEW YORK
Ball, Roller, Thrust and Combination Bearings

This Motor Truck Secured Them the Contract

ONE of the coal and building supply houses of Philadelphia had an opportunity to bid on hauling sand, stone and gravel to this building operation.

They found their Autocar Motor Trucks could do the work at a profit, because a trip that would take two hours and a half with horses was less than an hour's work for an Autocar.

For six years they have been Autocar users, and have continually found they could secure contracts that were out of the question before.

Autocar Motor Trucks are doing the hauling for more than 7000 concerns in over 450 different lines of business. Write for a catalog and a list of Autocar users.

Chassis $2050
97-inch Wheelbase

THE AUTOCAR COMPANY, *Ardmore, Pa.* **Established 1897**

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Stockton

Represented by these Factory Branches, with Dealers in other cities

Autocar

The Commercial Vehicle
Read by Fleet Owners
Vol. XX June 15, 1919 No. 10

Photograph Courtesy of U. S. Dept. of Agriculture

Farmers in their horse wagons bringing milk and cream to one of the roadside pick-up platforms from which the co-operatively-owned truck seen in the background carries it to the city markets in Baltimore, between 25 and 30 miles

Farmers Get Benefits of Fleet-Owner Service Through Co-operative Truck Line

Successful Maryland Route Enables Farmers Not Served by Railroads to Market Goods and Buy Supplies from Big City

FARMERS who do not have sufficient goods to ship to market to warrant the purchase of a truck may receive the same service they would obtain if they operated a fleet of trucks, by forming a co-operative association. The principle of the co-operative motor truck association is fundamentally correct. Those which have failed heretofore have done so because of the ignorance of truck operation on the part of the founders or because of poor business methods.

That such as association may be made a success when the trucks are operated over improved highways and when there is a sufficiently diversified volume of goods to be moved throughout the year is proved by the satisfactory service rendered over a 2-year period by the Farmers Co-operative Co. of Hartford County, Inc. That association has its headquarters in Bel Air, Md., and operates between Churchville, Bel Air and Baltimore and intermediate points. The route is 33 miles long one way between Churchville and Baltimore.

HIGHLIGHTS OF CO-OPERATIVE ASSOCIATION

1—Enables farmers to market goods with fleet-owner service at lowest possible cost.
2—Two-family house built at end of route and rented to drivers at prevailing rates to make lot of drivers easier.
3—Truck service charges reduced by carrying full return loads.
4—Line a success because route is over good roads.
5—Cost of city pick-up station reduced by selling its service to other lines.

Three trucks are employed, two of 3½-ton capacity and one of 1½-ton capacity. At least one complete round trip is made over the full route daily. The line was started on April 1, 1917, with one truck and since that time only one trip has been missed on account of excessive snow and two other trips lost on account of repairs to the first truck when it slid off an ice-covered road down an embankment before the second truck was purchased. This is a record to be envied, especially when the one railroad serving the same territory lost a greater number of runs during the same period.

Photograph by courtesy of the U. S. Dept. of Agriculture

A harrow ordered a few hours before being delivered at the farmer's gate by the association's truck. The full cans of milk seen on the roadside will be picked up during the same stop and delivered to Baltimore

In order to keep the truck drivers contented by making their lot as easy as possible, the association has invested between $4,000 and $5,000 in the purchase of land and the construction of a two-family house and garage at the end of the line in Churchville. The house will be rented to the drivers at the same rates as prevail for similar houses in the community. The garage is situated on the same plot of ground as the house and lies between it and the main highway so that the drivers have only to walk a stone's throw from the garage to the house at the end of the day's work. This convenience keeps the drivers contented and does away with the otherwise long hikes in the early morning hours between their homes and the garage.

The various topical phases of the work, including how and why the association was formed; the benefits of the association to the farmers belonging to it; the method of joint use with other lines of the city pick-up station to reduce the cost to the association; the rates charged and how the records are kept are all discussed under separate headings in the article.

Why and How the Co-operative Motor Truck Association Was Formed

THE association was formed to enable the hundred or more farmers living along the route from Baltimore through Bel Air to Churchville to market their milk and other agricultural products. The territory is poorly served by but one railroad.

Formerly the farmer hauled his products by team or motor truck either to the railroad station or to Baltimore, the nearest large city. This meant the loss of the use of the team and men for a full day or an investment for a truck which the earnings of the farmer with a small farm did not warrant. Later a motor truck owner operating a private truck line carried milk and other products satisfactorily for quite a period. But with the increased cost of labor and materials, he was forced to raise his rates.

As a result, the leading farmers and merchants along the route decided to organize the co-operative association and to operate it at cost with no idea of earning dividends on the investment.

Canvass First Necessity

A canvass was then made among the farmers and rural merchants to learn the sentiment towards the formation of such an association and to ascertain how much milk and other goods every proposed member of the association would have moving to and from Baltimore. The canvass showed that a sufficient number of men would join the association and would have enough tonnage moving in both directions to warrant the operation of one 4-ton truck at the start.

With this groundwork completed, ten farmers interested in the formation of the line filed a certificate of incorporation under the general laws of Maryland and a charter was accordingly issued for a corporation called the Farmers' Co-operative Co. of Hartford County, Inc. The association was incorporated in order that its work might continue irrespective of any changes in membership as time went on. The expenses of incorporation were about $35. Although the association was formed primarily to provide for transportation, liberal provisions were asked for in the charter so that the association might engage in other lines of work without the necessity of applying for amendments to the original charter.

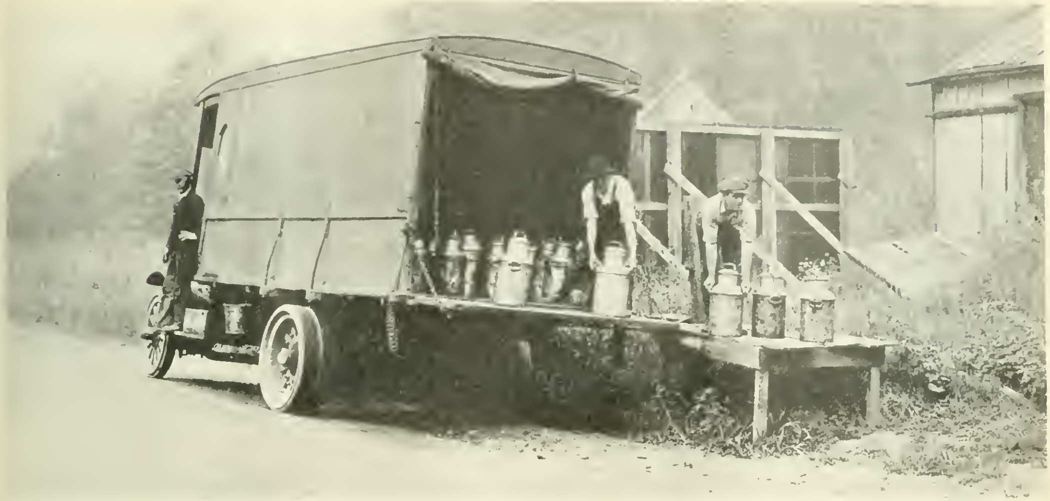
Some Charter Provisions

The following extracts from the charter indicate the wide field in which the association may operate:

"To buy, sell, transport, and otherwise deal in farm products and goods * * * of all kinds, to lease, purchase, sell and otherwise deal in all machinery tools * * * used in connection with business carried on by the corporation; to purchase, hold, own, lease, convey, mortgage, pledge, transfer, or otherwise acquire or dispose of all property, both real and personal, of every class and description, or any interest therein necessary or desirable for the carrying on of the aforesaid business or any of them."

Membership in the association is based on the ownership of stock. The association is authorized to issue 200 shares of stock at the par value of $25 each, thus making the total authorized capital $5,000.

The officers of the association consist of a president, vice-president and combined secretary and treasurer, together with a board of directors composed of ten stockholders. The directors are elected at the annual meeting of stockholders and a majority of the stock represented at the annual meeting is necessary for election. It is necessary to own at least one share of stock to become a member



Photograph by courtesy of the U. S. Dept. of Agriculture

In order to save the time of the truck on the route and to make the loading and unloading of both empty and full cans easy, many of the members have erected platforms along the truck route. These platforms are level with the floor of the truck body

of the association and membership is open to both sexes. Each share of stock permits the owner to cast one vote in the proceedings of the stockholders, but no member may own more than twenty shares.

Any distribution of profits is to be made on the basis of the stock owned by each member. Up to the present time no effort has been made to earn dividends and no dividends have been paid on the stock issued.

How Association Started

The association started on April 1, 1917, with a capital of $1,100. The first 3½-ton Kelly-Springfield truck purchased to begin the operation of the line into Baltimore cost $3,285 complete, and was paid for on the installment plan. When it became evident that one truck would not meet the requirements of the route, additional money to the total value of $10,000 was borrowed from local banks. Approximately $3,000 of this amount has been paid off, leaving an outstanding debt of $7,000 covered by the trucks now owned which consists of a Mack 3½-tonner and a Kissel 1½-tonner in addition to the original 3½-ton Kelly-Springfield.

In addition to the money appropriated for the purchase of the trucks, the association also voted between $4,000 and $5,000 for the purchase of a plot of land at Churchville, one end of the line, and for the construction thereon of a garage to house two trucks and a two-family house to be rented to the truck drivers and their helpers at rates corresponding to the charge for similar accommodations in the same neighborhood. The money paid in as rent on the driver's house will of course wipe out this charge in due time.

The truck drivers are paid $22.50 a week and the helpers, when used, $20 a week.

The secretary-treasurer, Jacob A. Doxen, an attorney with offices in Bel Air, Md., takes care of the active management of the association and is paid a nominal sum of $1 a day for the services he renders.

By the able efforts put forth by such men as Mr. Doxen the success of the association has been assured. Similarly, the success of any similar association in other parts of the country is dependent upon the selection as officers and directors of men of ability and business judgment, and who are public spirited enough to be able to harmonize differences arising and to sink their own personal feelings and interests for the benefit of the association. Frequent meetings of the board of directors should be held in order that opportunity may be given to any stockholder to present matters to the board for consideration. The meetings also serve to keep the board closely informed as to the character of service being rendered.

Benefits of the Association Are Low Rates and Quick, Reliable Service

THE main benefit of the association to its members is in the low rates charged for the truck hauling. These rates are lower than could possibly be obtained from an owner operating the truck as a private line, since such an owner would have to earn a profit on his work. On the other hand, the association does not seek to earn a profit but gives to its members any possible profit in the form of lower rates on the business which they contribute. The association will not haul goods for any farmer who is not a member of the association. There is also a reduction in the license fees charged on the association trucks. The fee on the 3½-tonners is $100 each and $40 a year for the 1½-ton truck. A co-operative motor truck association is not regarded as a common carrier in the State of Maryland but is classed as a private individual so long as it hauls exclusively for its own members. A common carrier on the other hand must pay a much larger license fee based upon the tonnage carried and the mileage covered, and this fee might amount to $400 or $500 a year.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

The two-truck garage and the two-family house for drivers which the association has put up at Churchville, one end of the line. The house is rented to the drivers and helpers at the same rates for corresponding accommodations in the same neighborhood

In addition, the truck service is much quicker than could be obtained from the one railroad which serves the territory. If the farmers had had to depend upon the railroad exclusively during 1917 and 1918, the many railroad embargoes and the inability to get cars due to railroad congestion would have resulted in serious losses. The association has effectually eliminated destructive competition.

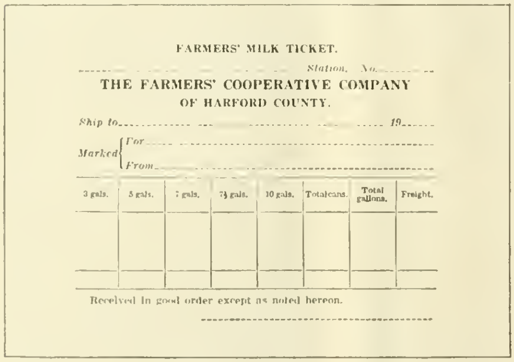
Notwithstanding that the association was formed primarily to establish a quick and cheap means of transportation to the farmers and rural merchants along the route, it has not confined itself entirely to that field. It has also carried on considerable purchasing for its members. Wholesale dealers in Baltimore sell goods to the association at wholesale prices because in buying for the hundred or more members the association is able to purchase in wholesale quantities. Each member advises the secretary of his needs for different kinds of goods and the secretary then ascertains if other members are in need of the same commodities. If they are, the goods are bought in large quantities and delivered by the association's truck directly to the farmer's gate or roadside platform. The payment for goods bought through the association may be made at the time the orders are given, at the time of delivery, or when the bills for transportation charges are submitted to the members at the end of each month for settlement.

Expense of Baltimore Station Cut by Use by Four Other Truck Lines

IN the beginning, to save time and expenses in Baltimore, a responsible man first acted as agent to receive all the goods consigned to association members by Baltimore merchants and to accept other goods brought from the rural territory into Baltimore. The business along the route increased so rapidly, however, that the association was forced to hire a pick-up and distributing station at 933 Hillen Street, Baltimore, in the shipping district where rents were not excessive.

At first, this distributing station was used exclusively by the association. It soon became evident, however, that it could also be employed as a receiving station for other truck lines operating out of Baltimore in different directions than that to Bel Air and Churchville. This was done and the station is now used by four other concerns, each of which pay respectively $10, $10, $15 and $15 a month, bringing in a total income of $50 a month. The co-operative association pays as rent only $20 a month, so that it has a clear income of $30 a month which it applies to the salary of the person in charge of the station. The making out of bills at the station and the receipting for goods is done by a young woman at the rate of $15 a week.

The central receiving station and its use by five lines is thus a distinct convenience to merchants who ship to rural customers living in different parts of the state. This is also convenient for all the lines, since goods originating on one line and delivered on another can be rehandled at the same station.



FARMERS' MILK TICKET.

Station. No.

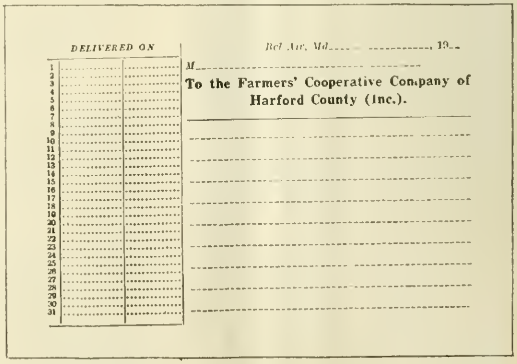
THE FARMERS' COOPERATIVE COMPANY
OF HARFORD COUNTY.

Ship to 19

Marked { For
From

3 gals.	5 gals.	7 gals.	7½ gals.	10 gals.	Totalcans.	Total gallons.	Freight.

Received in good order except as noted hereon.



Bel Air, Md. 19

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To the Farmers' Cooperative Company of Harford County (Inc.).

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At the left is shown the farmer's milk ticket which he makes out in duplicate, one for his own record and the other for the truck driver. At the right is shown the monthly charge sheet on which the record of each farmer's shipments are kept and which serves as a bill for transportation charges

Rates Are Low Because No Attempt Has Been Made to Earn Any Profits

RATES are based with a view to meet all current expenses but not to earn any profit. In the consideration of the rates given below, it should be borne in mind that Bel Air is 27 miles from Baltimore and Churchville 33 miles.

Milk is hauled at 2½c. per gallon and the cans returned free. A charge of 4c. per gallon is made for hauling cream if the shipper wishes to be insured against loss. If, however, he is willing to assume the risk the charge is 2½c. a gallon, the same as for milk. Should the shipper pay the 4c. rate, all losses are settled at the market price of cream on the date the loss occurred. Thus far damages paid on account of loss or damage of goods have been taken out of the operating revenue, although it is intended to provide a fund or take out insurance to cover such risks.

The rates given below have been prepared in schedule form and distributed to all members of the association. The rate on first-class goods is 15c. per 100 lb. from either Bel Air or Churchville. The rate on second-class is 12c. per 100 lb.

Articles	Rate
Apples	1st class
Axle grease	1st class
Axes	2d class
Baskets, 4 times	1st class
Butter	1st class
Beans	1st class
Buckets	1st class
Buckwheat	1st class
Barley	1st class
Barrels (empty)	1st class
Blankets	1st class
Blacking	1st class
Bananas, 1½ times	1st class
Candy	1st class
Canned goods	1st class
Carriages, 1½ times	1st class
Cans (cased)	
No. 2	2½c. per case
No. 3	3½c. per case
Coffee	1st class
Calves	50c. each
Cattle (Except on special trips)	50c. per cwt.
Cabbages	1st class
Cantaloupes	1st class
Chickens	25c. per coop
Cream (can to be returned)	2½c. per gal.
Eggs (empties to be returned)	25c.per cr.
Fish	1st class
Groceries (Except those classified)	1st class
Glass (glass jars) 1½ times	1st class
Glass (panes)	1st class
Hardware (common)	1st class
Hogs	Same as live cattle
Hogs, dressed	1st class
Household goods 3 times	1st class
Harness	1st class
Hay, baled	1st class
Iron	1st class
Lemons	1st class
Meats 1½ times	1st class
Milk (Cans to be returned free)	2½c. per gallon
Molasses	1st class
Machinery (No piece over 400 lb.)	1st class
Machinery (Pieces over 400 lb.) 2 times	1st class
Melons, loose, 1½ times	1st class
Melons, crated	1st class
Notions	1st class
Oils	1st class
Onions	1st class
Oranges	1st class
Office furniture	Same as household
Potatoes	1st class
Poultry	25c.per crate
Poultry, dressed	1st class
Pipe	1st class
Ranges	1st class
Stoves	1st class
Tires, auto	1st class
Vegetables	1st class
Wagons (knocked down):	
One-horse	$2.00
Two-horse	3.00
Three-horse	4.00
Four-horse	5.00
Wheels:	
Passenger car	1st class
Motor truck	1st class
Buggy	1st class
Wagon	1st class

So far the income on the 3½-ton trucks based on the rates shown above have been $25 a day apiece. The actual operating cost, including driver, gasoline and oil and maintenance charges but no overhead, has been estimated at $10 a day, thus leaving a profit, exclusive of the overhead charges, of $15 a day per truck.

Accounting Method Simplified Because Milk Forms Bulk of Goods Hauled

DUE to the fact that milk and cream form the bulk of shipments from the country areas to Baltimore, the method of accounting for the incoming goods into Baltimore is simplified and is handled with a minimum of clerical work by the use of the two forms shown at the bottom of page 8.

One of these forms is made out for the farmer with a duplicate for the driver at the time the shipment is picked up. As shown, it provides spaces for the number of various sizes of cans shipped and for the total number of gallons contained in the cans. Such a filled-out form is received with each shipment and after the delivery of the shipment is kept on record at the central distributing station at Baltimore until the end of the month, when the bills for the particular farmers are made out.

The monthly bills are made out on a separate sheet as shown at the right at the bottom of page 8.

Other goods brought to the Baltimore station for shipment to the farmers or the rural merchants are recorded on duplicate bills of lading, one copy of which is given to the driver for the delivery and turned over the farmer at the time of delivery, and the other kept at the Baltimore station to determine the total amount of the various charges at the end of the month.

Photo Courtesy of the U. S. Dept. of Agriculture

One of the trucks at the central depot in Baltimore and about to be loaded with empty milk cans and peach baskets. Also note the rolls of wire fencing already in the body and on the ground

The Editor's Viewpoint

Need for Garage System

TOO many times savings effected in the actual operation and economical routing and dispatching of trucks are wasted or neutralized by inefficient methods in the repairshop or garage. When the fleet owner decides to garage and maintain his own trucks, he should not begrudge the cost of the garage equipment, tools and machinery required to do the work properly. In truck repair work, it always pays to do a job right or not at all. Slipshod methods of truck repair are bound in the end to be most expensive.

In too many instances, the fleet owner tries to maintain a costly truck armada worth $50,000 or $60,000 with $500 worth of spare parts and $500 worth of tools. Of course, such methods are bound to prove unsuccessful, and the first thing the owner knows the repair bills are mounting high. He then feels like blaming the truck and unless he looks into the actual conditions causing such repair bills, he invariably does blame the truck when it is not the truck's fault in the least. All trucks need repair and a certain sum should be set aside for repairs each year, depending upon the age of the truck and the character of the work in which it is engaged.

When the repair work is conscientiously done, one dollar spent in the ship will return many dollars in added profits.

Overtraining Truck Drivers

SOME truck operators claim that the less the average driver knows about his truck, the better it is for the truck. They base their deductions for this line of reasoning on the ground that the driver who thinks he knows all about his truck is continually tinkering with his carbureter, magneto or what not, with the result that the vehicle is too often out of kilter. This class of owners claims that the main and most important tasks of the driver are to drive the truck and deliver the loads carried. There the driver's responsibility ceases. Other shopmen or mechanics are responsible for the mechanical condition of the vehicles.

Still another class of owners operates on the theory that the driver should know everything about his chassis, even the fundamental principles of the operation of the four-cycle internal combustion engine, power transmission, engine and chassis lubrication, etc. These men claim that the day of the roughneck driver is pretty near over and that the more a driver knows about his chassis, the better care he will take of it and the more intelligence he will show in its method of operation.

Undoubtedly, both classes are partly in the right and partly in the wrong. The crux of the problem lies in the thoroughness of the training given to the driver. If it is given in a slipshod fashion, it is worse than no training at all, for it gives the man half-correct ideas on many topics and thorough ideas on none. It is such drivers who generally make a botch of adjusting carbureters and the timing mechanism.

On the other hand, if the driver's training has been thorough, beginning with the rudiments before attempting to befuddle his mind with the more intricate problems, he generally develops into a valuable man for any truck owner to have around. With a man so trained, there is no argument against the contention that the intelligent driver is much more preferable than the ignorant one and will give his truck much better care.

Wearing Down Tires

TRUCK owners should not attempt to get the last mile out of the rubber in their tires at the expense of repairs to the truck powerplant, springs and other power-transmitting parts. Tires should not be allowed to wear down so close to the edge of the steel tire base rim that the rim is liable to come in contact with the stones of the roadway when the truck is run over uneven roads.

Greater care should be exercised regarding the front tires than the rear ones, especially if duals are fitted in the rear because the entire powerplant is carried over the front tires. If the latter are allowed to wear down too close to the base rims, the shocks set up when the rims come in contact with the road will be transmitted through the wheel bearings, tie rods, steering gear, springs, frame and the delicate powerplant with a resultant excessive wear on every part.

Solid Tires Should Be Removed When Worn Down to Within One Inch of Top of Steel Base

THE THREE QUESTIONS ASKED

1—How do you determine when to remove a worn tire?

2—If a tire is kept in place until it is worn down almost to the top of the edge of the steel base, have you found that greater vibration has resulted and consequently greater repairs?

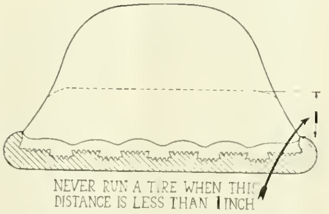
3 What experience have you had with tire companies in adjusting mileage on solid tires which they claim still have more mileage in them?

ONE ANSWER

ALL motor trucks must be fitted with tires and all fleet owners must pay tire bills, so that the determination of the time when worn tires must be removed is of the utmost importance to the fleet owner, whether he operates five or fifty trucks. It is self-evident that if a tire is left on a wheel after it has been worn down too near the edge or rim of the steel base, the cushioning effect of the tire may be entirely lost and expensive mechanical repairs result.

In order to determine just at what point of wear a solid tire should be removed, THE COMMERCIAL VEHICLE has asked several of its subscribers who own and operate large fleets of trucks to give their experience in this regard. As a means of obtaining definite information on this subject, the three questions given at the head of this article were put. The questions are direct and require direct answers. The first two questions are the most important and must be answered by the truck owner alone, while the third question may be answered both by the truck owner and the tire maker.

These three questions were put to Nat Mallouf, of the Motor Haulage Co., New York City, which operates a fleet of forty-seven Pierce-Arrow 5-tonners. He answered the first question by stating that the Goodrich De Luxe tires used on practically all of his trucks except those which were delivered with other makes of tires are removed when they have worn down evenly to a line across the tire drawn at a point 1 inch above the edge or top of the steel tire base, as shown in the illustration on this page. The depth of the rubber of the tire when worn down to the point when it is removed is measured from the top of the edge of the steel base instead of from the line of joining of the resilient rubber and the hard rubber base because the measurement taken from the top of the rim can be made more easily.



Mr. Mallouf uses 36 by 5 Goodrich De Luxe tires on the front wheels of his trucks and 40 by 6 duals on the rear wheels. The illustration on this page is a reproduction to scale of a Goodrich De Luxe 6-inch tire in which the rubber is 3¾ inches high. Mr. Mallouf keeps such a tire in place until it has worn down to a line 1 inch above the top of the steel base rim so that approximately two-thirds of the rubber in the original height of the tire has been worn away, leaving one-third at the bottom when the tire is removed. The actual percentages are 27 per cent of the height left in place and 73 per cent worn away.

Fronts More Important Than Rears

Strange as it may seem at first thought, Mr. Mallouf pays closer attention to the tires on the front wheels of his trucks than he does to those on the rear wheels. Further consideration of the subject, however, reveals the correctness for the closer scrutiny of the front tires because of the fact that the entire engine with all of its delicate mechanism is carried principally by the tires on the front wheels. In no case is a front tire permitted to run after it has worn down to the point 1 inch above the rim of the steel base, although in emergencies rear tires may be worn down a trifle below that point. It is unsafe in the case of the front tire because when going over rough roads it is possible that the rim of the tire base may come into contact with the ground and thereby impart shocks which will be transmitted direct to the engine, frame, springs, steering gear mechanism and the front wheel bearings. More chances are taken in running rear tires after the maximum wear has been reached because of the fact that duals are used and the second tire of the dual will get the truck home if the other tire be destroyed.

The Motor Haulage Co. has had no difficulties in making adjustments with the Goodrich company when tires have been taken off when worn down to the line 1 inch above the edge of the steel base for the simple reason that in every case such tires have always given much more than the guaranteed mileage of 7000 miles. The tires on Mr. Mallouf's trucks average 14,000 miles on the fronts and 11,000 miles on the rears.

Mr. Mallouf further stated that his experience has shown that tires which do not give their guaranteed mileage fail to do so because of one of two reasons, of which the first is a defective tire and the second, improper care on the part of the truck driver. What adjustments he has had to have made have been due to the tire breaking loose from the base rather than wearing down evenly so quickly that the guaranteed mileage was not secured. Practically every one of his tires which have worn down to the line 1 inch above the edge of the rim has given from one and one-half to two times the guaranteed mileage.

When the tire has been worn down to the point of maximum wear as outlined above, it is taken off and turned in at the nearest Goodrich service station which sells the rubber still remaining in the steel base and makes an allowance to the Motor Haulage Co. of from 50 cents to $1 per tire.

New Highway Bill Is Before the Senate

To Create Federal Commission and National Road System

WASHINGTON, D. C., June 11—A bill providing for the establishment of a Federal Highway Commission, a national highway system and the encouragement of efficient and economical highway transportation was introduced into the Senate on June 2 by Senator Newberry for Senator Charles E. Townsend, who is father of the bill. The Committee on Agriculture and Forestry discharged the bill and referred it to the Committee on Post Offices and Post Roads on June 3.

The bill, which takes over the present duties and authority of the Bureau of Public Roads, Department of Agriculture, provides that this national highway system will comprise not less than 2 per cent or more than 5 per cent of the total highway mileage actually used as such in any state, or less than 2 per cent or more than 4 per cent of a total highway mileage actually used as such in all the states, and affording convenient ingress to and egress from each state at not less than three points, and connecting the highways forming parts of the national highway system in adjoining states. The total mileage in the national parks, reservations and public lands or other class of public domain in which title is held by the United States, will be deducted from the total road mileage of the state in which it is located and the state shall be given credit in the establishment of the national highways on the basis of the total mileage thus indicated instead of the mileage actually ascertained to exist.

For the purpose of carrying out the provisions of this act a Federal Highway Commission consisting of three members is to be appointed by the President with the consent of the Senate. The members are to be chosen from different geographical sections of the country, and not more than two to be of the same political party. The members of the Commission first appointed shall continue in office for the terms of 2, 4 and 6 years respectively, from the date of their appointment, the term of each to be designated by the President. Their successors shall be appointed for a term of 6 years each. Any person appointed to fill a vacancy shall be appointed only for the unexpired term of the member of the commission whose place he is taking. Each member of the commission shall receive a salary of $10,000 per annum, payable monthly. The commissioners shall devote their entire time to the work.

The commission shall select the highways which it deems advisable to comprise the national system and shall determine the order in which all or parts of such highways shall be constructed, reconstructed, improved, repaired and maintained. The commission shall obtain recommendations of the State Highway Departments as to the routes which they consider should be followed in their respective states. The National Highway System shall not include any highway in a municipality having a population of 5000 or more except that portion of any such highway shall be a street along where the houses average more than 200 ft. apart. Within 2 years after the date of the passage of this act the commission shall prepare and promulgate a map showing the highways which it has definitely selected and established as parts of the National Highway System.

The commission shall determine the types of construction and reconstruction work to be done and shall draw plans and supervise the work of construction

The Secretary of War shall turn over to the commission from time to time motor trucks and road building machinery which the commission shall pay for out of the appropriations made by this act.

The commission shall acquire or provide a right of way for highways comprised in the National Highway System of not less than 66 ft. except where physical conditions or excessive cost or legal obstacles render the attainment of such width impracticable.

The highways comprised in the National Highway System shall be constructed, reconstructed, improved, repaired, maintained and regulated, except as to State police powers and except as to right of way, entirely at the expense of the United States, provided, however, that not more than 10 per cent of the funds appropriated for any 1 year shall be expended.

For the purpose of carrying out the provisions of this act a sum of $50,000,000 is appropriated out of any moneys in the Treasury not otherwise appropriated. This money shall become immediately available. For the fiscal year beginning July 1, 1920, a sum of $75,000,000, and for the 3 succeeding fiscal years, $100,000,000 each shall be appropriated.

Not later than the first Monday in December of each year the commission shall make a report to Congress showing in detail the expenditures and operations provided under this provision.

NEW ST. LOUIS TRUCK TAX

ST. LOUIS, MO., June 6—A wheel tax ordinance, providing for the collection of a tax on motor trucks, was passed by the East St. Louis, Ill., City Council. The following schedule of rates on trucks was decided upon: Motor trucks of less than 35 hp., $15; motor trucks of more than 35 hp., $20; motor buses, $30.

Coming Events

June 21......Philadelphia, Pa. Annual Outing Kugler's Mohican Club Motor Truck Assn. of Phila., with the Phila. Auto Trade Assn., Automobile Accessories Business Assn. and the Camden Auto Trade Assn.

June 23-27...Ottawa Beach, Mich. Summer Meeting, S. A. E.

Sept. 22-24...Philadelphia, Pa. Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.

New York and Chicago Shows in January

Will Be Held at the Same Time as the Car Exhibitions

NEW YORK CITY, June 8—At a recent meeting of the National Automobile Chamber of Commerce the dates for the Chicago and New York motor truck shows were decided upon. These two shows will be held at the same time as the passenger car shows are being held in each of the cities. The New York show will be held from Jan. 3 to 10, at the 22d Regiment Armory, 168th Street and Broadway. The Chicago show will be held from Jan. 24 to 31 in the Drexel Pavilion in the stockyards section. S. A. Miles will be manager of both shows.

ROAD PROJECTS APPROVED

WASHINGTON, D. C., June 6—Projects for improving highways totaling 11,350 miles to cost $108,295,329 and on which Federal Aid amounting to $43,076,176 was requested have been approved by the Bureau of Public Roads to date. This includes 1188 projects, of which 813 miles have been completed at a cost of $6,870,451, of which $2,692,491 was paid in the form of Federal Aid by the Government.

TRUCK AUCTION DELAYED

WASHINGTON, D. C., June 1—Because of delays in the War Department incident to the inventorying of its stock of surplus motor equipment which has proved to be unsuitable for government use, it has been found necessary to postpone public auctions of its trucks until after June 15, instead of June 1, as planned.

CHASSIS NOW A CHASSIS

WASHINGTON, D. C., June 2—As a result of numerous protests from the National Automobile Chamber of Commerce, the National Automobile Dealers' Assn. and other bodies, the Treasury Department has issued new rulings relating to some of the excise taxes on trucks, cars and parts. The tax on tires, accessories and parts does not apply when sold to the manufacturer or producer of trucks for the sole purpose of being used in their manufacture or for sale on them. In all successive sales, however, it will be necessary for the buyer to furnish a certificate showing that the parts or tires will be used as prescribed.

The ruling on chassis whereby all chassis were classed as passenger cars and taxable at 5 per cent, has been changed, and any chassis with a superstructure that will allow its use as a truck without any substantial additions is regarded as a truck and taxable at 3 per cent. All other chassis, however, remain taxable at 5 per cent.

New Motor Truck Fees in Pennsylvania

Dithrich Bill Before Governor Sproul for Signature

HARRISBURG, Pa., June 6—The revised Dithrich motor vehicle bill, which has just passed the senate, and which it is expected Governor Sproul will sign in a few days, has the following truck provisions:

Motor trucks are registered according to chassis weight, with trucks weighing less than 2,000 pounds on the basis of horsepower. Commercial vehicles with chassis weight above 2,000 pounds are divided into classes as follows:

Class	Chassis Weight	Registr. Fee
AA	2,000 to 3,000 lbs.	$20
A	3,000 to 4,500 lbs.	25
B	4,500 to 6,000 lbs.	30
C	6,000 to 7,000 lbs.	50
D	7,000 to 8,000 lbs.	75
E	8,000 to 10 000 lbs.	100
F	More than 10,000 lbs.	150

No registration fee is necessary for trailers weighing less than 500 pounds, while the fees for trailers weighing from 500 to 750 pounds is $2; 750 to 1,000 pounds, $5; 1,000 to 2,000 pounds, $10, and $15 for all trailers above 2,000 pounds. This trailer tariff generally has not been known till now.

The full registration fees are payable on all motor trucks registered before August 1 of each year and the half-rate will prevail after that time. It is estimated that the new fees will increase the license revenue between $2,000,000 and $3,000,000 yearly.

The length of motor vehicles has been limited to 28 feet, with a width of 90 inches and an overall weight of 26,000 pounds, including chassis, body and load. The restriction as to length, however, does not apply to trucks now in use. This point was conceded only after a struggle with the Motor Truck Owners' Assn.

Truck speed is limited, in the interests of the highway department, to the amount of load it may carry. Trucks in Class AA (up to 7,000 pounds), and A (11.000 pounds), are allowed to go 20 miles an hour; Class B (15,000 pounds), 18 miles; Class C (20,000 pounds), 15 miles; Class D (24,000 pounds), 15 miles; Class E (26,000 pounds), 12 miles, and Class F (26,000 pounds), 10 miles.

The load allowances given above are for the combined weight of chassis, body and load.

Special permits are to be issued by the highway commissioner for special hauling over specified routes in excess of weight and length regulations.

The Dithrich measure contains provisions intended to prevent the theft of trucks, including severe penalties for the removal of identification marks, and provides records for garage keepers, of all trucks left for repair or storage, and immediate notification of the police and the State Highway Department in case of any motor truck with manufacturer's number, or other identification mark removed. Sworn statements must be filed with each application for license, showing the applicant is mentally and physically qualified to operate, and learners' permits for 30-day periods are provided for. Persons having less than 20 per cent normal vision and less than 2 per cent normal hearing, are considered physically incapacitated for driving.

The Dithrich bill will go into effect as soon as signed by the Governor, with the exception of the regulations covering registration of motor vehicles and trailers and the licensing of operators. The new rates for registration become effective next year.

NEW COMPANY TO MAKE RAYFIELD

CHICAGO, June 9—The Beneke & Kropf Mfg. Co. has succeeded the Findeison & Kropf Mfg. Co. and will make the Rayfield carbureters formerly made by the latter concern. With the reorganization of the company plans for the material expansion of manufacturing are formulated also. Henry Beneke, formerly vice-president of Hibbard, Spencer, Bartlett & Co., has purchased the entire interests of Frederick Findeison and becomes vice-president and treasurer of the reorganized company. O. F. Kropf remains with the company as active president, and E. A. Bates continues as director of sales and advertising.

NEW AMERICAN KNIGHT TRUCK

CHICAGO, June 2—The Highway Motors Co. has recently been incorporated to build American Knight-motored trucks in 3½- and 5-ton capacities. It has purchased the assets of the Motor Trucks, Ltd., Brantford, Ont.

ILLINOIS TAXES OIL MEN

Moline, Ill., has adopted an innovation that is not relished by the proprietors of the gasoline filling stations. An ordinance has been adopted which requires each filling station to pay an annual license of $10, and also to file a bond requiring compliance with the laws. The aldermen argued that the filling stations receive considerable benefit from the city and should pay for the favors that have been granted in relation to location.

MAXIM IN HANDS OF RECEIVERS

NEW YORK CITY, June 2—The Maxim Munitions Corp., which was formed in 1915 with $10,000,000 capital, to take over the inventions of Hudson Maxim, and which in June, 1918, announced its intention of making and marketing a farm tractor, as well as acting as domestic and export distributer for the truck manufactured by the Dart Motor Truck Co., Waterloo, Iowa, has been placed in the hands of a receiver.

It is understood that the assets and liabilities of the company are about $1,000,000 each and it is stated that there appears an excellent possibility of the company being reorganized and continued.

Will Haul Coal From Mine to City

Philadelphians Are Trying to Reduce the Cost of Coal

PHILADELPHIA, PA., June 7—In an experiment to see if the difference between the cost of coal at the mines and that for which it is sold on the market cannot be reduced considerably, the hauling of coal from the anthracite region of Pennsylvania direct to consumers in Philadelphia has just been started. It is believed that coal can be hauled cheaper by trucks than by steam roads. When the coal transported by truck arrives at the city, it will, of course, have the advantage of being delivered direct to the consumer, without the rehandling necessary by the railroads. This will avoid the expense of dumping the coal into the dealers' yards, scooping it up again and rehauling it to the consumer.

The first coal to be hauled by truck from the anthracite region to Philadelphia started yesterday from the T. D. Bergen mines at St. Clair and the first truck to leave with a load was a 5½-tonner.

NEW ENGLAND TRUCKING CONCERN

BOSTON, Mass., June 8—The Atlantic Motor Express has just been formed here to do an intercity trucking business throughout New England with headquarters at both Boston and Portland, Me. It will establish connections in 100 New England cities and towns, and it has taken over some motor express companies now in operation. The company plans to operate a fleet of Pierce-Arrow trucks which represent an outlay of $250,000 and expects to do a business of $1,250,000 a year. It has offices in thirty-five cities and towns in the territory.

The backers of the enterprise comprise Linwood E. Porter of Portland, president; Frank E. Rumely, vice-president; George Hendricks of Boston, secretary; and Frederick A. Nickerson of Portland, treasurer. Edward C. Walker is the manager of the Boston terminal. Buildings have been leased at 42-48 Hartford Street, Boston, and 72 to 76 Cross Street, Portland. The new company is putting out a stock issue of $750,000 to finance the project.

F. W. D. IN CANADA

CLINTONVILLE, Wis., June 3—The Four Wheel Drive Auto Co. of this city will open a Canadian plant in Kitchener, Ontario. The new company will be capitalized at $200,000, half of which stock will be owned bp the parent company. The officers of the company will be J. D. Cotton, president; Henry Nyberg, vice-president and sales manager; Archie Kerr, secretary, and W. G. Cleghorn, treasurer. The site for the new factory will be selected and building operations will be started at once.

35 Motor Trucks Begin a 400-Mile Run

Caravan Started Out June 9 and Will Return June 13

ST. LOUIS, MO., June 9—Just as the sun peeped over the horizon this morning thirty-five motor trucks of various makes and capacities started from St. Louis on a pilgrimage said to be the first of its kind ever undertaken—a 400 mile cross-country run through Missouri and Illinois.

The gasoline caravan was preceded by an aerial scout and herald, while another airplane loaded with spare truck parts was held in reserve. The expedition was accompanied by a tank truck filled with gasoline, a group of passenger cars carried press representatives and other dignitaries and officers of the St. Louis Automobile Mfrs. and Dealers' Assn., under whose supervision the tour was arranged.

The purpose of the trip is to test and demonstrate the endurance of the motor truck for intercity and interstate traffic. The trip had originally been set for June 2, but was postponed a week because of the condition of the roads following several weeks of incessant rains. It is planned that at each town to be visited by the motor truck train the advance airplane scout will drop literature about the motor truck.

The course which the caravan will follow and the schedule of stops which will be made on the road are as follows: Monday, June 9, St. Louis to St. Charles, Mo., Wentzville, Troy, Rockyford, Calumet, Louisiana, Mo.; Tuesday, June 10, Hannibal, Mo., to Quincy, Ill.; Wednesday, June 11, Camp Point, Clayton, Mount Sterling, Rushville, and Beardstown, Ill.; Thursday, June 12, Virginia, Jacksonville, White Hall and Jerseyville, Ill.; Friday, June 13, Alton, Ill., and return to St. Louis, Mo.

HANNIBAL, MO., June 10 (*En route with St. Louis Motor Truck Expedition*)—Oscar Bricker, aviator-pilot-herald of the St. Louis Motor Truck Expedition was burned to death in his plane after a fall at Hannibal, Mo., to-day, where he arrived a few minutes ahead of the expedition. Thus far, this has been the only accident to mar the trip. Bricker damaged the airplane in which he started from St. Louis in a landing yesterday and the plane in which he fell to his death to-day was one that had been held in reserve.

The first day's run of 97 miles from St. Louis to Louisiana, Mo., was completed on schedule time by every truck in the party.

Many of the trucks officially entered in the endurance run are loaded with genuine consignments of freight. Among these is a load of 2½ tons of leather soles sent from St. Louis to the International Shoe Co. at Hannibal; a load of motor truck tires for a dealer in Quincy, Ill.; a load of explosive containers, and various other merchandise. As fate would have it, one truck carried a shipment of two horses.

NEW PLANT FOR MACK

NEW YORK CITY, June 2—Negotiations pointing to an early merger of the International Motor Co. and the Wright-Martin Aircraft Corp. is indicated by negotiations which have been in progress for some time. It is expected that next week the stockholders of the Wright-Martin organization will approve of a plan whereby the New Brunswick factory of Wright-Martin is sold to the International Motor Co. in exchange for stock in the latter organization. The factory will be used as increased capacity for the manufacture of Mack trucks and should permit of the International doubling its truck output. The New Brunswick factory has 500,000 sq. ft. area and has been used for the manufacture of Hispano-Suiza engines during the war.

LARGE APRIL EXPORTS

WASHINGTON, D. C., June 6—During the month of April 1,029 trucks valued at $13,928,950 were exported. This shows an increase of 403 trucks in number and an increase in valuation of $12,391,001 over March of this year, during which month 626 trucks valued at $1,537,949 were exported.

The figures for April, 1919, show an increase of 374 trucks over April, 1918, at which time 655 trucks valued at $1,392,125 were exported. The difference in valuation is $12,536,825.

TRUCKS INSTEAD OF TROLLEY CARS

DETROIT, June 8—The motor truck and the passenger car are keeping Detroit from walking to-day, for not a street car has been running since 4 o'clock Sunday morning. At that time all motormen and conductors on the Detroit United Lines went on strike, which not only affects Detroit but Port Huron, Flint, Ann Arbor, Pontiac and Jackson. The men want an increase of 10 cents per hour.

It would seem as if such a strike would paralyze industrial Detroit, but that is not the situation here. Thousands of trucks and automobiles have solved the problem. Trucks out of commission for years have been hurriedly fitted up and are running to-day. The streets are literally jammed with trucks and cars all crowded with workers. The police have thrown parking and traffic regulations into the discard and are striving to keep some semblance of order in the business district.

SIXTH CANADIAN CONVENTION

QUEBEC, Can., June 2—The sixth annual convention of the Canadian Automobile Assn. was held in the Château Frontenac, May 21 and 22. Delegates from the motor leagues and clubs of every province were present, as well as a number of men from the United States.

American Trucks May Remain in France

Some of the Other Allies Have Bought Our War Trucks

PARIS, May 10 (Special Correspondence)—An official decision regarding the disposal of the American Army trucks now in France is expected within a few days. At the end of December, 1918, the Army possessed 32,500 trucks. Only a small number of these is required for the Army of Occupation, and the rest must be disposed of in Europe or returned to America. This week the Liquidation Board prepared a detailed statement of automotive material no longer required by the army and submitted the same to the French Government, which alone has authority to say whether the material shall remain in France or not. It is hoped that the French reply will be received early, as the clearing up of this question will permit the Americans concerned to return home.

Some of the American army vehicles have already been sold to the Allies other than France, who are in urgent need of them. A number of trucks has gone to Roumania, Serbia and Belgium. In addition, the Reconstruction Department of the French Government has taken for its own use some American army trucks.

When these purchases have been made, the officers of the Liquidation Board have insisted on sufficient spare parts being taken to keep the vehicles in efficient service for at least 6 months. This has been done in an unofficial manner in order to protect the interests of the American manufacturer. Nothing could be more disastrous to the reputation of the American automotive industry than to allow trucks to go to foreign countries without any means of maintenance.

In addition to the vehicle, there are large service depots and repair shops to be disposed of. The most important of these is the Reconstruction Park at Verneuil. This place has big machine shops and immense stocks of spares, including 146,000 solid tires. Owing to the shortage of buildings, these tires had to spend the winter out of doors without protection and have suffered a little in consequence. Probably they will be sold with the trucks, for they are inch sizes and could not be used on European vehicles.

Numerous rumors have been afloat regarding the disposal of the Verneuil shops. One of the most persistent is to the effect that the White Co. had an option on the entire place. Inquiries at headquarters show that while the White people are interested, no option has been given to them.

The Question Mark is the name of the house organ of the General Motors Truck Co., Pontiac, Mich., the first issue of which appeared on May 1, 1919. It is a very newsy little publication.

Truck and Steamboat to Work Together

St. Louis Experimenting So as to Reduce Hauling Costs

ST. LOUIS, MO., June 6—A movement has been projected in St. Louis to establish a Truck-Trailer-Steamboat system of transportation, by which motor trucks and trailers will deliver goods to the buyer from the boat to the store door with one handling at each end.

The new plan will save the steamboat company all expense of labor in handling of freight involved, and would warrant the company making a special freight rate which would induce shippers to avail themselves of this system. Harry Newman, president of the Harry Newman Co., Inc., is promoting the enterprise by investigations of facilities for such a system.

DIXIE HIGHWAY PROGRESSING

CHATTANOOGA, TENN., June 8—The eastern division of the Dixie Highway between Cincinnati and Chattanooga will be a well surfaced highway which can be traveled every day in the year and under all weather conditions by June 1, 1920. It will probably be open for through travel under favorable weather conditions by this winter. The reports of financial provisions definitely made were so conservative that the Dixie Highway Assn. at the annual meeting of the board of directors in Chattanooga has officially designated June 14, 1920, as the date of the inspection and dedication of this great highway.

NEW MICHIGAN TRUCK LINE

GRAND RAPIDS, MICH., June 7—Organization plans are on foot for the formation of the Grand Rapids Motor Transit Co., which is being financed by local business men. It is proposed to capitalize it at $150,000 for the establishment of motor truck routes between Grand Rapids, Kalamazoo, Grand Haven, Hastings, Cadillac and other cities. Four hour service will be given and eventually connection will be made at Jackson with Detroit motor truck service.

WAR TRUCKS TO RETURN

WASHINGTON, D. C., June 2—A considerable quantity of motor trucks and trailers, comprising nineteen special types, such as machine shop, printing press, laboratory and photograph trucks, and seven types of special trailers, have been ordered returned to the United States from France.

MICH. GETS ARMY TRUCKS

LANSING, MICH., June 3—The Government has given the state 229 Army trucks for Federal Aid road work. This gives on an average of three trucks to each county. The trucks will be lent to the counties but they must remain in the name of the state.

The legislature will convene June 3 to enact laws to provide for the expenditure of the money which will be raised by the sale of $50,000,000 worth of state highway bonds. A bill creating a highway improvement loan has been prepared. This bill specifies that a board composed of the governor as chairman, state treasurer, attorney general, auditor general and state highway commissioner shall supervise all road construction work.

SUCCESSFUL REO TRUCK SCHOOL

CHICAGO, June 10—The Reo branch in this city has found that its school, which was started last year as a war measure, has proved of such great service to Reo owners that it will continue the school as a permanent institution. The next course is scheduled for August and September of this year. At this course of lectures, which are conducted two nights a week for 8 weeks, the student is taught with an actual Reo chassis before them for demonstrating work. The same subject is taught on both nights of a week in order that anyone who cannot come for the first lesson will not lose anything. The same consideration is given the person who cannot come to the lecture on the second night of the week.

By means of this course owners have made many minor repairs which they would otherwise have had made by the service department of the Reo company.

NEW HURLBURT AGREEMENT

NEW YORK CITY, June 6—An agreement has been reached and approved in court between the Hurlburt Motor Truck Co. of New York and the Harrisburg Mfg. & Boiler Co. of Harrisburg, Pa., whereby the latter is licensed to make 1,200 Hurlburt chassis during a 2-year period. R. W. Walker has been given the exclusive Hurlburt agency. The plan in its entirety will serve to short-circuit the existing receivership of the Hurlburt company.

SUCCESSFUL TRUCKING COMPANY

CHAMPAIGN, ILL., June 6—The Paul O. Marshky Co. of this city has built up a successful long-distance trucking business. The company operates a fleet of twelve trucks and solicits business at a distance of from 50 to 100 miles away. Recently the firm hauled the furniture from a house in Belleville, Ill., to Champaign, a distance of 200 miles, and charged $205. The owner of the furniture found that to crate the goods and make the haul from the house to the railroad and from the railroad to the house at the new location would be about $200, while the freight would be $100 additional. The saving by truck was approximately $100 and there was no loss through breakage or other trouble. In addition, there was a saving of several days in time. Trips as far as Lima, Ohio, and southern Indiana are not uncommon and business of this character is rapidly growing.

War Trucks Delivered for Road Work

5336 Mack, Nash, Aviation and Other Trucks Distributed

WASHINGTON, D. C., June 5—The Department of Agriculture has given out the following list of appropriations of war trucks to the various states to be utilized for road work. This list shows that 5336 Mack, Nash, Aviation and miscellaneous trucks have been shipped to the various States as follows:

	Mack	Nash	Miscellaneous	Aviation
Alabama	3	77	16	20
Arizona	2	51	10	13
Arkansas	2	61	13	16
California	2	112	23	28
Colorado	2	64	14	17
Connecticut	1	22	5	6
Delaware	0	6	1	2
Florida	1	42	9	11
Georgia	3	99	21	26
Idaho	2	45	9	12
Illinois	5	161	33	41
Indiana	2	100	21	26
Iowa	2	106	22	28
Kansas	2	105	22	28
Kentucky	3	71	15	18
Louisiana	2	49	10	13
Maine	1	35	7	9
Maryland	1	32	7	8
Minnesota	3	104	22	27
Mississippi	2	66	13	17
Missouri	3	125	26	32
Montana	3	73	15	19
Nebraska	3	78	16	20
Nevada	2	48	10	12
New Hampshire	0	15	3	4
New Mexico	2	59	12	16
New Jersey	1	44	9	11
New York	5	183	38	47
North Carolina	3	84	18	22
North Dakota	2	57	12	15
Ohio	4	136	28	35
Oklahoma	2	85	18	22
Oregon	2	59	12	15
Pennsylvania	5	169	35	43
Rhode Island	0	9	2	2
South Carolina	2	52	11	14
South Dakota	2	160	12	16
Tennessee	2	83	17	21
Texas	7	215	45	54
Utah	2	42	9	11
Vermont	0	16	4	5
Virginia	2	73	15	18
Washington	2	54	11	14
West Virginia	1	39	8	10
Wisconsin	2	91	20	24
Wyoming	2	45	10	12
Total	107	3565	742	922

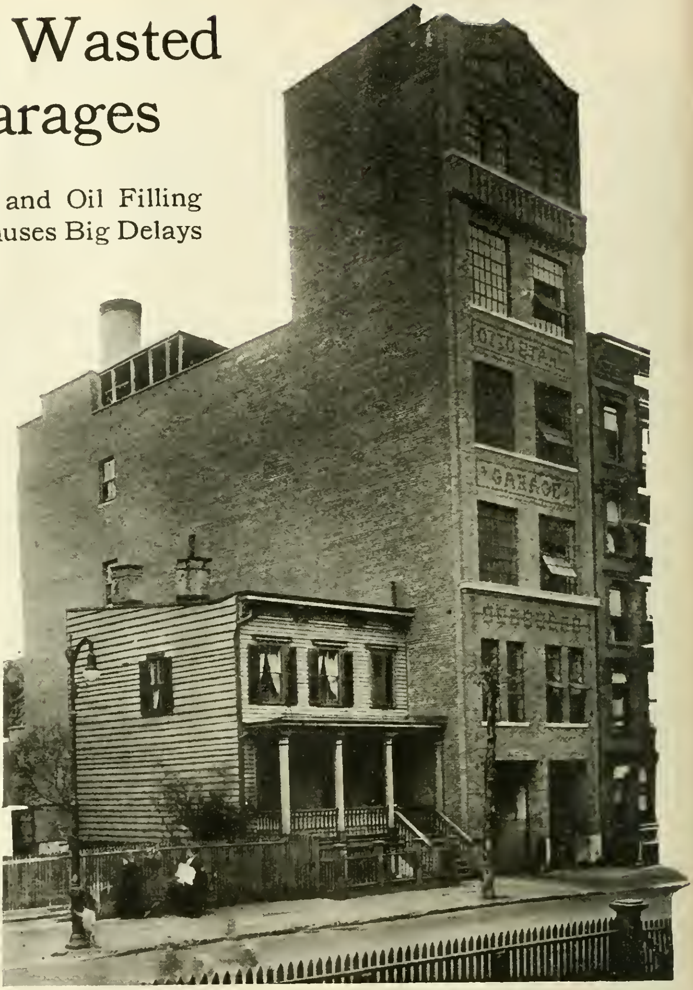
Title to these trucks will be vested in the States which use them, but they will be turned back to the Department of Agriculture as soon as their usefulness for road work is ended. The State has no right to sell them, and in the event of their being ready for the scrap pile a joint board of State and national representatives will consider condemnation proceedings.

MARTIN-PARRY MERGER

INDIANAPOLIS, IND., June 9—The Martin Truck & Body Corp., York, Pa., and the Parry Mfg. Co., of that city, both motor truck body makers, have merged as the Martin-Parry Corp. John J. Watson, Jr., is chairman of the board, and other directors are: Guy E. Tripp, Westinghouse Electric & Mfg. Co.; James F. Shaw, Knouth, Nachod & Kuhno; F. H. Small, former president of the Martin Truck Co.; Robert I. Burr; S. C. Parry, Parry Manufacturing Co.; Walter R. Herrick, Herrick, Berg & Co.; and George R. Walbridge, Bonbright Co., Inc.

How Time Is Wasted In Truck Garages

Improper Location of Gas and Oil Filling Stations and Stockrooms Causes Big Delays



The Stahl Garage in Which Trucks Are Stored on the Roof and Also on the Elevator

The three garage floors are 15 feet wide and 75 feet deep, allowing space for only twenty-one of the company's trucks. The remaining four are kept on the elevator and on the partly open roof. The trucks are backed on to the elevator when being taken to the street. The elevators are only wide enough and long enough to hold one truck, and as a result the elevator must make a separate trip for each vehicle

PICTURE to yourself a three-story garage, 100 ft. long and only 22 ft. wide and you have one similar to the Otto Stahl building in New York City. Then again picture twenty-five trucks and passenger cars stored on three floors, on the elevator, and on the partly sheltered roof. You now have a mental view of the conditions under which that merchant's fleet is maintained. Each of the floors is only 15 ft. wide and 75 ft. long, allowing room for twenty-one trucks, or seven on each floor. The remaining four are distributed evenly on the elevator and the roof. The elevator is large enough to hold two of the Ford runabouts.

Notwithstanding this handicap in space, the company during the past 6 years has managed to house its vehicles under this one roof and has also kept its trucks up to delivery schedules, as told in THE COMMERCIAL VEHICLE for June 1, 1919. As a result, the business of the Otto Stahl Co. has expanded so that its trucks are now sent through New Jersey to Trenton. They also cover Long Island about 60 miles inland and sometimes reach Greenwich and Stamford, Conn. Otto Stahl is one of the largest merchants in delicacies, such as sausages, hams, etc. This business requires the completion of a delivery during the day, as the loads must be delivered fresh. Therefore the maintenance of these trucks must be such as to insure them against breakdown on the road with an uncompleted delivery of that company's food products.

The Stahl garage is a three-story building of brick and concrete construction. What constitutes practically the first floor is occupied by the boiler room, which also occupies the cellar. Here all of the steam and electricity are generated for use in the garage and in the factory across the street. There is an underground passage through which the pipes are run across the street to the factory.

The first floor of the garage proper is reached by elevator and stairway, as are the two remaining floors and roof. Most of the repair work is done on the first floor, where the tools are located, together with a block and pulley, mounted on an overhead trolley used for moving parts. The foreman's office is also on the first floor.

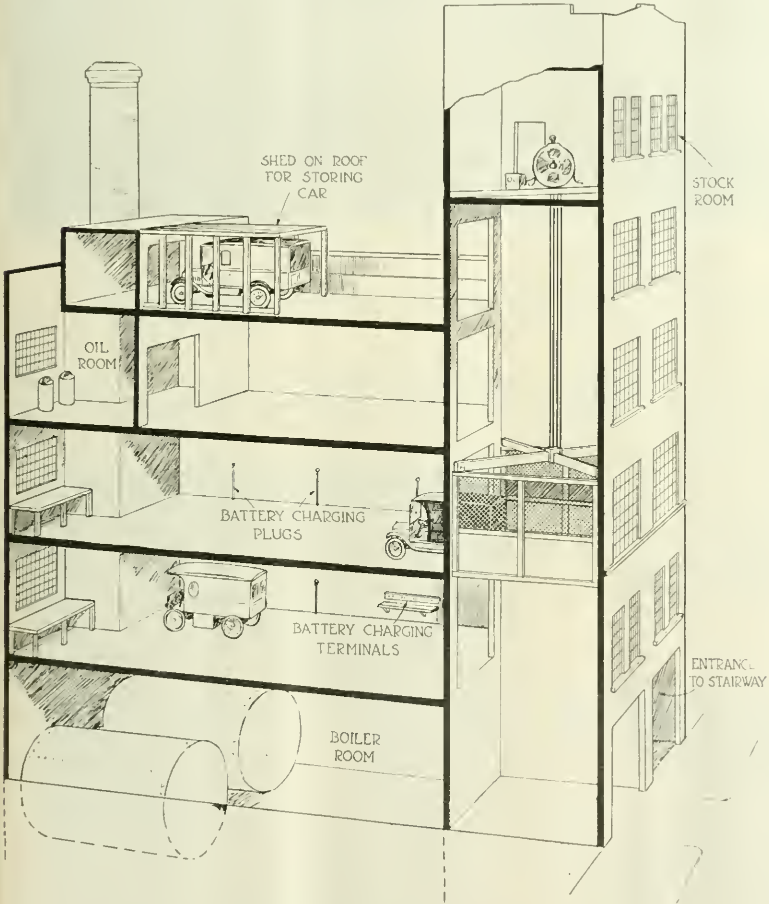
The second floor is used for storage and for repair of tires. A bench in the rear of the floor is used for this work.

The third floor is used for storage of trucks and oil, there being a separate room at the rear for the latter. Part of the roof is used for storing two of the trucks, the rest of the space being used for work connected with the factory.

As nearly all of the trucks are out on their routes during the day, no assistance can be procured through spare trucks. As a result, when trouble does occur, an outside truck is either hired to complete the delivery, or, if it has been completed, the company's foreman is sent out to the disabled truck with the necessary parts and tools to put the vehicle in proper running condition. If an axle has broken or something else has happened making it impossible for a roadside repair, the truck is towed in by an outside truck or by one of the Stahl vehicles.

Luckily, this company is not forced very many times to adopt the foregoing method of hiring outside trucks because of the expense and waste of time involved. Furthermore, with a large fleet of twenty-five trucks, whose time is entirely taken up with deliveries, each roadside delay on account of breakdowns increases the cost of maintenance considerably. It can be assumed that were some kind of a systematic inspection or overhauling schedule adopted by the Otto Stahl Co., where it could anticipate troubles before they actually occurred, a large majority of the roadside repairs would be eliminated.

As there is no inspection or overhauling schedule, the repair foreman is forced to rely entirely on the drivers' verbal report in order to ascertain what repairs or adjustments may be needed. Too much reliance cannot be put on the drivers' verbal reports alone, as it is impossible for these men, who are more salesmen than drivers, to be able to tell whether the truck is in A1 condition or not. And then again, it is impossible for them to keep an accurate record each day of any troubles that have occurred or are pending. The trucks must be gone over thoroughly at stated periods by the mechanics for wear and tear, etc. An accurate record should be kept on gasoline and oil consumption, as well as the mileage covered. For the past 2 years none of the Stahl trucks have been equipped with speedometers, thus rendering it impossible to determine whether the trucks were getting good mileage records through their fuel and tires or not. In fact, without some kind of a system of keeping maintenance records it is impossible to tell whether the fleet is being run at a loss or not.

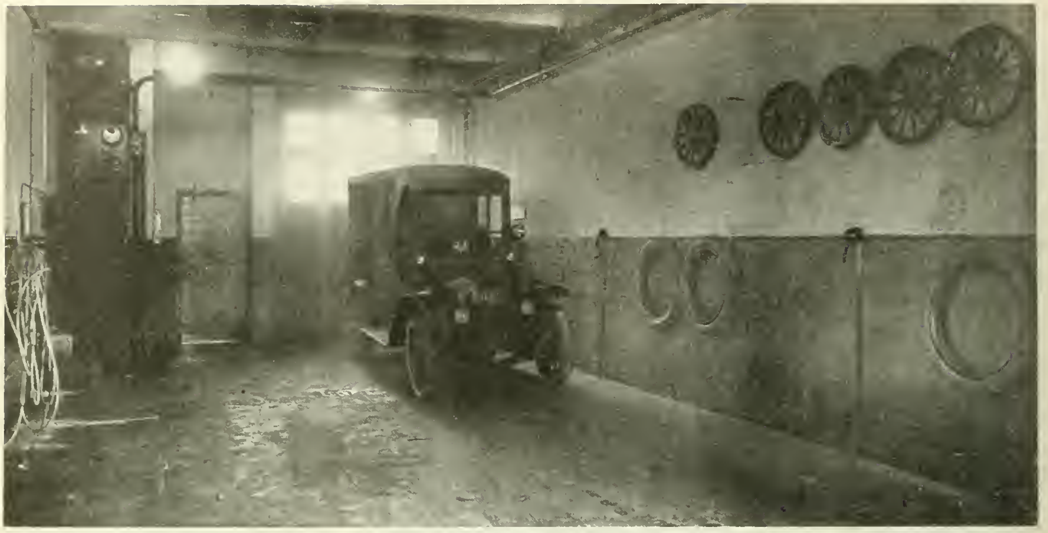


One Hour and a Half Required to Take Twenty-five Trucks from This Garage

None of the trucks can be run from the garage under its own power. As a result, the elevator makes at least sixty trips a day just for the trucks. What constitutes practically the first floor is occupied by the boiler room, where the company generates its own electricity and steam. The next two floors are used to house the trucks and charge the electrics. The third floor is for truck storage and the oil room. Note the inaccessibility of the stockroom. All repairs are done on the second floor

Fleet owners may gain by the experience of the Otto Stahl Co., which, though it realizes that conditions are not as they should be, has been forced through circumstances during the war to maintain its fleet under the conditions described above. That company is now negotiating for the purchase of land adjoining its garage so as to relieve the present cramped conditions, and THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks has been installed so as to keep an accurate record of all maintenance costs. The trucks are also being equipped with speedometers.

However, there are still many chances for improvements wherein such important elements as time, labor and the reduction of overhead expenses must be reckoned with. Due to the cramped conditions and to the garage construction, it is obvious, for instance, that there will be much delay in taking the trucks in and out of the garage. In repairing the vehicles, it is mani-



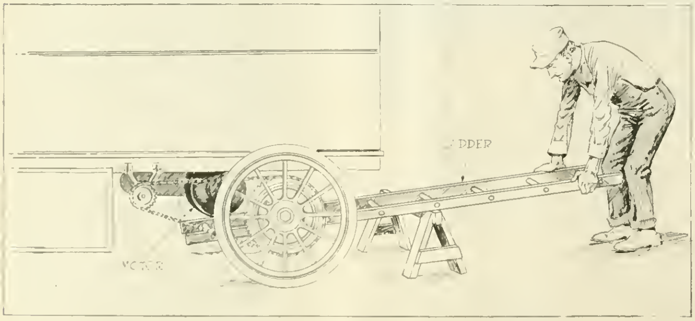
Only Seven Trucks Can Be Stored on a Floor in the Stahl Garage

They are parked in two rows, leaving little space for heavy repair work or maneuvering. In the morning when being taken to the street they must be backed onto the elevator. The electric trucks are parked along the wall so that their batteries may be charged from the plugs placed on the wall as shown in the illustration

fest that little heavy work can be done at night on account of the crowded conditions. As a result, the big repair jobs are done in the daytime. The only work that is done at night is the charging of the electric trucks' batteries, small adjustments such as cleaning spark plugs, adjusting carbureters, etc. The trucks are washed every other night.

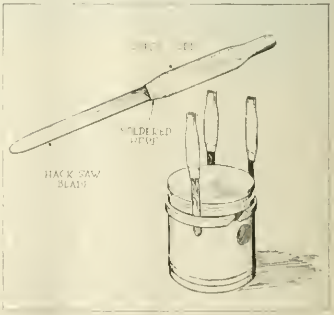
As a result of the crowded conditions at night and the lack of space to do any heavy repair work, the trucks to be repaired must be taken off their routes for a day in order to complete this work. This means delay and an increase in overhead expense because another truck must be taken off some other work to take its place.

Though the company generates its own electricity and saves money thereby, it is certain, however, that were the electricity bought from a private concern, the company would be paying heavily each month on account of the unnecessary number of trips that are made each day by its elevator. In the first place, due to the peculiar construction of the building, the elevator is used every time a vehicle comes into the garage. This amounts to at least sixty trips a day, counting in the fifty trips of the twenty-five trucks in and out of the garage every day. At night, when the trucks are filled with gasoline and oil, the man in charge is forced to use the elevator much more than necessary because of the fact that there is only one porta-



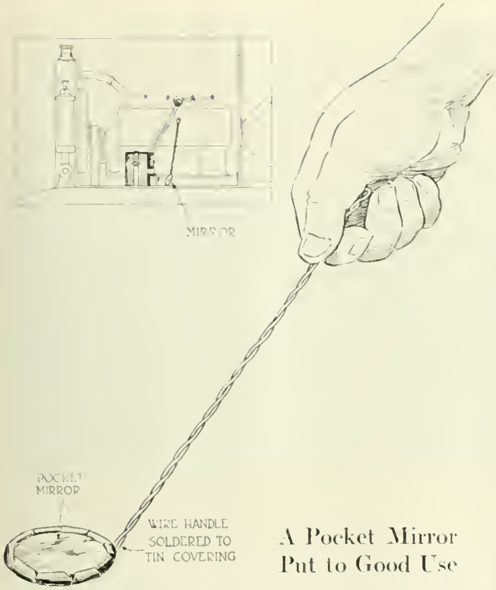
A Simple Method of Taking Down Motors

The apparatus consists of a ladder and a wooden horse. The horse serves as a fulcrum and the ladder as the lever. The motor fits snugly in between the rungs at one end of the ladder. One man supports the weight of the motor by pushing down at the other end of the ladder, while another loosens the motor from its supports. The motor is lifted to its supports in the reverse manner



Piston Rings Easily Removed

Three hack saw blades soldered to copper tubing handles are all that are needed. The blades act as guides when inserted between the piston and the rings



A Pocket Mirror Put to Good Use

Attached to a wire handle, a mirror comes in handy for adjusting parts that are out of eyesight. By reflecting the part on it, the adjustment can be accomplished with ease

ble gasoline tank and none whatever for oil. During the process of filling the trucks, the 50-gallon gasoline tank is refilled a number of times during the night. This

A Neat Way of Storing Accessories

Though this stockroom is well laid out, it is inconveniently placed and as a result loses its usefulness

means that the elevator must be used because there is only one gasoline filling station and that is on the first floor. Oil filling takes an unnecessary amount of time on account of the inaccessibility of the oil tanks, located on the third floor. As in the case of gasoline filling, much time is wasted during the process of oil filling on account of the extra trips that are made back and forth between the three floors. Instead of using a portable tank, an open pail is filled and carried around to the different trucks. This is not a good plan, as the oil is exposed to dust and other foreign matter that may drop into the open pail.

Though the stockroom is well laid out, it is inaccessible and hard to reach. It is placed in that portion of the building that houses the elevator motor, located in the extreme top of the building. It is reached by a narrow stairway leading from the main one, which ends at the entrance to the roof. As a result of its inaccessibility full use is not made of the stockroom. For instance, spare tires and tubes and other parts that should be carefully put away when not in use are found exposed to light, air and dust in various parts of the garage. Spare tires and tubes should be wrapped in paper or placed in tire covers so as to protect them from light and air. Rubber depreciates when left in the light and the air much more rapidly than it does when it is in use. Rubber is kept alive by use. By covering rubber goods, however, they are protected from what is called blooming, in which rubber becomes brittle and loses its elasticity.

However, a number of time and labor saving devices that will be of interest to fleet owners have been put into use in the Stahl garage. There is a handy method of taking down an electric motor; a labor-saving device for pulling batteries out from their cradles; a handy device for aiding a repairman in adjusting parts that are out of sight, and a suggestion for simplifying the work in taking off piston rings.

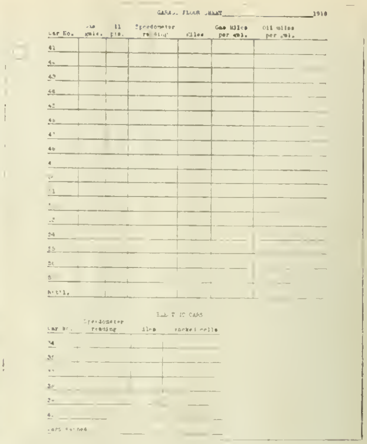
All that are needed in taking down an electric motor from a truck, according to the Stahl method, are a wooden horse and a ladder. The horse serves as a fulcrum and the ladder as the lever. The motor fits snugly in between the rungs at one end of the ladder. One man supports the weight of the motor by pushing down at the other end of the ladder, while another man loosens the motor from its supports. After it is freed the motor is lowered to the floor when the ladder is permitted to rise at the other end. In the reverse manner the motor is lifted to its supports.

A Result of Bad Stockroom Location

Tires and parts that should be locked up in a storeroom are left hanging on the walls or in open boxes

The Stahl Garage Roof Comes In Handy for Storage

The elevator runs to the roof, where there is room for parking at least two of the trucks. The roof is partly covered so that in the summer the repairmen can be protected while light repairs are being made



Stahl's Record Sheet

Each truck is numbered and the daily oil and fuel consumption, mileages, etc., are checked opposite each specific number on the sheet

Instead of pulling the heavy batteries out of their cradles by hand every time the cells are flushed, this labor has been minimized by the use of a block and pulley. This is attached to the handle of a battery at one end and to the spoke of a wheel on a truck standing next to the electric at the other end. A small stand is used to slide the batteries onto. This stand is just high enough to be flush with the floor of the battery cradle. Before putting the batteries back, all foreign matter that has collected in the floor of the cradle while the battery was in is cleaned out. The floor of the stand is also greased so that the battery may be easily slid back into place. Should there be cause for repairing the battery a small four-wheeled truck is used to carry it to the repair bench.

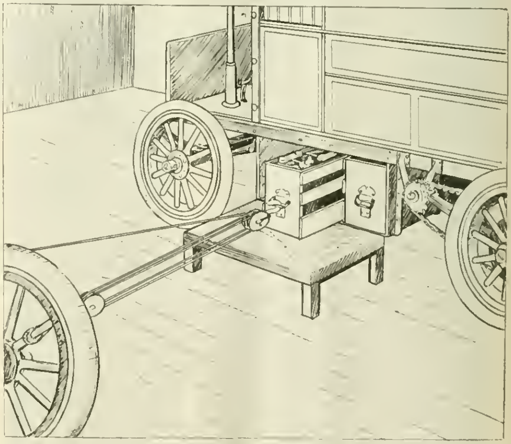
A small pocket mirror, attached to a wire handle, about 12 inches long, has been put to good use in the adjustment of parts that are out of sight. For instance, the adjustment of the breaker point in the magneto is sometimes troublesome on account of the breaker box being down below the truck frame and hard to see. By placing the mirror so that this part will be reflected on it, the necessary adjustment can be accomplished with ease.

Removal of piston rings has been made comparatively simple by the use of three hack saw blades attached to copper tubing handles. The teeth of these blades are ground off. Each blade is soldered onto the copper tubing, which in turn is hammered flat at the end where the blade is inserted so as to allow easy fitting. The blades are about 5 inches long and are used to insert between the piston rings and the piston. The piston rings will then slide off easily, as the metal strips will act as guides to prevent the rings from catching in the other piston grooves.

The very simple gasoline and electric truck performance sheet shown at the top of this page on the right, has been worked out in order to keep the records of the trucks comprising the Stahl fleet. It is intended to be a daily sheet and to cover the gasoline and oil distributed to the gasoline trucks of the fleet during each day. A column is also provided for the mileage made daily by each truck so that the miles per gallon of gasoline and per gallon of lubricating oil may be calculated on the same sheet.

While the idea of the sheet is an excellent one, its usefulness has been partially lost by the fact that a large number of the Stahl vehicles are not now equipped with either odometers or speedometers.

This one incident of the neglect to furnish mileage recording instruments on the trucks; the method of having to carry gasoline and oil from floor to floor to fill the truck tanks; the inconvenient location of the stockroom at quite a distance from where the truck repairs are made; the method of allowing tires and tubes to be exposed to the light while in stock and the method of battery maintenance are cited here not in criticism of the Stahl company, which is working under a large handicap, but in the spirit of constructive suggestions.



These Batteries Are Not Lifted

Batteries are easily moved from their cradles by means of a block and pulley, attached at one end to the battery and at the other end to the spoke of a nearby truck wheel

General view of the Omaha hog unloading platform, showing the wide maneuvering space in front for backing up and the four trucks which may back up to the platform at the same time. The vehicles in line are seen on the street in the background on the left

Livestock Haulage to Omaha Shows How Fleets of Trucks May Be Used Economically

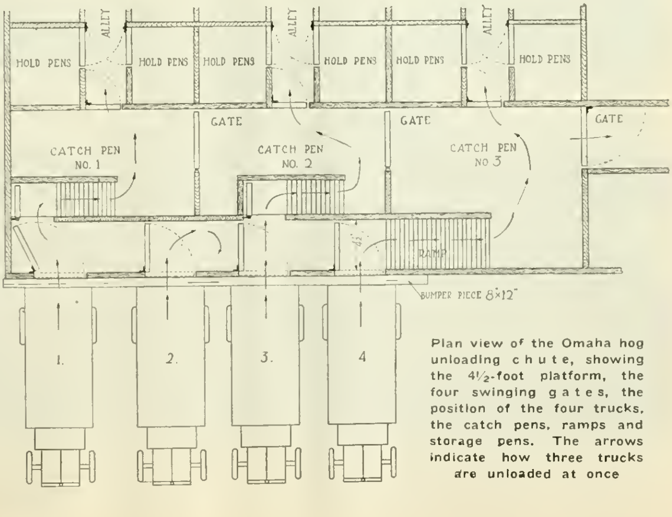
Of 259,076 Drive-Ins, 216,099 Are Handled by Trucks—The Future Lies in Big Fleets Doing Work as a Separate and Distinct Business

LARGE fleets of motor trucks will eventually be used in the hauling of livestock to the various stockyards throughout the United States, but particularly those in Omaha, Indianapolis, Cincinnati, Kansas City, St. Joseph, Fort Worth, Louisville and Peoria. The future development of the highway haulage of livestock by concerns with large fleets of trucks to do the work as a special business is well illustrated by a study of the conditions at Omaha, which, next to Indianapolis, receives more livestock driven in over the roads than any other stockyard in the United States.

During 1918 the total drive-ins of cattle, calves, sheep and hogs was 259,076 animals. It is estimated that of this total, 216,099 were brought to the yards by means of motor trucks. This large total brought in by motor truck indicates that approximately 84 per cent of all the livestock driven into the Omaha yards is carried on motor trucks. Approximately one-third of the livestock received at Omaha over the highways comes from the State of Iowa and the other two-thirds from Nebraska. Both states are great corn-growing sections and for that reason the bulk of the animals driven in are hogs. Of the 259,076 total animals driven in during 1918, 188,417 were hogs. Of this total approximately 90 per cent, or 169,575, were driven in by trucks. Nebraska also takes an important rank in the raising of sheep and of the 44,811 sheep driven into the yard, approximately 75 per cent, or 33,600, were brought in by trucks. The use of trucks has been greatest in the handling of hogs, next for sheep and last for cattle. During 1918, 25,848 cattle and calves were driven into the yards, of which about 50 per cent, or 12,924, were brought in by motor trucks.

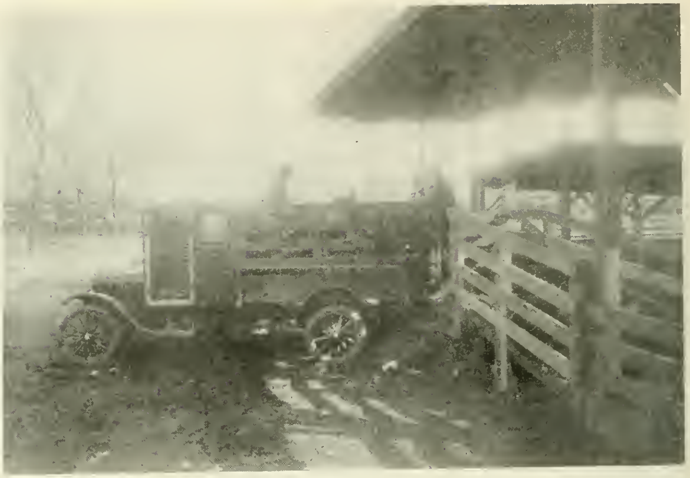
How Work Developed

The work developed so quickly during 1918 and the latter part of 1917 that the stockyards management was entirely unprepared for the big increase in drive-



Plan view of the Omaha hog unloading chute, showing the 4½-foot platform, the four swinging gates, the position of the four trucks, the catch pens, ramps and storage pens. The arrows indicate how three trucks are unloaded at once in receipts. As a result, there was much loss of truck time and money due to congestion and delays in unloading, until the stockyards management evolved a new type of hog unloading platform at which 2,000 hogs can be unloaded daily.

The plan of the new hog unloading platform, as shown in the illustration at the bottom of page 21, permits four trucks to back up at the platform at once and for three of them to unload at the same time with no possibility of the animals unloaded from one truck becoming mixed with those unloaded from the other trucks. Other vehicular congestion was lessened by providing separate unloading chutes for the cattle and calves and for the sheep at other points of the stockyard quite distant from the hog unloading chute. The details of the operation of the unloading facilities for each of the three classes of livestock will be treated of more fully later on in this article so that the development of the use of large fleets of trucks in the work may be treated of at this time.


A side view of the hog unloading chute, showing a truck actually unloading and one of the ramps leading to the catchpens at the right. Note that even the Fords are provided with suitable closed-in cabs for the protection of the drivers

War Congestion Helped Trucks

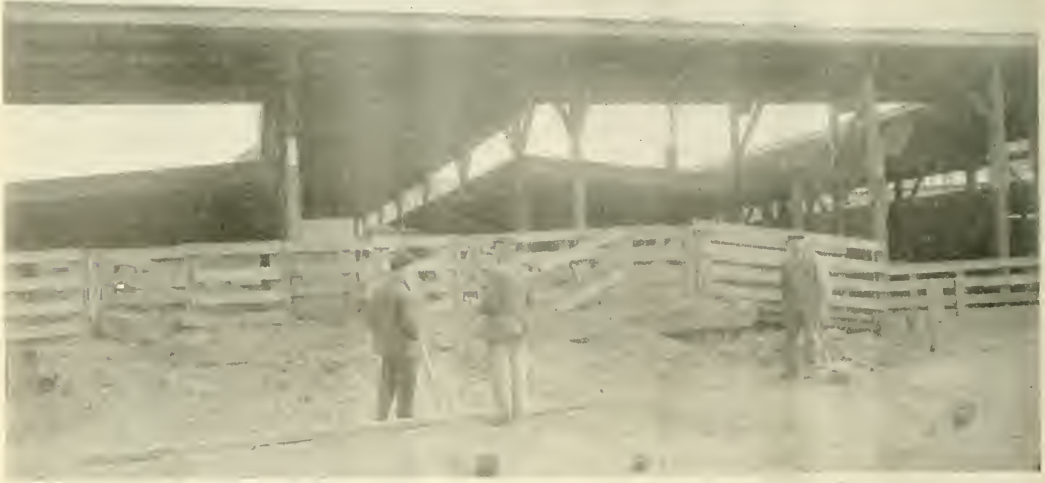
Of course, war conditions and the inability to obtain freight cars for the shipment of livestock really gave the motor truck its initial impetus in the work. During the latter part of 1917 and early part of 1918, it was almost impossible to estimate with any degree of regularity as to how many days it would take to get a freight car after the order had been placed. Due to these delays, the stock raisers who wanted to ship their animals to market when the prices were high often lost considerable money because they did not receive the freight cars in time and when the animals finally arrived at market the price had dropped.

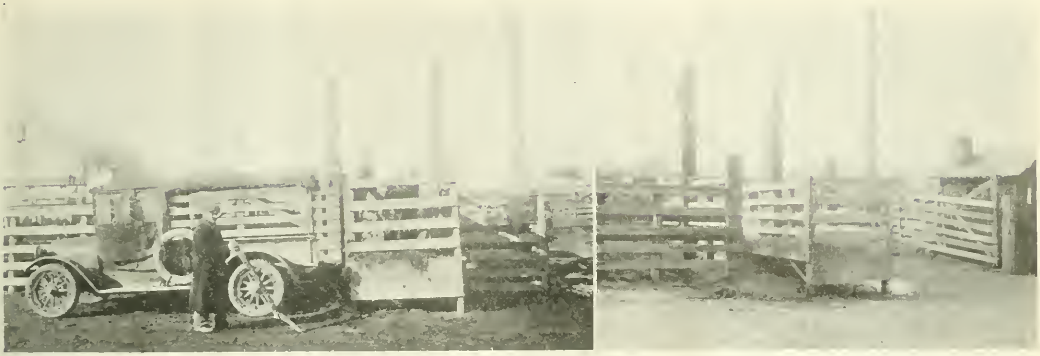
For the small stock raiser, the railroad method of shipping animals to mar-
this was later raised to 1500 cars a week
ket is not entirely satisfactory even when he can get his freight car at the time ordered. Unless he has a full freight car load he must club with some other farmer in his neighborhood in order to obtain a full freight car load before ordering the car to be placed on the nearest railroad siding. In some instances the neighboring farmers are not quite ready to ship their stock to market or believe that the price will be higher a little later on. This prevents the first shipper from getting his animals to market when he himself thinks the price will be highest.

Then again, he has to haul the animals from his farm to the railroad car before they can be shipped, and in some instances this haulage costs almost as much as to move the hogs direct to market by trucks in large numbers, from distances up to 25 miles.

Car Limit Adds to Hardship

The ability to get empty livestock cars was made more difficult by a ruling which was in effect for almost a year and which limited the number of freight car loads of hogs which could be received at the Omaha stockyards which are really located in South Omaha. At one time the allotment of car loads of hogs for Omaha was 1200 cars a week. While


A front view of the hog unloading chute, showing the heavy bumper at the front to prevent careless drivers from damaging the platform in backing up. Note the four swinging gates, one for each of the four trucks which may back up to the platform at the same time. One of the three ramps leading from the platform to the three catchpens behind is seen at the right end



Two views of the cattle unloading chute at Omaha. The platform extending out into the roadway is pivoted to the edge of the catch-pen and is supposed to be swung up out of the way by the weighted cables running over pulleys in the tops of the two tower posts. It is generally out of order, however, so that the trucks have to back up to it instead of running up parallel with the pens and having the chute dropped down in back of the truck body

this was later raised to 1500 cars a week in February, 1919, it did not relieve the situation appreciably because when that limit had been reached the farmers could ship no more hogs by that method until next week when the price might have dropped several cents a pound.

Trucks Only Way Out

Under these conditions it was imperative that the stock raiser find some other method of getting his animals to market when they were ready to be shipped and when the price being paid at the stockyard was highest. The motor truck was the only method of accomplishing this end. In the beginning, the farmer with a small farm and who, perhaps, owned a Ford roadster or touring car bought a light two-wheeled trailer which he hauled behind his Ford and carried from one cow to several calves or hogs. Other farmers with more cattle or hogs to be shipped to market purchased small ¾- or 1-ton trucks and drove them to the market themselves. This proved more economical than moving a smaller number of animals, but yet was not the cheapest method because it took the farmer away from his farm for the greater part of the day. Then, too, he might haul animals only two or three times a week during certain periods of the year, and on some occasions he might have more animals to move on a particular day when the price paid was high than he could haul himself.

Big Companies Now Forming

The evolution in the method of animal transportation has been the formation of special concerns which make a specialty of hauling livestock and do nothing else. Such concerns can afford to buy larger trucks to carry more animals and thereby reduce the cost per animal carried. They can also equip their trucks with special bodies particularly well suited to the handling of livestock. Furthermore, considerable care must be exercised in hauling livestock to market, especially in the case of hogs, for if the hogs are allowed to become overheated they are liable to die, with a large resultant loss to the raiser.

For instance, the writer visited the stockyards early this spring and watched the unloading of eleven hogs and one calf brought from Maynard, Neb., 25 miles from the yards, in a 2-ton Republic truck owned by A. E. Satchell. When the truck backed up to the loading chute and the animals were shoved out, one 250-lb. hog died while stepping off the truck. As hogs were selling at 17½ cents a pound, this meant a loss of $43.75 minus what the dead hog would bring at the price paid for fat. This was 3 cents a pound, which netted the owner $7.50, who thus lost the difference between $43.75 and $7.50, or $36.25. A second 350-lb. hog in the load was so overheated that he could not walk out of the truck body, and water had to be poured on his snout and belly for over an hour before it could be moved.

Too Much Speed Causes Losses

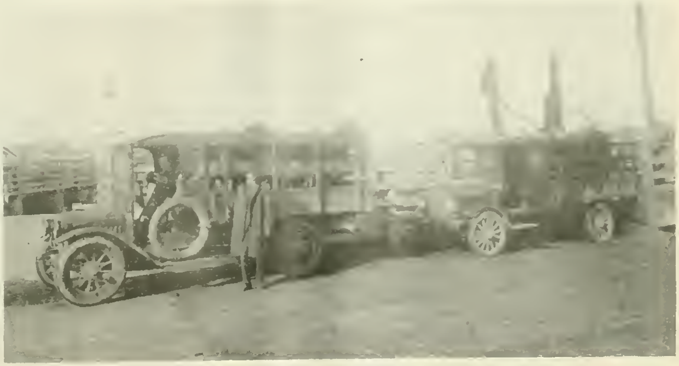
The death of the one hog and the near death of the other was caused by driving the trucks at too high speeds over the poor country roads in order to reach the stockyards before the close of the market at noon. When the weather is warm the trucks must run at fairly slow speeds in order not to shake the hogs up so that they become overheated.

Trucks Mounted on Giant Pneumatics

Some of the regular lines carrying livestock into the Omaha market are overcoming difficulties of this nature by mounting their trucks on giant pneumatic tires. The A. D. Compton Farm, situated in Waterloo, Neb., 25 miles from Omaha, over bad roads, owns a 2-ton Diamond-T truck mounted on 38 by 7 pneumatics in front and 40 by 8 pneumatics in the rear. The use of these giant pneumatic tires has been very satisfactory and loads of approximately twenty hogs have been carried regularly with practically no loss due to overheating.

Two-thirds of the livestock hauled to the Omaha stockyards is received from Nebraska farms and the other one-third from across the Missouri River in Iowa. The territory within a radius of 50 miles of Omaha is a very rich agricultural one and has 141 towns within that radius.

The great increase in the number of animals hauled from this territory dur-



Two typical small trucks used in hauling livestock to the Omaha yards. They are shown lined up in front of the cattle unloading chute. Note the type of body employed and that the truck to the left is mounted on pneumatic tires all around ing 1918 simply swamped the stockyards' facilities for unloading. The unloading chutes which had been sufficient to handle the comparatively small number of cattle driven in prior to 1917 were entirely inadequate to meet the big increase of 1918. On the busy days of the week as many as five or six hundred vehicles bring one or more loads to the stockyards and with the old facilities this large number of vehicles caused most serious congestion and great loss of truck time because each truck had to wait its turn in line for long periods, sometimes as long as 1 or 2 hrs.

As a result, the stockyards management had to devise an entirely new hog unloading chute in order to keep pace with the increased number of truck drive-ins. The plan evolved is clearly shown in the sketch on the bottom of page 21. The plan includes a 4½-ft. runway with four swinging gates at the front. A truck backs up to each of the gates and unloads its animals directly into the 4½-ft. platform. Three ramps with cleats to prevent the hogs from slipping are provided, two in back of the platform and one at the end. Each of these ramps leads to a catch pen in which the hogs may be counted before they are driven down into the alleys and into the storage pens.

Unload Three Trucks Simultaneously

While four trucks may back up to the loading platform at once, only three of them may unload at the same time because there are only three ramps leading from the platform. If four trucks were to attempt to unload at once, the animals in one shipment would get mixed with those of one of the other trucks. As it is, the shipments of three of the trucks are prevented from being mixed by means of the front platform gates which are swung around to block off the platform into three sections, one leading to each ramp, as shown in the plan view on page 21. This design of unloading chute has a capacity of 2000 hogs a day or 600,000 hogs for a 300-day year. This yearly capacity is about three times the present yearly hog drive-in receipts of approximately 170,000. The present unloading facilities are therefore adequate to take care of the increased number of drive-ins for several years to come.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

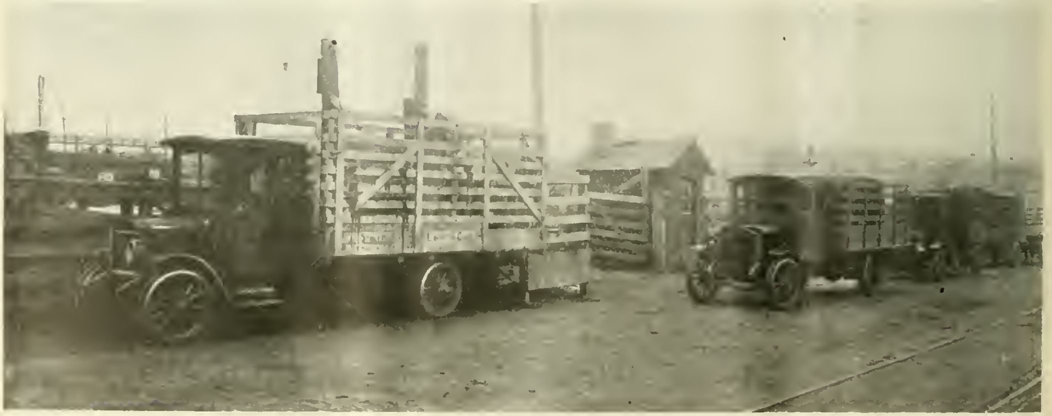
The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

To one who has studied the unloading means provided at other stockyards, that at Omaha might have been improved if a fourth ramp were provided in back of the main unloading platform. The addition of the extra ramp would permit four trucks instead of three to unload at once. However, the unloading chute as constructed has proved very satisfactory, mainly because of the simplicity and because of its large daily capacity. The plan on page 21 and the illustration at the bottom of page 22 show the details of construction and layout. It is to be noticed that none of the swinging devices or drawbridge apparatus in use at some of the other stockyards throughout the country are retained. These were tried at the Omaha yards but found unsatisfactory because they were continually getting out of order and required the services of a carpenter to keep them in repair. The reason for the construction of such swinging or drawbridge apparatus of preventing damage to the truck body and making it unnecessary for the truck to back up to the platform has been met by the plain platform actually built by the provision of a heavy 8 x 12-in. bumper piece or stringer extending for the full width of the four unloading gates. This stringer is so heavy that the average truck driver is liable to damage his truck body rather than the unloading platform if he is careless or indifferent in how he backs his truck up to the platform.

How Congestion Is Prevented

To prevent vehicular congestion at the stockyards the unloading chutes for sheep and for cattle are located some distance away from the hog unloading chute so that the vehicles with the three classes of animals form into three lines instead of one and thereby reduce the waiting time of the trucks carrying each class of livestock.

As shown in the illustration at the bottom of this page and in the three views on page 23, the cattle unloading chute is of the drawbridge type in which a plain platform is pivoted to two posts at the outside edge of a large catch pen and lifted clear up off the ground by means of cables running over pulleys in two high towers. When lowered into place on the ground the chute extends out into the roadway, the idea being that the trucks would run up close to and parallel with the outside edge of the catch pen and then have the chute lowered down directly in back of the truck body so that the animals might walk off and down a small ramp into the catch pen. As explained previously, this type of chute is difficult to maintain and at the time the writer visited the Omaha yards it was out of order and remained permanently in place on the ground. The trucks backed up to it without difficulty and the drivers interrogated said that they would much rather back up to the chute while on the ground than have to pull it down into place from its elevated position.



A line-up of some of the trucks hauling cattle to the Omaha stockyards on a busy day. Note that every one of the trucks shown is fitted with a closed-in cab to adequately protect the driver in all kinds of inclement weather. The first truck to the left has backed up to the unloading chute to discharge its load. The chuteman's house is between the first and second trucks

Ask Your Driver These Eight Questions

Men Who Understand Why the Wheels Go Round Make Fine Drivers Who Take Good Care of Their Trucks

ALMOST every fleet owner will tell you that the driver is the human element which may make or mar the successful use of a motor truck. While the average fleet owner understands this, a very large percentage of such fleet owners forget all about it when hiring their drivers. Once hired, they are too often left to their own resources and come into contact with the superintendent only at the beginning or the end of the day's work or when serious trouble develops that necessitates the laying up of the truck for repairs.

Very often a man hired as a driver does not make a success of himself because he is lacking in an understanding of the fundamental principles of the motor truck mechanism. Very often he knows the traffic rules; the speed regulations; how to steer the truck moderately well and how to shift gears, yet he is unable to explain to anyone just why the wheels go round. In a general way he knows the truck has an engine, clutch, gearset, rear axle, steering wheel and a body to carry goods. But just what happens in the engine on the four strokes of the cycle he cannot comprehend because no attempt was made to school him in the fundamentals when he first became a truck driver.

Some of the truck makers publish books of instruction for the drivers, but these are generally put under the seat cushion in the cab and not referred to from one month to the next. Other makers try to overcome the difficulty of getting truck drivers to read books of instructions by printing the instructions on placards tacked up somewhere in front of the driver's eyes in the truck cab. Even this method is not always entirely successful.

A new method which is gaining in popularity because of the successful results obtained is the actual training of a driver by the personal contact method in a school conducted by the maker or one of his branches. This is the policy which has been followed by the Packard Motor Car Co., Detroit. The instruction at the New York Branch of the Packard company is divided into classroom lessons and actual road tests as more fully outlined and illustrated on pages 32 and 33 of THE COMMERCIAL VEHICLE for Feb. 1, 1919.

The eight questions printed on this page must be answered correctly by every driver who attends the Packard school. They are given herewith so that every fleet owner in the land may have his drivers answer the same questions even though his men are not fortunate enough to be able to attend the Packard school.

THE EIGHT QUESTIONS

1—What is the purpose of a radiator and water?

How does the water do its work?

Why is it necessary to keep the radiator full?

2—What different kinds of oil are necessary to good lubrication of a truck?

Why does the cylinder require a different kind than the differential?

3—What change takes place in the cylinder when you advance the spark lever?

Should you advance or retard the spark when the engine is working up to its limit and why?

4—How many times does the piston go up and down in the cylinder every time an explosion takes place?

What is the action of the gasoline gas in the cylinder from the time one explosion takes place until the next one occurs?

Why are the carbureter and intake manifold water-jacketed and what advantage is gained by such construction?

5—What happens to the cylinder when the motor is run without oil? Water?

What happens to the bearings when the motor is run without oil? Water?

6—What happens when you are coasting down hill and suddenly let in the clutch?

7—Why is it not good to put on the brakes suddenly?

If you do, what happens to the brake shoes?

8—What does running in car tracks do to the tires?

The questions are of course very elementary, but when answered satisfactorily indicate that the driver understands the fundamental principles of the internal combustion engine and the why and wherefore of engine lubrication and cooling.

In other words, they enable him to picture to himself the reason why the truck wheels go round. The answers to these questions indicate that the driver can make a mental picture of just what happens in the mechanism of the truck as he goes through the various routine motions of an average day's work. While sitting on his seat driving the truck, his mind can look through the walls of the engine and imagine the pistons moving up and down and just what occurs during each of the four strokes of the engine. He can see the pistons reciprocating and the connecting rods moving up and down and see the crankshaft with the flywheel at the rear end revolving. When he understands these simple motions, he knows how the reciprocating motion of the pistons is transformed into the revolving motion of the crankshaft through the medium of the crank arm and the connecting rod. Tracing the power of the engine farther aft through the clutch, then the gearset and finally to the rear axle he has a very good mental picture of just what makes the truck run.

The questions as given on this page also bring home to the driver the necessity of proper lubrication and proper engine cooling. Without sufficient water the engine overheats, thereby tending to neutralize the effect of the lubricating oil and results in bearing wear and high gasoline and oil consumption per mile run. The proper answers to the questions regarding the advancement or retarding of the spark lever when the engine is working up to its limit insures that the driver will get the most out of his engine and probably reduce the gasoline consumption considerably.

The questions, although simple in form and comparatively easy to answer when once explained, are of great value in training the driver's mind to think of the various parts of the truck's mechanism and how his neglect to give these parts the proper care to which they are entitled will result in a high operating cost.

One of the Big 8 in Truck Operation

4—OVERHAULING

THE FIVE WAYS TO OVERHAUL TRUCKS

1—By the number of miles covered
2—By the number of months in use
3—By piecemeal
4—By slack business periods
5—When trouble develops

BROADLY speaking, there are five general methods of motor truck overhauling. These include taking in the trucks for overhaul after a certain number of miles have been covered. A second method calls for taking in the trucks after they have been in use for a certain number of months. This method is closely allied with the first or mileage method of overhauling, since the mileage covered during any period is generally proportionate to the number of months the truck has been in actual operation during that period. In a third method, the overhaulage work is done piecemeal. As for example, engines may be gone over thoroughly at one time and the trucks put back to work. At a later date the rear axles may be gone over in a thorough manner and so on with other units of the truck construction. Some concerns bring in their trucks for overhaul during the slack months in their business. Sometimes these occur regularly year after year, but in others they come at irregular intervals. The fifth and last method is to keep the trucks in operation until serious trouble results. This does not generally happen during the first year of the truck's life, but if the vehicle is allowed to run for over 1½ to 2 years, it is bound to occur.

It has been found that all of the above methods give goods results except the last, that of letting the truck go until something happens to it before repairing it. Although some truck owners still advocate this plan, repairs which would have been small if attended to when they first developed, are often found to become so serious as to make it necessary to lay up the vehicle for long periods. In the meantime, the truck owner is of course deprived of his means of delivery unless spare trucks are maintained or outside vehicles hired for the work.

There are no set rules which can be given in regard to truck overhaul on account of the great variation of the conditions under which trucks in miscellaneous lines of business are engaged. Some trucks which perform a specially strenuous work must be overhauled more often than the same make and size of trucks in the same business in other cities where road conditions and grades are less severe.

Principles Instead of Set Rules

Then again, the question of maintenance throughout the year has a large bearing on the frequency of general overhaul periods. In this respect the type of driver employed is most important, for if a competent operator is hired and takes good care of his vehicle it requires a fewer number of overhauls than is the case if the driver is careless and indifferent to the costly piece of machinery entrusted to his charge.

THE BIG 8

Read Them All

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Furthermore, the maintenance of trucks in public or private garages affects the period between overhaul in some instances. The fleet owner with a large number of trucks must determine whether it is more economical for him to handle his own repair work than to have it done in a public garage or in a maker's service station when he keeps the trucks in his own garage. Of course, if he maintains his vehicles in a public garage throughout the year, he generally has the overhaul work done at the same place.

Owners Require Sufficient Equipment

But when an owner has once decided to house his own vehicles, he must decide for himself whether it is more economical for him to install sufficient garage equipment of his own and hire a crew to operate it than to send his trucks outside for current as well as periodical repairing. If he decides to do his own repair work he must install a proper repair outfit if results commensurate with the cost are to be expected.

There are many advantages in a truck owner making his own repairs and other advantages in having the work done outside. In making a decision between these two methods, the cost, convenience and ability to keep the trucks in service for the greatest possible time each year are the considerations which must be taken into account. In the matter of cost, the expense of having the work done outside should be compared with the upkeep of the owner's shop which must include the cost of supervision and overhead, the initial cost of the repair equipment and the labor charges incident to its use.

When the owner installs his own repair equipment he is generally able to get his trucks through the shop in much quicker time than he can if they are sent

A repairshop with a concrete floor covered with wood to make it easier and warmer during the winter months for the mechanics. The interior lighting is excellent, and the workbench, lathe, drill-press and stands are arranged so that the workman can use them most efficiently

to an outside station. This is due to the fact that work can generally be begun on the truck as soon as it is put into the shop instead of having to wait for someone else's vehicle to be got out of the way first, as often occurs in a public service station. There is also an additional saving in time when the trucks are maintained in the owner's garage, since they do not have to be run over the roads to the maker's service station or garage and then run back after the work has been completed.

Public vs. Private Garages

It is sometimes more economical for the fleet owner of three or four trucks to maintain them in a simple garage at his own place of business and to have the repair work done outside. Such a course relieves the owner of the worry and supervision necessary in order to maintain a repair department in an efficient manner. When such a course is followed, the truck owner must bear in mind that he is paying for service as well as for the actual repair work. This service charge will, of course, include the actual cost of labor and material and an overhead or profit charge to which every concern is entitled.

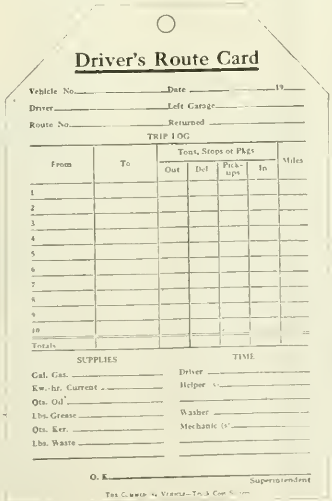
Overhauling Secret of Truck Success

Generally speaking, however, the larger the fleet, the more economical it is for the owner to handle his own repair work. When repair equipment is installed by the truck owner, sufficient provision should be made for expansion of the company's business. If this is done and sufficient equipment is installed to more than take care of the current truck needs, the surplus work ability of the shop can be utilized by taking in repair work on other trucks operated from the same neighborhood. This has been successfully done by many owners of large fleets, notably the Robert Gair Co., Brooklyn, N. Y., as told in THE COMMERCIAL VEHICLE for May 15, 1919.

While overhauling is not the first item but rather the fourth in the Big 8 in Truck Operation so far as yearly money outlay is concerned, as told originally in THE COMMERCIAL VEHICLE for April 15, 1919, proper repairing is in reality the secret of successful truck use. No matter whether the preceding items of driver, tires and gasoline of the Big 8 are excessively high in cost or extremely low, the truck can still be operated, whereas if the repair work is not done properly, the vehicle must be laid up, during which time it produces no income whatever.

Eternal vigilance should be the watchword in all motor truck repair work, for only by eternal vigilance can small repairs be remedied while they are still small and before they develop into major repairs perhaps costing several hundred dollars.

As an example of what may be accomplished by proper overhauling, take for instance the case of the seventeen electrics owned by the Gorham Co., silversmiths of New York City. The first two of that company's trucks were purchased in 1898, or 21 years ago. Those two trucks, together with five others of the same kind purchased in 1898 and ten others bought between 1899 and 1906, are still in operation and giving better service than when they were new. Practically every one of the trucks ex-



Driver's Route Card

Vehicle No.________ Date ________ 19____

Driver________ Left Garage________

Route No.________ Returned________

TRIP LOG

From	To	Tons, Stops or Pkgs				Miles
		Out	Del	Pick-ups	In	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Totals						

SUPPLIES

Gal. Gas. ________

Kw.-hr. Current ________

Qts. Oil ________

Lbs. Grease ________

Qts. Ker. ________

Lbs. Waste ________

TIME

Driver ________

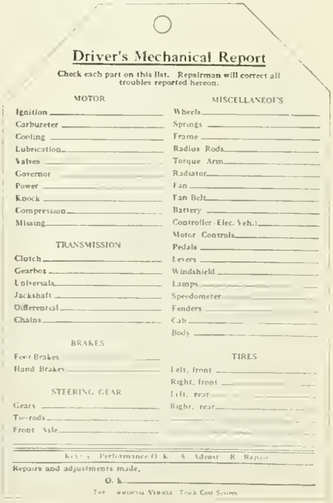
Helper (s)________

Washer ________

Mechanic (s)________

O. K.________ Superintendent

The Commercial Vehicle—Truck Cost System



Driver's Mechanical Report

Check each part on this list. Repairman will correct all troubles reported hereon.

MOTOR

Ignition ________

Carbureter ________

Cooling ________

Lubrication________

Valves ________

Governor ________

Power ________

Knock ________

Compression________

Missing________

TRANSMISSION

Clutch________

Gearbox ________

Universals________

Jackshaft ________

Differential________

Chains________

BRAKES

Foot Brakes ________

Hand Brakes ________

STEERING GEAR

Gears ________

Tie-rods________

Front Axle________

MISCELLANEOUS

Wheels________

Springs ________

Frame ________

Radius Rods________

Torque Arm________

Radiator________

Fan ________

Fan Belt________

Battery ________

Controller (Elec. Veh.)________

Motor Controls________

Pedals ________

Levers ________

Windshield ________

Lamps ________

Speedometer ________

Fenders ________

Cab ________

Body ________

TIRES

Left, front ________

Right, front ________

Left, rear ________

Right, rear________

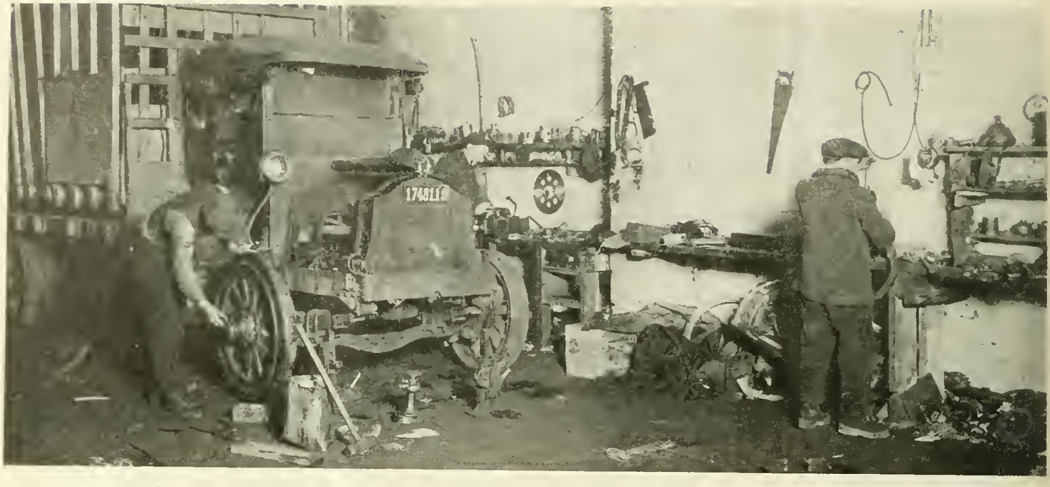
Key: ✓ Performance O. K. A Adjust R Repair

Repairs and adjustments made.

O. K.________

The Commercial Vehicle Truck Cost System

The reverse side of the driver's route card, shown at the right, and one of the two forms of The Commercial Vehicle Standard Cost Keeping System for Motor Trucks, is a good form for keeping close track of the truck repairs or adjustments required daily. The headings and items listed under each help to prevent overlooking any minor repair work



An example of a poor shop layout in which there is no orderly arrangement of bins for parts or for the necessary repair tools. The lighting is also very poor and all sorts of junk is thrown under the makeshift workbench, where it gets in the way of the repairmen

cept those purchased in 1906 have been rebuilt. In several the only original parts remaining are the wheels and the field blocks of the motors. Frames, driving gears, motor armatures and field coils, and axles have all been replaced.

Some 21-Year-Old Electrics

This repair work is, of course, an unusual example and is cited here merely to show that trucks can be run indefinitely provided they are properly overhauled and worn parts replaced by new ones as found necessary.

In the case of the Gorham Co., it was really forced to make its own repairs because the manufacturer of the first of its trucks went out of business shortly after they were put into operation and the Gorham Co. could not get the necessary spares. The only thing to do was either to scrap the trucks or make the parts itself and the company chose the latter course. As a further example of the great number of repairs and even changes which were made, it was necessary to replace the original chloride batteries by those of the modern lead-paste design with a consequent increase of ampere hour capacity from 112 to 140 in order to permit of a greater daily mileage.

Two Motors Replace One

When the trucks were first bought they had only one motor apiece and these overheated so that two motors had to be fitted. This necessitated changes in the driving construction with two driving gears instead of one. These driving gears were originally made in one piece, the gear proper being cast integrally with the hub and the spoke. If a spoke cracked, the gear itself with its costly machine work was useless. When the change was made, the gear was cut on a separate ring which could be slipped over a hub and spoke unit. This simple change saved considerable repair work and a corresponding amount of repair cost.

Then again, take the case of the famous old Mary Ann, a 3-ton electric made by The Motor Vehicle Equipment Co., Flatbush, Long Island, N. Y., and operated for 14 consecutive years from 1901 to 1915 by the Central Brewing Co., New York City. Like the electrics of the Gorham Co.'s fleet, the Mary Ann underwent many changes during its 15-year life. Chloride batteries were replaced by those of the modern type and other parts were improved upon from time to time. When finally taken out of service, the truck had its original frame and motor, the latter being in as good shape as when the vehicle was bought.

The truck was christened the Mary Ann by its driver who cherished it as one of his best friends during the many years of its service. It was also the pride to the Central Brewing company and on every occasion it was pointed to as an example of what excellent service a motor truck can give, provided it is afforded the proper care and attention, and given repairs when needed.

Basis of Truck Life

From these two examples, it would seem that the life of a motor truck is dependent only upon the repair work done upon it. There is no doubt a time when the cost of repair work on an old truck will more than offset its value, provided the development in truck design and construction has progressed to such a point that it would be cheaper to buy a new truck with greater work ability than to keep the old truck, even in its best state of repair. Then again, gasoline trucks generally cost more to maintain than electrics on account of their greater speeds and greater mileages covered daily, with the consequent greater vibration which causes breakages and rapid wear.

Daily Inspection Necessary

Because of the fact that no set rules can be made to govern the overhauling of trucks on account of the almost limitless variation of the work which trucks perform, each truck owner should study his own installation as a separate unit and determine his own methods of repair. However, there seems to be one basic principle which applies to either gasoline or electric truck maintenance, and that is the desirability of a daily or nightly inspection of each truck after its work for that day has been completed. In this work, the reverse side of the driver's daily route card which forms a part of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks is a great aid to the superintendent in charge of the truck fleet. As shown in the illustration on page 27 the reverse side of the card is given over to a driver's mechanical report and is divided up with headings for the Motor, Transmission, Brakes, Steering Gear, Miscellaneous and Tires. Under each head are set down the names of various parts which may need repair from time to time.

As the driver turns in his truck at the end of the day's work, he simply indicates what particular part has given him trouble. The card, which is provided with a punched hole at the top, may be attached to the truck itself by means of a string so that the repairman may have the card indicating what repair work is to be done on any particular truck always on that truck while he is performing the work. A line is also provided at the extreme bottom of the card for the signature of the mechanic doing the repair work, so that he may be identified provided the part which he claimed to fix gives trouble on the subsequent day.

Because of the fact that each truck installation must be considered separately, in so far as the methods of repair are concerned, on account of the great difference in operating conditions, separate examples of the methods of repair will be given herewith.

Taking one or more instances of the methods of overhaul followed by department stores in the maintenance of their trucks, the Eleto Co., which makes all the package deliveries outside of Manhattan Borough for Lord & Taylor and James McCreery & Co., has found that continual tinkering with trucks is very expensive. While minor repairs and adjustments are made each night, every one of the trucks is taken in the shop once in every 12 months and stripped down to the chassis. Every portion is taken apart, examined carefully and put in first-class shape. It is in effect a practical rebuilding of the vehicle with an annual repainting of the truck body. This rebuilding period takes about 30 days.

A Twice-a-Year Inspection

While a lay-off of such duration ties up a certain amount of capital, the Eleto Co. has found that in the end it is much cheaper than many 1- and 2-day lay-offs during the year. Such small periods are not long enough to give each vehicle a thorough overhauling, with the result that while the part or group of parts examined may stay in first-class condition for a year or more, some other group is always in need of repair shortly afterward. When the second group of parts has to be gone over, the truck has to be laid up again. If one could tell exactly when this work had to be done, preparations could be made for the internment of the vehicles. But these enforced lay-off periods always come when least expected, thus causing much confusion, a necessary re-arrangement of schedules and delivery routes, and consequently much loss of time.

Take the case of the gasoline and electric delivery trucks operated by the department store of L. Bamberger & Co., Newark, N. J. Each Bamberger vehicle is washed and thoroughly inspected every night. Minor repairs are made by the night gang of repairmen. Each truck is completely overhauled every 6 months, between January 1 and April 1, or between August 1 and November 1, the slackest business seasons of the year.

The Bamberger company has found that it is much cheaper in the long run to overhaul trucks thoroughly than to operate them until some mechanical difficulty presents itself which necessitates long lay-up periods. The average overhaul period for each of the three classes of vehicles operated by the Bamberger company are as follows: Fords and electrics, 1 week each, and Autocars, 2 weeks. These times include body repair and painting if such are necessary.

John Lucas & Co., Inc., Philadelphia, Pa., who have reduced the average cost of handling paints from $1.42 per ton delivered, to 76 cents, found that proper overhaul and current repairs were the principal items which made such a great saving possible. Each vehicle is examined thoroughly every night before it enters the company's garage. All minor misadjustments which are discovered are corrected before the truck is allowed to depart on the following morning.

Semi-Monthly Driver's Inspection

In addition to this daily inspection, the driver of each truck must make a personal inspection of his vehicle twice a month and submit a written report of his findings to the traffic manager of the company. These reports are made on printed forms supplied by the Lucas company. The forms have two main heads, as follows: Motor Power and General.

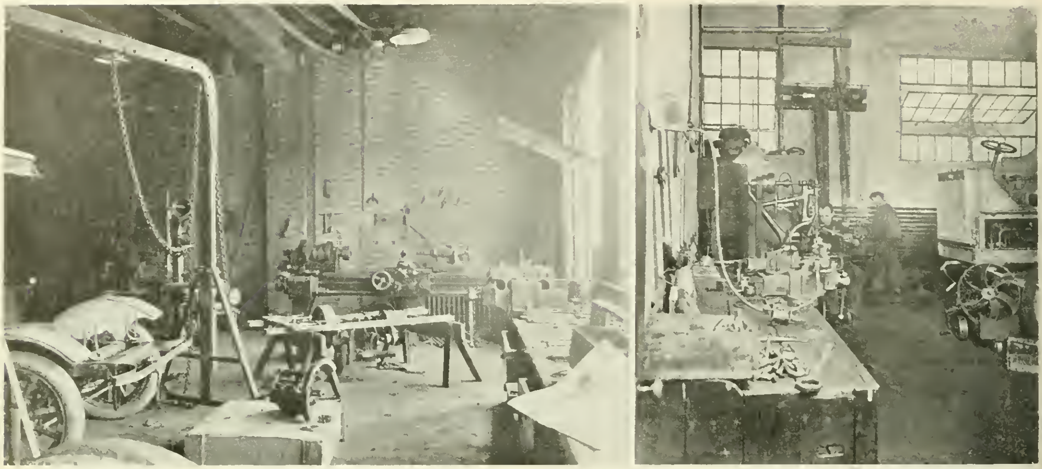
Under the head of Motor Power are items for each part of the powerplant, with blank lines after each on which the condition of that particular part is written down by the driver. In some cases the items have printed questions after them to eliminate any evasion on the part of the driver. For instance, after the item, Radiator, there appears two questions, "Any Leakage?" and "When Last Cleaned Out?" These questions must be answered directly. Similarly, other questions are printed after the items Valves, Crankcase, Magneto, Gearbox, etc.

Under the head, General, appear items on the foot and hand brakes, axles, driving chains and sprockets, wheels, tires, springs, and the body. The use of a form of such nature, leaving nothing to the discretion of the driver in making the inspection, insures the traffic manager of getting a comprehensive report of the condition of the vehicle without making him go over it personally.

Drivers vs. Mechanics

And there is the question of whether the driver should be allowed to make any repairs or whether special mechanics should be responsible for the ability of the trucks to operate when called upon. The Central Brewing Co., New York City, has found that it does not pay to attempt to promote drivers from the ranks to become repairmen. It further found that ninety-nine times out of a hundred the best truck driver is a failure as a mechanic, or as the head of a repair department, because he does not possess the technical knowledge which is essential to the proper maintenance of a piece of machinery such as a motor truck. For this reason, none of the drivers of that company's fleet of trucks are allowed to repair or make adjust-

At the left, a neat method of cleaning truck parts by means of kerosene forced out through a hose by pressure. The portable crane is employed to readily move heavy parts from the trucks to the cleaning station. The view at the right shows a typical stockroom for forty-seven 5-ton trucks of one make. Over $12,000 of spare parts are carried on hand and each part is indexed on a card system



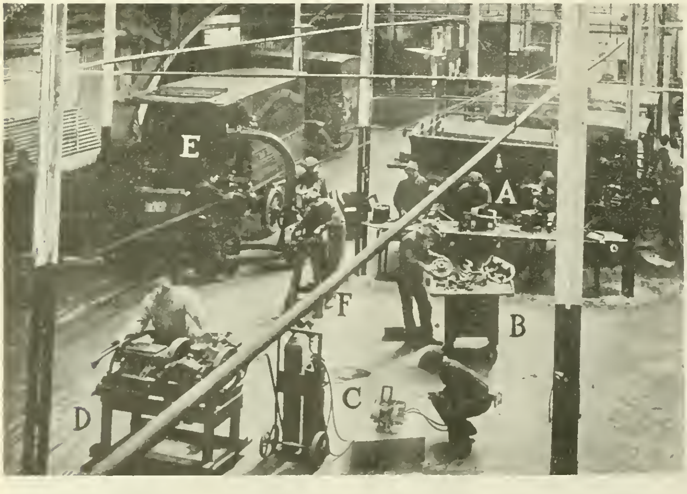
Two good examples of well-lighted workbenches in motor truck garages. In the view at the left, note the portable inverted-V-shaped stand for removing heavy parts such as engines. The bench layout is shown clearly. Notice the carbureter testing device at the right

ments on their trucks except in cases of necessity when something goes wrong on the route.

Each truck of the fleet is inspected as soon as it comes into the garage on its last trip for the day. On the forty electric trucks maintained, this work is performed by two men at night and two in the day. Four mechanics and three helpers are employed for the sixteen gasoline trucks, three mechanics and two helpers working in the day and one mechanic and one helper at night. This force also handles the annual overhauling of both classes of vehicles.

The International Oxygen Co., Waverley, Newark, N. J., uses two 5-ton Pierce-Arrows for the delivery of hydrogen and oxygen in casks within the Metropolitan area of New York City. One of the trucks is 5 years old and the other 4 years old. Both are thoroughly overhauled at the service station of the Pierce-Arrow company in Newark every 20,000 miles, which is covered approximately every 18 months. The minor repairs are made by the drivers, who are held responsible for all repairs except breakages of parts. Each driver is paid $25 a week, with time and a half for over-time, and is made to feel as if the truck was his own property. With this feeling instilled in the drivers, they take much greater care of their vehicles.

Taking another example of a truck owner in Newark, N. J., the Jacob Häussling Mineral Water Co., operates a fleet of five 2-ton Autocars and completely overhauls each truck once a year in its own shop. This work is done during the slack winter season and includes a complete take-down and thorough inspection. From 3 days to a week is taken for the work if no body painting is required. If the latter is necessary, the vehicle is in the shop for about 2 weeks.



Typical equipment in a truck service station, showing the following time-saving tools: A, a workbench in otherwise waste space between columns; B, a portable tool bench; C, a welding outfit on wheels; D, an engine and gearset stand; E, a special rigging for lifting the engine out of a chassis with a portable crane, and F, a stand to hold the engine crankcase

Overhauling Coal Trucks

In the coal business, the Burns Bros. Co., which operates a large-sized fleet of heavy capacity trucks for coal delivery, has cut down the time of overhaul periods by making the engines of the different makes of trucks the same capacity interchangeable with each other. For instance, the motor of any 3-ton truck can be transferred to any other 3-tonner; that of a 10-tonner to any other of the same capacity and similarly with the other 5- and 6-ton trucks maintained. It makes no difference whether the motors are of the same make or not, since it is only the mounting which has been standardized. If one 3-ton truck is in the shop undergoing repairs to its gearbox, but with a good motor, the latter may be taken out in a few minutes' time and placed in another 3-tonner whose motor is giving trouble and which without this quick changeability might be laid up for 2 or 3 days.

The same scheme has been followed with carbureters, magnetos, pipe fittings, steering gears and steering posts. By

(*Continued on page* 44)

Federal Combination Truck Body Designed for Express and Dump Body Work

Is Easily Removed from the Chassis and Also Equipped with a Hydraulic Hoist and a Spring Drawbar for Tractor Use

THE Federal Motor Truck Co., Detroit, has designed a combination body that renders the truck useful for a number of different kinds of work. This body was recently delivered to an owner at McCloud, Cal., who wanted it designed for special work on his large estate. This work included express and dump body work, as well as the haulage of large and cumbersome commodities, such as logs, etc.

The express or delivery body is equipped with a drop tail gate, is zinc-plated, steel lined and constructed to be leak proof. It is readily adaptable for loose materials such as sand, gravel, etc., or for the purpose of hauling merchandise.

The body is so constructed that during a demonstration given recently, it was removed from the chassis and rolled upon a specially built receiving stand in less than 4 min. The frame of the truck is equipped with rollers so that the body can easily be slid off the truck chassis onto the receiving stand by two men.

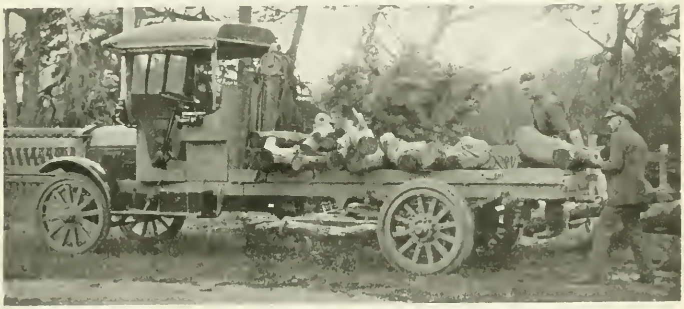
When the body has been removed from the truck chassis the specially constructed flat bed can be used to haul logs or other large and cumbersome articles that it would otherwise not be possible to handle.

A feature of this body is that the under portion is equipped with rollers and skid sockets on both sides and rear. These are placed there so as to permit the handling of heavy materials which are rolled or skidded over these rollers to the loader position on the truck. Heavy materials, such as logs, are automatically lifted or drawn into place on the truck by its own power through the use of the hoist cables operating from the engine.

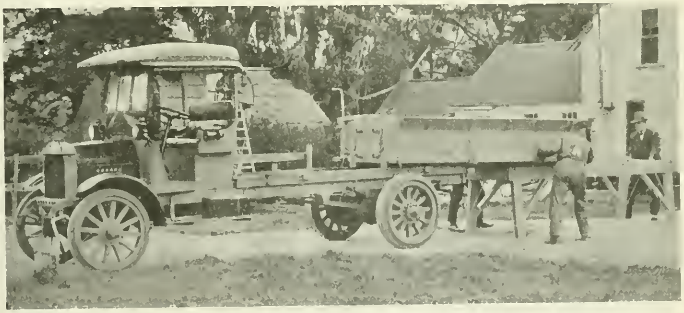
This body can also be used for road work, being equipped with a special hydraulic hoist which raises the body to an elevated dump body position permitting loose materials used for road work to be easily slid out of the dump body and spread.

The double-acting tail gate which consists of a drop tail piece into which has been built another gate that is used for spreading when the body is elevated for dumping purposes, is another feature. The latter gate is operated from the driver's seat by means of a line running on the outside of the flared part of the body at the top and working on pulleys at both ends.

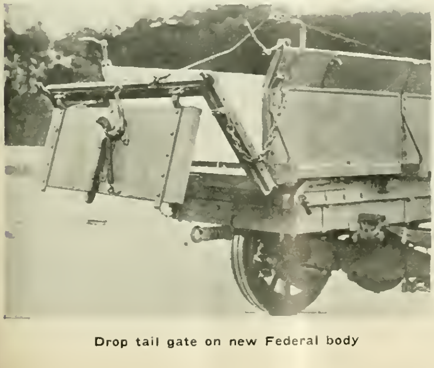
The new Federal body is likewise equipped with a specially designed spring drawbar for tractor use. This eliminates the undue shock and stress upon the truck when used with a trailer. This attachment is mounted under the rear frame member.



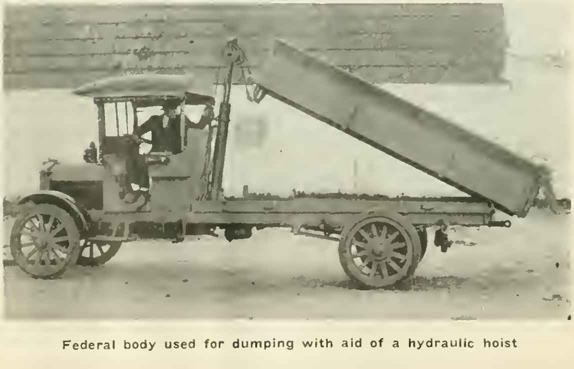
A Federal truck used for hauling logs after the body has been removed



The body is easily rolled off the chassis in about four minutes



Drop tail gate on new Federal body



Federal body used for dumping with aid of a hydraulic hoist

Ship-by-Truck Caravans Help the Truck Owner to Sell His Service to the Shipper

Twenty Trucks Carry 30 Tons of Goods from Atlanta, Ga., Shippers to Merchants in Macon, 72 Miles Away, at Less Than Freight Rates

FOLLOWING closely on the heels of the successful Ship-by-Truck demonstration sponsored by the Chamber of Commerce of Macon, Ga., the Atlanta Automobile Assn. has demonstrated conclusively that goods can be transported between Atlanta, Ga., and Rome, Ga., a distance of 72 miles, with greater dispatch and at less cost than is made possible by railroad transportation. This latest Ship-by-Truck demonstration was held under the auspices of the *Atlanta Journal*, a daily newspaper.

On the morning of May 20, twenty motor trucks of many makes and various sizes gathered in the heart of Atlanta and, despite a heavy and continuous downpour of rain, started on their way to Rome. Metal beds, Coca-Cola, cotton, excelsior, cement, tinware, and even an electric coupe were among the many items of merchandise loaded on the trucks by Atlanta manufacturers and dealers for delivery in Rome. A total of 30 tons of merchandise was transported on the run.

Train Divided Into Two Parts

The *Atlanta Journal* appointed a number of representative Atlanta business men as observers, and these observers examined carefully the amount of fuel carried by each truck and sealed the gas tanks. An official observer rode with each truck.

The train was divided into express and freight detachments, the lighter trucks riding on pneumatic tires composing the express detachment and the heavier trucks riding on solid tires composing the freight detachment. The pace was set at 15 miles per hour by the official pacemaker, a passenger car driven by the editor of the *Atlanta Journal*.

At Cartersville, 27 miles from Atlanta, a stop was made for lunch, and the entire town turned out to see the truck cavalcade. Between Cartersville and Rome, the roads proved to be in much better shape than was expected and splendid time was made throughout that portion of the trip, all of the pneumatic-tired trucks and a few of the solid-tired trucks remaining within a few hundred yards of the pacemaker.

All of Rome met the truck train as soon as it had passed the county line. Every passenger car and truck in the city joined in the parade, and the drivers of the truck train were given a tremendous ovation. The reception committee was headed by Mayor Vandiver, who officially welcomed the truck train to Rome, and handed the keys of the city to the visiting delegation. Immediately after arrival in the city the merchandise transported from Atlanta was distributed to the various merchants for whom it was intended.

The line-up of some of the twenty trucks which formed the Ship-by-Truck caravan that delivered 30 tons of miscellaneous goods from Atlanta, Ga., shippers to merchants in Macon, Ga., 72 miles distant. Some of the trucks carried mattress material and others tinware, Coca-Cola, cement and beds

A dinner, at which Mayor Vandiver presided, was tendered to the Atlanta delegation by the Rome Chamber of Commerce, and the mayor in well-chosen words predicted the establishment in the near future of a permanent truck service between Atlanta and Rome.

Return Loads Carried

The following morning, May 21, the trucks were reloaded with merchandise by Rome merchants and sent on their way to Atlanta. The return trip was without incident, except for the continuous ovation accorded the drivers in every town en route. All deliveries were made in Atlanta before 4 p. m. of the same day.

Imagination is necessary to properly appreciate the importance of this run to Atlanta and the surrounding country. Under normal circumstances, the average time of a freight shipment between Atlanta and Rome, in either direction, is 1 week. The average time of an express shipment is 72 hours. These figures were volunteered by the merchants of the two cities, who have for some time been dissatisfied with the service they have been given. The merchandise transported amounted in weight to 30 tons.

Trucks Do Work Cheaply

The entire cost of the truck trip, according to figures compiled by the *Atlanta Journal*, was $103.99. The same merchandise, if transported by freight, would have cost $214.55, and if transported by express, $598.40. And this does not take into consideration the cartage charges at both ends, which are a considerable item when the goods are shipped by express and freight. And it does not take into consideration the fact that goods require heavy and careful packing when shipped by freight or express, whereas this heavy and careful packing is eliminated by motor truck shipment, as the goods are handled twice only, once at the shipper's front door and once at the consignee's front door.

An Example

A concrete example may better show the point. A Mack 2-ton truck entered in the demonstration was loaded with 2½ tons of metal beds by the Fulton Metal Bed Co. of Atlanta and delivered its load to the Scroggins Furniture Co. of Rome in 5½ hours. The total cost, including driver, gas and oil was $5.10, as compared with a freight cost of $15, and an express cost of $41.60. These figures were supplied by the manager of the Fulton Metal Bed Co., who rode on the Mack truck throughout the trip to Rome and return. On the return trip to Atlanta, the Mack 2-ton truck was loaded with 2½ tons of flour by the McWilliams Feed & Grocery Co. of Rome and delivered to the Atlantic Ice & Coal Co. of Atlanta in 5¼ hours.

Georgia Favors Good Roads

Surely no more concrete or forcible example is needed to doom the mule team of northern Georgia. Already 70 per cent of the counties in Georgia have voted bonds for good roads, and the remaining 30 per cent are rapidly falling into line. From present indications, it is expected that Aug. 1 will see every county in Georgia financially in the movement and the year 1920 will see Georgia well up in the list of states that see directly ahead the transformation that will make every merchant's front door his shipping platform.

A 2-ton Mack which carried a full load of metal beds from an Atlanta distributor to a Macon retailer. The truck run was made in about 6 hours, with stops, as compared with 72 hours, the average time for an express shipment between the two cities

Installation Service for the Fleet Owner

SO many manufacturers, retailers, municipalities and other concerns doing miscellaneous businesses have been forced to buy motor trucks in order to solve their transportation problems, that there has been created a new field for the consulting engineer who specializes particularly on the problems of the motor truck fleet owner. The work which such a consulting engineer can do for the large fleet owner is entirely different from that service given to the truck manufacturer and including expert advice on the design and construction of trucks or the layout of factories.

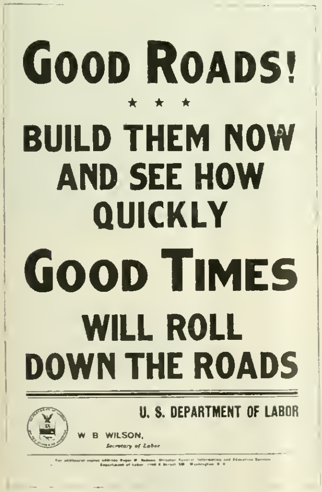
Such a consulting engineer can first of all be of service to the prospective truck owner by studying the conditions under which the trucks will have to be operated and then selecting the type and size of trucks best suited to the work. Other work which can be carried along at the same time or after the trucks have been delivered includes their method of operation, loading and unloading, routing, the type of body best suited for the work and the use of any auxiliary equipment to further increase the truck efficiency.

Such work is most important for the successful fleet owner and becomes of greater and greater moment as the size of the fleet is increased. The services of a specialist in truck transportation may be of great value to a concern, even though its trucks are already under the supervision of a man also trained to the work. In most cases the latter is forced to give most of his time to the details of the work and this does not permit him to obtain the wide knowledge of how others operate trucks unless he should read such a fleet owner's paper as THE COMMERCIAL VEHICLE. On the other hand, the truck specialist who makes a business of such service to the fleet owner is more liable to have a much wider range of experience and be able to point out economies from the outside which the man on the inside may pass over from his very close association with the work.

When the average business concern goes into the market for motor trucks, it generally calls in the salesmen of two or three companies whose trucks they have heard something about. These salesmen present their conflicting claims, each maintaining that the truck he is selling is the best on the market. This has a result of befuddling the prospective purchaser to such an extent that he is unable to make an intelligent selection either as to the make of truck or as to the manner in which it can be operated most efficiently.

This was exactly what happened when the Department of Public Works of the City of Yonkers, N. Y., decided to pur-

(*Continued on page 35*)



GOOD ROADS!

★ ★ ★

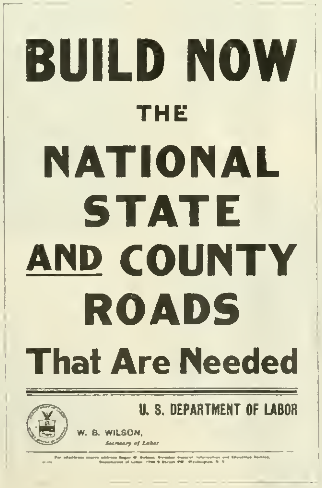
BUILD THEM NOW
AND SEE HOW
QUICKLY

GOOD TIMES

WILL ROLL
DOWN THE ROADS

U. S. DEPARTMENT OF LABOR

W. B. WILSON,
Secretary of Labor



BUILD NOW
THE
NATIONAL
STATE
AND COUNTY
ROADS
That Are Needed

U. S. DEPARTMENT OF LABOR

W. B. WILSON,
Secretary of Labor

Truck Owners Should Help Get Good Roads

Because the lack of good roads is the only thing which will retard future truck development and prevent a reduction in truck operating costs, commercial vehicle fleet owners should do everything in their power to get new and better highways built. As the above two posters issued by the Department of Labor in conjunction with the Highway Industries Assn. indicate, now is the time to start the good work

The Clark Three-Wheeled Tractor Has Many Uses

Is Replacing Hand Trucks, Wheelbarrows and Horse-Drawn Equipment in Factories, Foundries, Warehouses, Etc.

THE Clark Tructractor, made by the Clark Tructractor Co., Chicago, is a dual machine which does the work of both a truck and a tractor. It can be used most anywhere and is replacing hand trucks, wheelbarrows and horse-drawn equipment in factories, foundries, warehouses, freight terminals, railroad stations, etc., as well as in the construction and contracting field, the building of good roads, mines, highway hauling and farm work. It will do the work of a number of wheelbarrow men, or horses and wagons. On account of its design, it is able to climb narrow, steep inclines, run in and out of buildings and tight places, and turn in its own length.

It is equipped with a four-cylinder, 3⅛ by 4½-in. engine and an internal-gear-driven front axle. The engine is a unit with the gearset. The drive is taken from the engine at the rear through the clutch and gearset to the one-piece driveshaft and from there through the internal-gear-driven axle to the springs.

Front Drive Employed

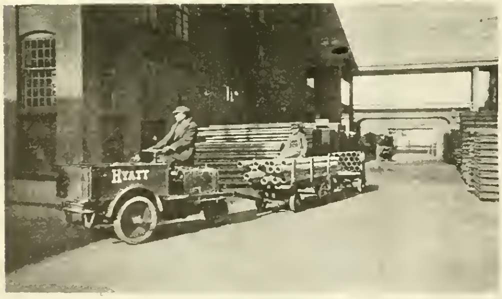
The engine is water-cooled, the radiator being located at the rear. The clutch is of the multiple-disc, dry-plate type and non-adjustable. The selective gearset has three speeds forward and one reverse. The two universal joints on the driveshaft are of the flexible disc type, requiring no lubrication. Fuel is fed by gravity to the carbureter, which is preheated by a flexible pipe connection to the exhaust manifold.

The steering gear is of the worm and sector type. The brake contracts on the driveshaft, between the gearset and the universal joint.

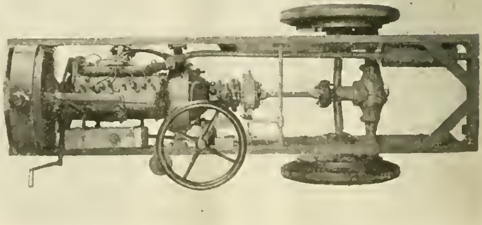
The wheelbase is 72 inches with a tread of 35½ in. The over-all length is 112 inches with an over-all width of 42 inches. The height of the platform is 28 inches above the ground. The ground clearance is 9½ inches. A speed of 1 to 15 m.p.h. is obtained with a gasoline consumption of 3 gallons per day when the tructractor is in constant use.

As a truck, it carries a 1½-ton load and as a tractor it will haul a number of loaded trailers. The weight of the vehicle complete with the standard body is 2050 pounds.

The turning radius is 6 feet. It is equipped with two single piece metal disc wheels in the front and one in the rear. Roller bearings are used on the front wheels and annular ball bearings on the rear wheel. The solid tires are the pressed-on type. Special wheels and bodies are interchangeable with standard equipment. This truck is made with four types of bodies, dump, cargo, platform and stake. The price is $1135.

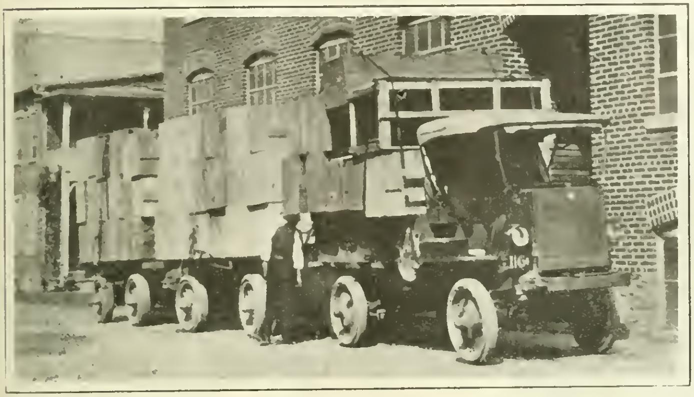


Upper—The Clark tractor is handy for factories
Lower Used for hauling engines and other units



Upper—Equipped with a dumping body
Lower The Clark tractor chassis showing front drive

Use of Trailers Saves Money for Casket Maker



A Nash Quad and its two Troy trailers hauling caskets from Boyerstown, Pa., where factory land is cheap, but where shipping facilities are poor, to Philadelphia, where shipping conditions are good

THE Boyerstown Casket Co. is located in the town of Boyerstown, Pa., 43 miles from Philadelphia, and has practically no railroad accommodations. A marked increase in business necessitated daily connection with Philadelphia and this is being provided by means of Packard and Pierce-Arrow trucks and Troy trailer combinations. A Nash Quad is also used in the work, as shown in the illustration.

The trailers used are the 2½-ton models and each carries from ten to twelve caskets, making a load of from 8 to 10 ft. high. The wooden caskets have an average shipping weight of from 215 to 285 lb. each, and the metal caskets average about 350 lb. Hence each trailer is carrying an overload of about 1 ton per trip.

The road connecting Boyerstown to Philadelphia is partly paved and partly gravel and has several grades averaging between 8 and 10 per cent, but these are all negotiated without difficulty.

The use of this equipment permits the Boyerstown Casket Co. to take advantage of the railroad and loading facilities of Philadelphia and maintain its factory in a small town where overhead is low.

New Jersey's New Highways Will Help To Reduce Operating Costs

THE heavy motor truck traffic of the future will be well provided for in the new system of concrete highways now being constructed in the State of New Jersey, as first told on pages 20 to 22 of THE COMMERCIAL VEHICLE for September 1, 1918. The entire system proposed includes the building of 655 miles of real truck roads with 20-ton bridges. The narrowest of the highways will be 18 feet of pavement, together with a 3-foot macadam shoulder on each side, thus giving actually a road surface of 24 feet.

One Section 65 Miles Long

One of the sections now under construction is the main line route across the state and forming a part of the Lincoln Highway. This section is 65 miles long and during 1918 carried a volume of traffic estimated at over 2000 tons a day. Construction work is now going on over two sections of the route. These sections total 17½ miles in length and $1,157,264 is being spent on them, or on an average of more than $66,000 to the mile. This high cost is due to the fact that one of the routes required the relocation of the highway to eliminate thirteen dangerously sharp turns and a grade crossing over the Pennsylvania Railroad. Over $20,000 was also spent for acquiring new rights of way made necessary by the elimination of the sharp turns.

All Foundations Drained

The State Highway Engineer, W. G. Thompson, is a firm believer in putting down first of all a properly drained foundation in order that the life of the road may be as long as possible. If foundations are not properly drained, the water which finds its way under them freezes during the winter months and causes heaving or cracks with their resultant surface deterioration. On 2 miles of one of the sections now under construction, $50,000 was spent for foundation drainage alone.

The pavement on the two sections now under construction is of concrete laid 18 feet wide. It is 8 inches thick at the sides and 10½ inches thick at the center or crown, or almost 1 inch thicker than the heaviest type of road laid previously. This extreme thickness has been used on account of the great traffic over the road and the increased traffic of the future, since the route is the main line across the State of New Jersey for motor trucks operating between New York, Philadelphia, Baltimore and other points south. To prevent collisions of vehicles going in opposite directions, as sometimes occur on an 18 foot road when the vehicles happen to be large-capacity motor trucks with extremely wide bodies, a 3-foot macadam shoulder is being laid on each side of the road, thus giving in effect a highway 24 feet wide.

Truck Selection Service

(Continued from page 33)

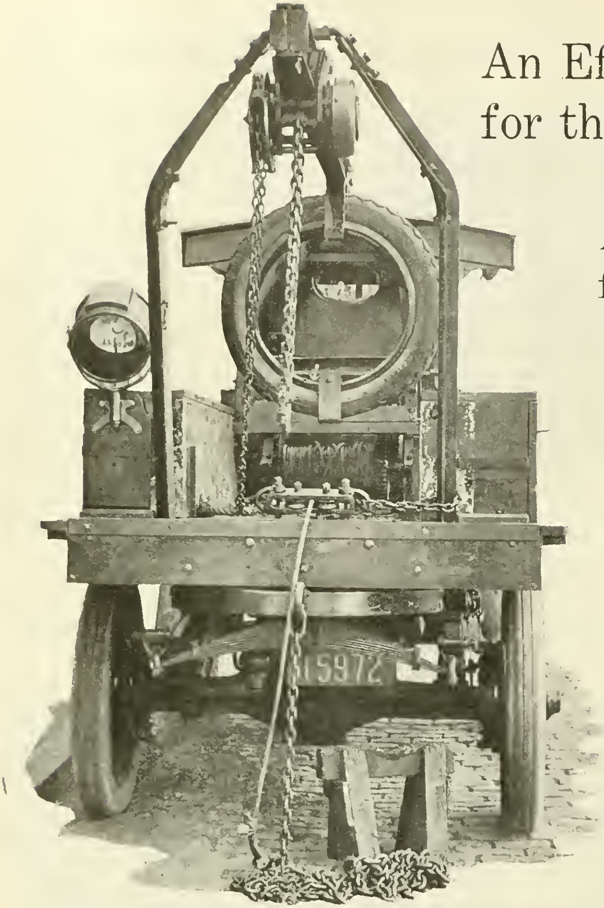
chase the first two trucks of a fleet which will ultimately motorize its vehicular equipment. When Thomas H. See, Commissioner of Public Works of that city, asked for bids on two 2½-ton trucks he received almost a score of proposals to supply such trucks. The claims set forth in these proposals were so conflicting that he was at an entire loss to decide on which trucks to purchase, and admitted he was unqualified to analyze the claims in a proper manner.

He then retained Cornelius T. Myers, a consulting engineer of Detroit and New York, to analyze the score or more bids and to advise him of the truck best suited to the work to be done. The trucks were to be used for street repairs and for the collection of garbage and were to be fitted with wooden bodies with steel linings and Wood hydraulic hoists for dumping. After a study of the work conditions to be imposed and a complete analysis of the various makes of trucks offered, Mr. Myers was able to pick out the three most advantageous bids and to submit these to Commissioner See for final action to the latter's entire satisfaction.

While the case just cited is that of a municipality rather than that of a private owner, the great increase in the number of trucks in use and the great advance which highway transportation has made in the delivery problems in all lines of business seems to forecast a wide field of activity for such consulting engineers in serving concerns whose main business is to manufacture or sell commodities rather than to transport or deliver them.

An Efficient Service Truck for the Large Fleet Owner

Autocar Unit Designed for All Requirements

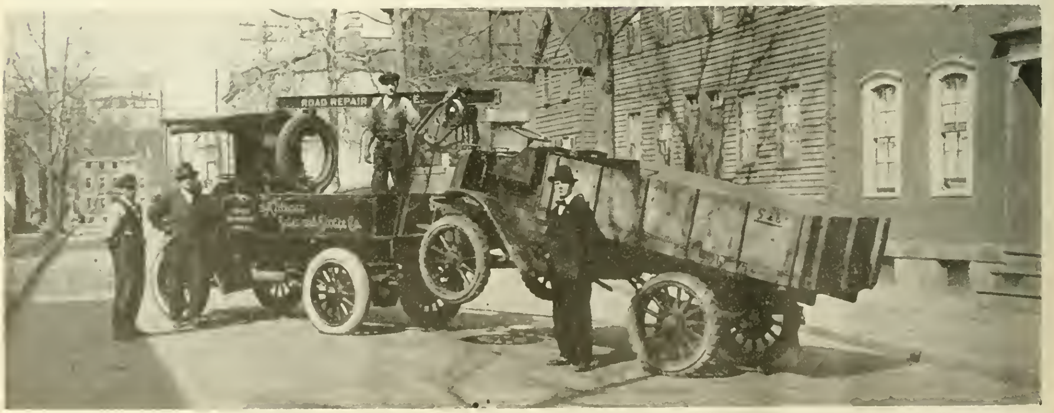


Rear view of the special Autocar service truck, showing A-frame, block and fall, tire holder, winch, tool and spare parts boxes and portable searchlight at left

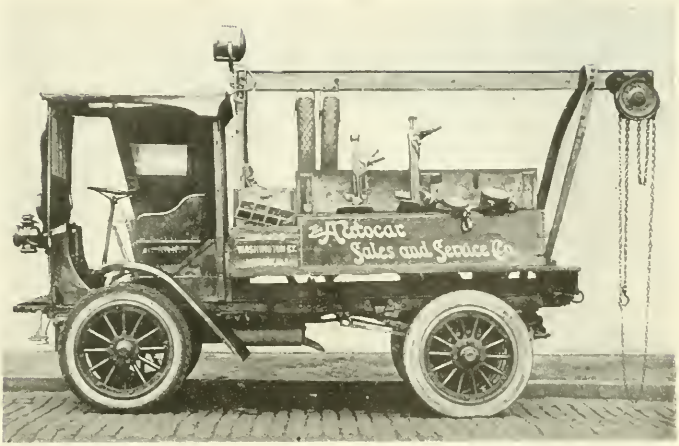
THE service problem from the viewpoint of the fleet owner is daily bringing forth inquiries as to the practical way of handling it. Of course, there are different ways in which it can be solved. There is the large department store, for instance, with its large fleet of trucks to keep up to the highest point of daily delivery efficiency. A number of these department stores have established their own garages throughout the surrounding territory where the trucks are stored and maintained nearer their actual routes instead of at the home garage. This method obviates the necessity of the long home trip every night and permits of better road repair service.

Then there is the brewery fleet owner, who cannot efficiently use the railroads for shipments throughout the surrounding territory, but must rely on his trucks entirely. Should an accident occur when one of these trucks is, say, 40 miles out in the country, it is obvious that there must be some method for quickly correcting the difficulty on the spot, so as to allow the truck to proceed with its work.

Should there be an accident serious enough to incapacitate the truck, such as a broken front axle, the vehicle should be brought back to the repair shop without delay and a substitute truck sent out to take up its delivery work. These problems not only affect the department store and brewery fleet owners, but are pertinent service questions to be solved by all truck owners.



A view of the truck in action, showing how the crane and block and fall is employed to lift the front wheels of a damaged truck off the ground to tow it home for repairs



Left side of truck, showing tire holders and some of the equipment, including jacks and rope block and falls

The subject may be studied from other angles of truck delivery, where there is a large-sized fleet, numbering from ten to seventy-five, and where the delivery zones range from 10 to 100 miles. Under this list are included the motor truck express routes, overland delivery, gasoline and oil delivery, warehouse delivery fleets, etc.

A few good ideas as how to solve the problem may be gained by the service methods of the Autocar Sales and Service Co., Newark, N. J. That service branch covers the north Jersey territory extending from Trenton to the Hudson River.

The company has in operation a number of traveling repair shops, fully equipped to handle most any repair on the roadside, if necessary. They are fitted with a traveling chain hoist, running on an I-beam section which is carried on angle-iron supports at either end of the body. This crane is used for various purposes. First, it enables the quick loading of any heavy spare parts or units into the truck prior to its going on the road for a repair, and likewise the quick unloading or placement of the part or unit into the damaged truck. Second, it can be used to carry a truck back to the repair shop as shown in the accompanying illustration. In this case the truck met with an accident resulting in a broken front axle. The I-beam is equipped with two stops at either end to prevent the chain hoist from running off. Parts and units such as engines, sub-frame assemblies, wheels, etc., are carried by this traveling repairshop.

Other Equipment Carried

Other equipment includes a vise, complete set of tools, block and pulley, two or three jacks of different lifting capacities, two spare tires, a 2-ton winch, nuts and bolts, grease and oil, and a set of small parts. The latter includes spindle bolts, bearings, spark plugs, needle valves, engine valves, piston rings, etc.

The winch is used for pulling stranded trucks out of ditches or fields when there has been an accident by skidding or otherwise. The winch is hand operated and has a double gear reduction. There is no need of backing the truck when pulling another out of a ditch because of the use of a pulley block which takes the strain of the pulling process exerted by the winch. This device is locked at both ends to the angle-iron crane supports by means of two chains. As the pulley is located at the rear end of the body, the truck can remain parallel with the roadside and still take care of the job.

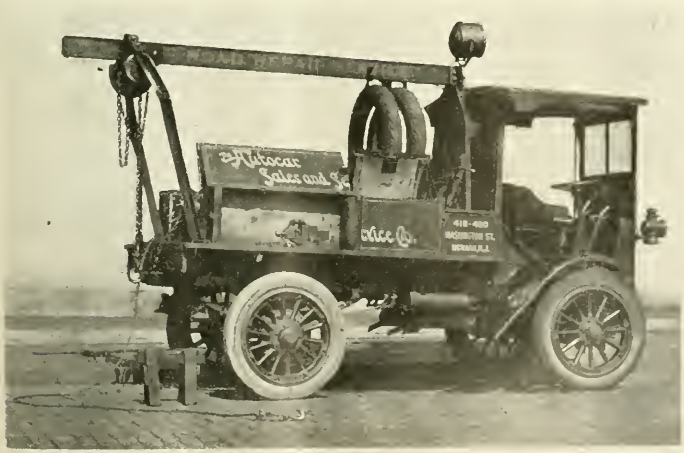
Each of the service trucks carries a small wooden horse which is fitted under the axle of a damaged truck when wheels are being put on. This takes the place of a jack and serves as a more stable support for the truck when on a slanting road.

Special Towing Device

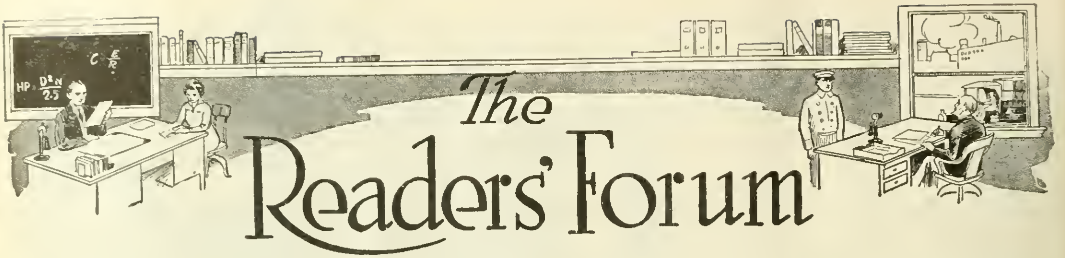
Towing is taken care of by a special device on the rear frame member. This device consists of a bumper arrangement bolted to the side frame members, a hooked bolt, a shock-absorbing spring, and the towing chain, attached to the hooked end of the bolt. The bumper or extension from the frame forms a support at its center for the hooked bolt, which is supported at its other end by the rear frame member. The shock-absorbing spring on the bolt is located between the bumper and the rear frame member. The bolt is locked in back of the rear frame member.

The spare tires are carried at the front end of the body where they are held at the top by means of U-shaped pieces bolted to the I-beam on the lower side, and at the bottom by a cradle and U-shaped pieces, provided with bolts which lock the tires in place on the cradle.

The Autocar company receives many calls for night work out in the country, and as a result each of its repair trucks has been fitted out with an acetylene searchlight, strong enough to enable the repair crew to carry on its work without difficulty. This night service not only includes repairs and unit installations under unfavorable lighting conditions but also pulling out trucks which have been ditched. As shown in the illustration, the searchlight is mounted at the forward end of the I-beam. It can be turned in any direction as it is held in a socket. It can also be swung up or down. The light is quickly demountable and can be used also at the rear of the truck when required. This is accomplished by having the lamp socket attached to a wooden support which will slide into holders fitted on both sides of the rear end of the truck body and on the front end of the I-beam.



Right side of truck, showing vise and parts box, tilted A-frame and searchlight in usual place at the front end of the horizontal I-beam for the block and fall



The Readers' Forum

ROADS AFFECT TRUCK OPERATION

Four Steps Necessary in Establishing Rural Motor Express Routes

To the Editor, COMMERCIAL VEHICLE:

I am writing to you to obtain, if possible, some facts and figures that will shed some light on the advisability of opening up a general motor truck delivery service between St. Joseph and Maryville, Mo., about 45 miles apart, and other adjacent towns, a dozen or more of them between 6 and 15 miles distant. St. Joseph, Mo., is the livestock shipping point for this territory.

This country is thickly populated, is extraordinarily rich in farm products, both stock and grain, and I have had in mind for some time the idea that several trucks of varied load capacities could be operated at a profit.

The dearth of really reliable data has kept me undecided as to whether a proposition of this kind can be made to pay, and one of my garage friends suggested your company as the one publishing house who might be able to throw some light on the subject.—R. F. WADE, Maryville, Mo.

The success of a rural motor truck express, such as you propose, depends principally upon the condition of the roads over which the trucks will have to operate and whether they can be negotiated all the year around.

There are many successful rural motor truck express lines in the United States, but a close study of them will indicate that the ones which are profitable are being operated over improved highways.

The success of the work also depends to some extent on the class of goods hauled and to the production of various crops to give haulage all year around instead of for only a few months. The various questions which you must answer for yourself after a study of your particular conditions were perhaps best expressed in the article entitled "How to Establish Rural Express Routes with Trucks to Haul Fresh Food." That article was published in THE COMMERCIAL VEHICLE for May 1, 1918, and the four steps outlined were as follows:

Steps to Establish Rural Motor Express Routes

1—Lay out map showing the location of towns from which food products may be collected and the condition of the roads over which rural express motor trucks will have to run.

2—Get together county agents, highway officials, and local Food Administrator to determine the amount of food products available, to get unimproved stretches of road made passable for trucks and to find the food needs of the city to which the trucks will haul.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

3—Then have all producers in the area under consideration fill in a questionaire to determine the local conditions, the most satisfactory routes and the names of the local farmers best qualified to operate the rural motor truck express routes.

4—Assist the best qualified farmers to start operating trucks over the routes determined upon, making use of the local Return Loads Bureaus to obtain return loads to the rural districts.

MAKERS OF TIRE PRESSES

New Yorker Wants Names of Dealers in Second-Hand Tire Presses

To the Editor, COMMERCIAL VEHICLE:

Do you know of any concerns who sell second-hand hydraulic presses for applying and removing solid tires?—B. F. GOODRICH RUBBER CO., New York City.

Second-hand tire presses are very scarce. So far as our records show only three concerns manufacture such presses. They are as follows:

Southwark Foundry Co., Philadelphia, Pa.

Wellman-Seaver-Morgan Co., Akron, Ohio.

Excelsior Tool & Machine Co., E. St Louis, Mo.

Perhaps one or all of the above concerns could advise you where second-hand presses can be obtained. If not, you may be able to get the information from one of the following second-hand machinery companies located in New York City:

Graves Machinery Exchange, 50 Church Street.

J. J. McCabe, 149 Broadway.

MacGovern & Co., 114 Liberty Street.

N. Y. Machinery Exchange, 50 Church Street.

F. H. Niles & Co., 233 Broadway.

ROWE SPECIAL BUS TRUCK

White Truck Operated Successfully on 36 Mile-Route for Over 2 Years

To the Editor, COMMERCIAL VEHICLE:

Will you please inform me what would be the best high-speed passenger motor truck bus which would be suitable for a limited stop passenger service running over a route of 80 miles to the round trip. The truck would have to run on a regular schedule and be kept in action 18 hours a day.—J. SELWYN RHODES & Co., Hamilton, Canada.

Regarding a high speed bus service, the instance which comes to mind most readily is that of the United Transportation Co., Inc., Troy, N. Y., which operates a high-speed bus service between Albany, N. Y. and Pittsfield, Mass., a distance of 36 miles over the country roads of the Lebanon Valley.

The truck chassis used is a White 1½-tonner which is priced at $3300 today. The bus body employed was made by the Kingsbury-Leahy Co., Albany, N. Y., and seats twenty-two passengers. The outfit was described on page 33 of the November 15, 1915, issue of THE COMMERCIAL VEHICLE. The average running speed of the bus during a period of 2 years has been about 25 miles an hour. It provides easy riding for its passengers at that speed. It is fitted with pneumatic tires in the front and cushion tires in the rear. The seats are 16 inches in length and 18 inches deep. The distance between the seats is 29 inches, which gives ample space for leg room and for six folding seats, two between each of four permanent crosswise seats.

The only special motor truck chassis designed particularly for high speed work, including the carrying of passengers, of which THE COMMERCIAL VEHICLE has record, is the new 3-ton model recently brought out by the Rowe Motor Truck Co., Lancaster, Pa. That vehicle is fitted with a Hershell-Spillman eight-cylinder engine developing a horsepower of 33.84 and is fitted with giant pneumatic tires 38 x 7 inches in the front and 42 x 9 in the rear. The truck sells at $4500 and was described in greater detail on page 43 of THE COMMERCIAL VEHICLE for January 1, 1919. One of the vehicles is used by L. S. Fortnum, Bridgeboro, N. J., and is employed for transporting munitions workers from Mount Holley to Riverside, N. J., under government contract. The truck has a speed of 25 miles an hour under full load.

COST FIGURES ON FORD MODEL T

Each Truck Installation Cost Differs According to Special Conditions

To the Editor, COMMERCIAL VEHICLE:

Will you kindly furnish us with a table of the cost of operation of a Ford Model T passenger car equipped with a commercial panel body and used for light delivery truck work.—P. G. O., Pinehurst, N. C.

It is impossible to give any set cost of operation for Ford Model T passenger cars without knowing the work in which they will be engaged; the number of miles they will be run daily; the kind of roads they will be operated over, in addition to a multitude of other information, including the cost of the driver; the cost of the helper; the method of garaging, etc.

Each motor truck cost of operation must be determined individually, since the conditions of operation vary to such an extent that the cost of any one item, such as driver or helper or even the cost of garaging may change the total cost of operation to such a degree that the final figure would be of little use if not entirely worthless for any comparative purposes.

However, on pages 8 and 9 of the Oct. 15, 1917, issue of THE COMMERCIAL VEHICLE there was published an authentic yearly cost of operation for six Ford Model T passenger cars as used in the delivery of newspapers by the Buffalo *Evening News*, Buffalo, N. Y. The figures given were for the year ending December 31, 1916, and were put down on the sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks.

A résumé of the figures follows:

OPERATING CHARGES

Gasoline, 3240 gallons at 20 cents	$745.20
Oil, grease, kerosene and waste at 1 cent a mile	336.67
Six drivers	5,204.00
Helpers and mechanics	872.72
Foreman	818.18
Total Operating Charges	$7,976.77

MAINTENANCE CHARGES

Tires	$612.07
Repairs	538.79
Overhauling and painting	109.08
Garage rental, pro rata	818.18
Total Maintenance Charges	$2,078.12

FIXED CHARGES

Insurance, Fire at $7.92 per year per truck	$47.52
Insurance, Liability at $125 per year per truck	750.00
Insurance, Collision at 2 2/5 per cent per year per truck	88.91
Insurance at 6% on investment of $3,704.40	222.26
Depreciation on chassis at 33 1/3%	640.00
Depreciation on body at 33 1/3%	220.00
Depreciation on equipment at 33 1/3%	250.00
Total taxes and licenses	60.00
Total Fixed Charges	$2,278.69
Total Cost Per Year of Six Fords	$12,333.48

INVESTMENT

Cost of six chasses, less tires	$1,920.00
Cost of six bodies	660.00
Cost of six sets of equipment	750.00
Cost of six sets of tires	374.40
Total Cost Complete	$3,704.40

PERFORMANCE RECORD

Days operated	1,878
Days idle	312
Days maintained	2,190
Total hours operated	14,021
Total miles covered	33,667
Total trips made	7,512
Total stops	131,460

PERFORMANCE AVERAGES

Average mile per day per truck maintained	15.37
Average miles per truck per day operated	17.93
Average miles per truck per trip	4.48
Average stops per truck per trip	17.50
Average commercial stop miles per truck per trip	78.40

RECAPITULATION

Total expense for year for six trucks	$12,333.48
Cost per Ford per day operated	6.561
Cost per Ford per day maintained	5.632
Cost per Ford per mile operated	0.369
Total commercial stop-miles for six Fords	588,840.80
Average Cost Per Commercial Stop-Mile	$0.0020

In the above figures, the cost of each item is given separately and if any of the items so given are larger or smaller than would be the case under your operation, you may insert your figures for those given in order to determine your own cost of operation. In any event, all of the items as given should be included in any figures you may calculate yourself. Also note that the figures merely cover the cost of operation and do not include overhead charges such as truck superintendence, office rent, advertising, etc. These latter overhead charges should be added to the actual estimated cost of truck operation after the latter has been determined.

ARTICLES ON GARAGE OPERATION

Model Garages and Those Requiring Reforms Described in C. V.

To the Editor, COMMERCIAL VEHICLE:

I contemplate opening a commercial garage and will greatly appreciate it if you will advise me what are the most improved methods of conducting a commercial garage and what systems of accounts are installed.—W. J. R., Brooklyn, N. Y.

The best system for use in motor truck garages is that published by *Motor World*, 239 West Thirty-ninth Street, New York City.

Articles on the design and operation of motor truck garages have appeared in the following issues of THE COMMERCIAL VEHICLE:

March 15, 1919, pages 16 to 21, describe in full the methods and lay-out of the garage of the Fifth Avenue Coach Co., New York City; that garage is one of the most efficient in existence to-day.

August 1, 1918, pages 21 to 25, and **August 15, 1918**, pages 18 to 21, describe the well-equipped and modern garage of the United States Post Office Department in New York City. Part I of the article in the August 1 issue, tells of the lay-out and equipment used in the garage and Part II, August 15, 1918, issue describes and illustrates in detail the forms used in the garage for keeping records of the cost of maintenance of the trucks.

Dec. 15, 1917, pages 5 to 9, tells of the garage of the Youghiogheny Coal Co., Pittsburgh, Pa., which operates a fleet of trucks for the delivery of coal and maintains its own garage, which has many modern improvements.

During the years 1914 and 1915 THE COMMERCIAL VEHICLE ran a series of articles on motor truck garages. A synopsis of each of these articles is given below:

Sept. 15, 1915, pages 30 to 33, points out the desirability of having a garage properly lighted and ventilated.

June 1, 1915, pages 23 to 27, tells of the Loose-Wiles truck garage in Long Island City, N. Y. It is light, clean and fireproof, with few columns which are exposed. Both gasoline and electric trucks are kept in it.

May 15, 1915, pages 34 to 35, describes the Brown Garage in Des Moines, Iowa. It is one of the largest in that state and is very modern in its equipment and methods.

May 1, 1915, pages 20 to 23, tells of the necessity of having the columns in a garage so placed as not to interfere with the free movement of trucks.

April 15, 1915, pages 5 to 9, tells of the garage run by the Autocar Co. in New York City in connection with its New York salesrooms and service station.

Nov. 1, 1914, pages 22 to 25, describes the garage of the Curtis Publishing Co., Philadelphia, Pa., which has a garage which is well lighted, well drained and without columns to obstruct the easy running of trucks in or out.

Oct. 15, 1914, pages 42 and 43, suggests sunken tanks for the purpose of reducing fire hazard.

Oct. 1, 1914, pages 24 to 28, tells how the model garage and system of the Kaufmann & Baer Co., of Pittsburgh, Pa., have greatly increased the efficiency of their trucks.

Sept. 15, 1914, pages 18 and 19, calls attention to the importance of having heating coils correctly placed.

Sept. 1, 1914, pages 34 and 35, brings out the desirability of having garage floors well graded and drained.

Aug. 15, 1914, pages 22 and 23, points out the good and bad features found in charging plants.

Aug. 1, 1914, pages 26 and 27, tells how special devices will save time and money for the garageman.

July 15, 1914, pages 18 and 19, treats of the danger and illegality of dirty garage floors.

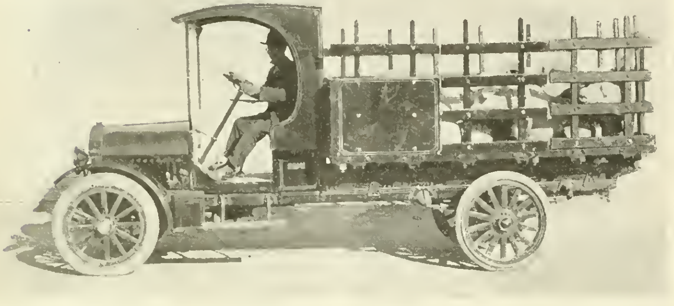
July 1, 1914, pages 5 to 9, is the first of a series of stories on the good and bad points of garages as found by personal observation by one of the representatives of THE COMMERCIAL VEHICLE. This article takes up in brief the faults found, such as old stables used for garaging, poor column arrangements, etc.

May 15, 1914, pages 14 to 17, tells of the electric garage maintained by the Exide Battery Co. in New York City.

April 15, 1914, pages 16 to 22, tells of the garage maintained by the International Motor Co. of New York City.

Feb. 15, 1914, pages 23 to 27, tells of the garage maintained by the General Motors Truck Co. in Detroit for the purpose of giving service not only to owners of GMC trucks but also trucks of other makes. It is one of the biggest truck garages in the country.

Comet Adds a 1½-Ton Worm-Driven Model — Similar in Design to 1-Tonner



New 1½-ton worm-driven Comet truck

COMET SPECIFICATIONS

Capacity, tons	1½
Price	$1,750.00
Wheelbase, in	130
Tires, front	34x4
Tires, rear	34x4
Bore, in	3½
Stroke, in	5
N. A. C. C. hp	19.60
Speed, r.p.m	18.00
Speed, m.p.h	20
Gear ratio in high gear	7.75 to 1
Final drive	Worm

THE Comet Automobile Co., Decatur, Ill., has added a 1½-ton, worm-driven model. This company is a newcomer in the truck field. It brought out its first model, a 1-tonner, late last year. With a few exceptions the new model is little different in construction than the 1-tonner. A Standard rear axle is used instead of the Chicago; the gearset is of the progressive sliding gear type instead of selective; and the driving torque is taken through the springs instead of through a torque arm.

Like its predecessor it is an assembled product, being made up of well-known parts. It is electrically equipped with a Dyneto two-unit starting and lighting system, with a 6-volt, 90-ampere-hour Prest-O-Lite battery. The truck is equipped with a four-cylinder Lycoming engine mounted in a unit powerplant under the hood forward of the dash. The four L-head cylinders are cast in block, with the valves located at the right. The engine is cooled by a thermo-syphon system and the water is circulated through a deep cellular cored radiator which has a cast-iron casing. The radiator is of the Standard Company's manufacture. The engine is lubricated by means of a circulating splash system. Ignition is taken care of by means of the storage battery, the generator, and the Delco distributor. The spark control is controlled by hand.

A Carter carbureter is used and is fed by gravity from a tank mounted under the driver's seat. From the engine the drive is taken through a Borg & Beck dry-plate clutch faced with Raybestos to a Muncie three-speed selective sliding gearset mounted in a unit powerplant with the engine, the gear ratio being 22 to 1 in low, 16 to 1 in second, and 7.75 to 1 in high, with a reverse of 24 to 1.

From the gearset the drive is taken to a Salisbury worm-driven rear axle by means of a hollow propeller shaft with two universal joints made by the Universal Machine Co. The rear axle is mounted on Maremont half-elliptic springs, which take the propulsion and the torque stress. Both sets of brakes are on the rear wheels, the foot and hand brakes both being of the internal expanding type.

The frame is made of pressed steel and is of rigid construction. It is made by Parish & Bingham. Bimel wood wheels with square spokes are used all around. Pneumatic tires are furnished for the front wheels and solid tires for the rears. The steering gear is of the C. & S. Products Co.'s make, and is mounted in vertical position at the left, with the brakes and gearshift levers in the center.

Two electric head lights, tail light, front fenders, runningboards, tools and tool box are furnished.

Famous Adds Two Internal-Gear-Driven Models of 1- and 1½-Ton Capacities

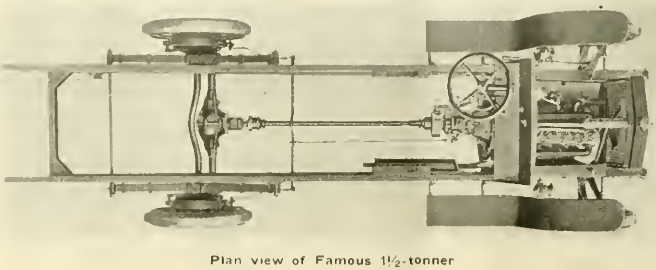
FAMOUS SPECIFICATIONS

Capacity, tons	1	1½
Price	$1,690.00	$2,250.00
Wheelbase, in	120	138
Tires, front	34	36
Tires, rear	3½	4
Bore, in	3½	3¾
Stroke, in	5	5
N. A. C. C. hp	19.60	22.50
Speed, r.p.m	1100	1300
Speed, m.p.h	16	14
Gear ratio in high gear	7 to 1	7 to 1
Final drive	Int.-gear	Int.-gear

TWO internal-gear-driven models, following the same general specifications, are being built by the Famous Trucks, Inc., St. Joseph, Mich. These are 1- and 1½-tonners. The two models differ only in engine sizes, wheelbases and tire sizes. Both are assembled of well-known parts such as Continental engine, Hydraulic frame, Bimel wheels, Chicago radiator, Eisemann magneto, Stromberg carbureter, Monarch governor, Fuller clutch and gearset, Clark rear axle and Columbia front axle, Detroit Steel Products springs, Ross steering gear, and Kinsler-Bennett universal joint.

The trucks are equipped with four-cylinder Continental Red Seal engines, mounted in unit powerplants and suspended at three points. The cylinders are cast in block, with the valves at the right. The engines are cooled by a thermo-syphon system and the water is circulated through a vertical finned tube radiator with cast iron casing. Oil is circulated through the engines by means of a horizontal plunger pump. Ignition is taken care of by a single high tension magneto with fixed spark control.

Fuel is fed to the carbureter by vacuum from a 17½-gal. tank, rigidly secured to the frame under the seat. The governor is of the suction type, controlling the speed of the truck at 18 m.p.h. Propulsion and driving torque are taken through the springs on the Hotchkiss plan. From the engine the drive is taken through the clutch to the three-speed selective sliding gearset. From the gearset the drive is taken to the internal-gear-drive axle by means of a tubular



Plan view of Famous 1½-tonner

one-piece driveshaft with three universal joints. The rear axle is mounted on half-elliptic springs as is the front axle. The front axle is an I-beam forging with the roller bearings on spindles.

The clutch is of the multiple-dry-disk type and the friction surfaces are Raybestos to steel. The gearset is bolted to the engine flywheel housing. Its gears have ⅞-in. faces and are made from nickel steel. The shafts are of chrome nickel steel. The main shaft is of the four-splined type. The reverse idler gear runs on roller bearings.

The emergency brake is external contracting on the rear wheels while the service brake is external contracting on the brake wheel mounted on the driveshaft. The emergency brake has a 16 in. diameter and is 2 in. wide. The diameter of the service brake is 8 in. and the width 2½ in.

The pressed steel frame is of flexible construction. It is 5 in. high and has wide flanges. The length of the frame back of the seat is 8 ft. The maximum length of the body is 9 ft. The maximum width of the body when set down between the wheels is 46 in. outside.

The wheels are wood all around with square spokes. They are mounted with Firestone single solids. Steering is on the left. The steering gear is of the irreversible screw and nut type with provision for adjustment to compensate for wear. The hand wheel is 18 in. wide and the steering arm is of alloy steel.

The gearshift lever and brake lever are mounted on top of the gearset in the center of the truck. The brake and clutch pedals are on an extension of the clutch shaft, on the left side of the transmission housing. The clutch pedal is adjustable. The throttle is operated by an accelerator pedal and hand lever.

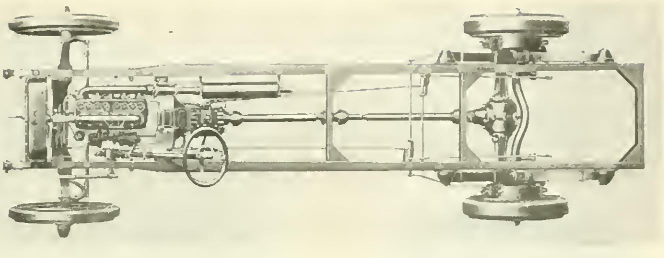
Standard equipment includes a driver's seat, two oil dash lamps, tail lamp, Buell whistle, jack, complete set of tools, front fenders and short running board.

HIGHWAY ENGINEERS' HANDBOOK

THE first edition of the American Highway Engineers' Handbook has been brought out by John Wiley & Sons, publishers, New York City. The editor-in chief, Arthur H. Blanchard, during the preparation of this handbook, had in view a publication of a reference book which would include reliable and comprehensive information on all branches of highway engineering and related subjects which would prove useful to highway officials, contractors, and engineer-salesmen of highway materials and machinery.

This handbook includes the fundamentals of administration and organization of highway departments, financing of highway improvements, grading, drainage, foundations, street cleaning, snow removal and disposal of waste.

It presents the subject of cost data from a conservative standpoint, giving the range of cost of materials and methods of construction under normal and average conditions, and draws attention to the several variables which must be taken into consideration in making estimates of cost and analyzing cost records.



New Transport 2-ton model

Two New 1½ and 2-Ton Transport Trucks —Internal-Gear-Driven

TRANSPORT SPECIFICATIONS

Capacity, tons	1½	2
Price	$1,950.00	$2,585.00
Wheelbase, in.	110	150
Tires, front	36x3½	36x4
Tires, rear	36x5	36x6
Bore, in.	3¾	4⅛
Stroke, in.	5	5¼
N. A. C. C. hp.	22.5	27.20
Speed, r.p.m.	....	....
Speed, m.p.h.	18	15
Gear ratio in high gear	7.6 to 1	8.15 to 1
Final drive	.......Int--gear	

THE Transport Truck Co., Mt. Pleasant, Mich., has added two new internal-gear-driven models, 1½- and 2-tonners, to its line, which also includes a 2½-tonner. The Transport company was organized in the summer of 1918 and got into production around the latter part of the year. Its first model was the 2½-tonner.

Like their predecessor, the two new models follow along conventional lines in design and employ units made by well-known parts makers. They have Continental engines, Eisemann magnetos, Duplex governors, Stromberg carbureters, Fuller clutches and gearsets, Arvac universal joints, Clark internal-gear-drive rear axles, Columbia front axle and Jacox steering gears.

The four-cylinder engines' cylinders are cast in block. The engines are unit powerplants. The oiling system consists of a plunger pump, force feed and splash system. The transmission and clutch are bolted directly to the engine bell housing, forming a unit powerplant, which rides on three-point suspension. Water is circulated through the engine and the radiator by means of a centrifugal pump. The radiator holds over 7 gal. of water and is equipped with a spring cushion and a spirex core. The radiator is cooled by an 18-in. fan which runs on a Hyatt bearing. The radiator case is detachable.

Ignition is taken care of by a single high tension magneto with manual spark control on the steering gear. Fuel is fed to the carbureter by means of gravity from a 20-gal. tank located under the driver's seat. The centrifugal governor on the 1½-ton model holds the truck in high gear down to a maximum speed of 18 m.p.h. or 1180 r.p.m. engine speed. On the 2-tonner the governor holds the speed down to 15 m.p.h. or 1180 r.p.m.

The clutches on both models are of the multiple-dry-disk type with 8-in. diameter and ten faces on the smaller truck and 8-in. diameter and sixteen faces on the larger one. The clutch pilot shaft bearing is of the permanently lubricated type in both sizes. The 1½-tonner is equipped with a three-speed selective gearset, while the 2-tonner has a four-speed selective type.

Power is transmitted to the road wheels, through a jackshaft securely attached to a dead axle, by means of the internal-gear-drive on the rear axle. Drive is from the engine through to the clutch and gearset to the two-piece tubular shaft. The latter carry three 5-in. universal joints and are carried in the middle on SKF ball bearings in an oil-tight bracket bolted to the frame cross member. The rear wheels and jackshafts are mounted on combination roller and ball thrust bearings throughout.

The service brakes are double-acting external contracting and the emergency or hand-operated brakes are double-acting internal expanding. Both brakes on the 1½-tonner operate on 16-in. brake drums and on 16½-in. drums on the 2-tonner. The brake rods on both models are equipped with a special evener and slip yoke, assuring the same pressure on both rear wheels and the positive control, whether loaded or empty.

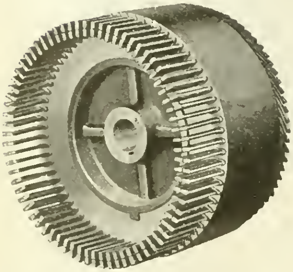
The pressed steel frames are braced with cross members and gussets. All holes are drilled. The length of the 1½-ton truck frame is 200 in. and the width is 34 in. and inswept to 30½ in. between the front wheels. The depth is 5 in. The length of the 2-ton truck frame is 208 in. and the width is 34 in., inswept to 31 in. between the front wheels. The depth of the frame is 5¾ in.

The wheels on the smaller model are of the artillery type, mounted all around with single Goodyear solids. The larger model is equipped with Prudden wood wheels which are also mounted all around with single Goodyear solids.

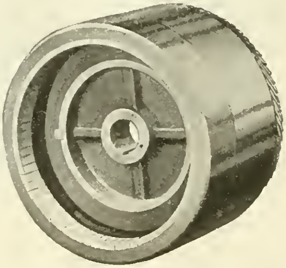
Steering is on the left. The steering gear is of the screw and nut type and adjustable so that it may be taken out from the frame without first taking out the engine.

Dayton Starting and Lighting System for Ford Trucks

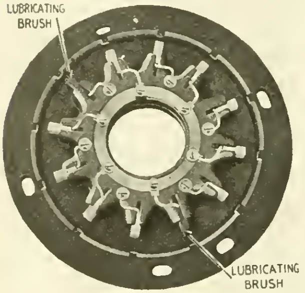
Hauck Battery Repair Outfit—Clark Steel Wheels for Trucks—Columbian Hand Hoist—United Spark Plugs—Toledo Grease Cup



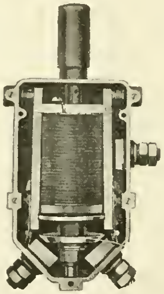
Hairpins shaped to weld on armature of Dayton starting and lighting system



Completed armature of Dayton starting and lighting system



Commutator brush assembly



Starting switch and automatic cut-out

THE Dayton Electrical Mfg. Co., Dayton, Ohio, has brought out an electric starting, lighting and ignition system for Ford cars and trucks. Several novel features are embodied in this system, which was designed by Vincent G. Apple, vice-president and general manager of the company. The outfit is of the single unit type and can be connected directly to the crankshaft because of the new type of armature used. There is no cotton insulated wire used in its construction, the windings being made with flat copper strips cut to length and formed into hairpin loops which are inserted through a score of laminated iron discs. They are then bent into shape by a special machine to make them uniform, leaving the flat ends to weld to the commutator segments. This is done with an electric welder, which makes the commutator a part of the winding. The commutator, as will be seen from the illustration, is of the internal type.

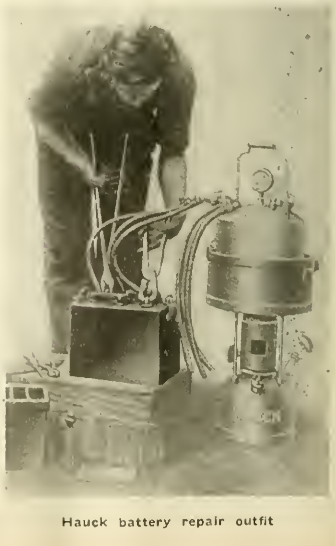
After the armature is assembled, it is impregnated with bakelite and baked, which makes it a solid homogeneous mass impervious to damage by heat, oil or water. This armature can be shaped to fit the frame of any low-voltage dynamo using the same sturdy construction. The field frame of the motor-dynamo is made of semi-steel and has twelve field poles in which the armature rotates to generate the electric current. The armature winding is of the parallel type. Two of the brushes are almost pure graphite for lubricating the commutator, thereby eliminating any necessity of using oil on the commutator. The other ten brushes are made of metal-graphite composition.

The starting switch and automatic cut-out are combined, and this unit is claimed to contain fewer parts than any starting switch and cut-out on the market. It is mounted on the frame of the truck under the heel board and is operated by pushing down on the starter button with the heel. This operation connects the battery in series, giving 12 volts for starting. When the starter button is released, it automatically comes back to the running position and the dynamotor then generates the electric current to recharge the 6-volt battery. This replaces the current which was used by the motor for cranking the engine and lighting the lamps. When the voltage of the dynamo drops below the charging rate, the cut-out in the switch automatically breaks the circuit between the dynamo and battery, so that the battery will not discharge when the truck is running at too low a speed or when the engine is at rest.

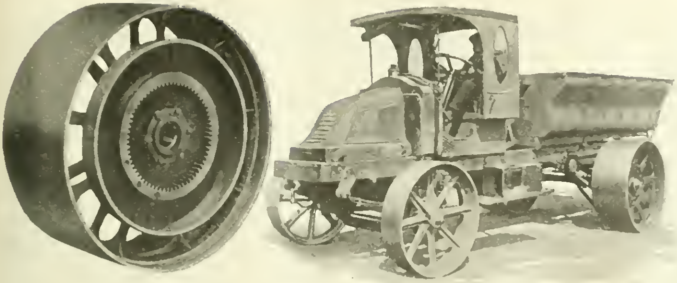
Hauck Battery Repair Outfit

THE Hauck Mfg. Co., Brooklyn, N. Y., is manufacturing a storage battery repair outfit which facilitates the work of removing cell plates from batteries. The complete Hauck repair outfit consists of a six jet steam generator, a 1-gal. kettle for melting wax for resealing, a 35-lb. capacity lead melting pot for reclaiming lead and a lead mould to make lead sticks.

The steam generator produces steam within 7 minutes and plates of a three or six-cell battery can be removed in 5½ minutes. Three of the six jets are controlled by a valve, which is closed when being used on a three-cell battery and opened when all six jets are used. The generator is also fitted with a safety pop valve which blows off pressure at 10 lb. Softening the sealing compound is accomplished by removing the caps of the battery and inserting the jets in each cell. Steam is forced direct into the cells.



Hauck battery repair outfit



Clark Equipment Co.'s steel wheel for trucks used in road building

It is stated that the time required for removing plates is within 4 to 5 minutes. The cost of operation is 3 cents. Grease and other impurities can be steamed and cleaned off the batteries also.

The outfit is operated by kerosene, although when desired gas burners can be furnished. The kerosene heating furnace carries 1½ gal. and is operated by a hand pump. The generator has a capacity of 2½ gal., and is equipped with a gage, safety valve, fittings, manifold and six 20-in. lengths of rubber steam hose.

The generator and fittings costs $40. Equipped with gas burners instead of the kerosene heating furnace, the price is $30.00. The melting kettle for wax costs $2.00 while the melting pot for lead and the lead mold each cost $1.50.

Clark Steel Wheel

THE Clark Equipment Co., Chicago, is now producing a new type of steel wheel for trucks used in road building. In order to obviate the wear and tear on rubber tires used on the sharp uneven surfaces of an uncompleted road, the Clark company has designed a wide band steel rear wheel and a narrower one for the front, which will also aid in the actual construction of the roadbed by firmly packing the surface, while engaged in hauling material.

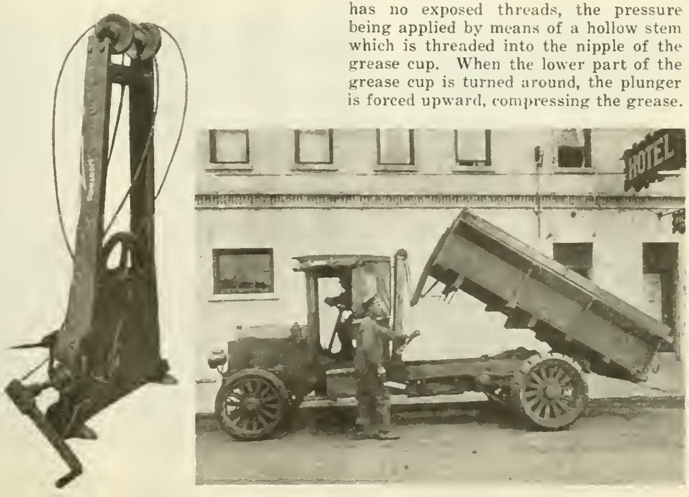
These wheels are built for any make of drive and are interchangeable with standard truck wheels. The wheel is made of cast steel center inserted in a rolled steel rim, making for lightness with strength. The broad tread of the Clark wheels, it is stated, provides ample and positive traction and prevents to a large degree the wheel sinking into soft ground.

In order to pull loaded trailers over heavy grades of ordinary soil, these wheels may be equipped with detachable wheel cleats, in which case the rims may be drilled for their application.

Columbian Hand Hoist

THE Columbian Steel Tank Co., Kansas City, Mo., which makes all-metal dump bodies for trucks, has designed a hand hoist to go with these and other dump bodies. It is so designed that one man can raise a dump body to an angle of from 30 to 50 degrees in less than 2 minutes and will handle with ease loads from 1 to 5 tons. It can be installed on any truck in 15 minutes without need of any drilling into the frame. The hoist is set on the frame and attached with heavy sliding U-bolts, which hold it in a rigid, upright position, so as to withstand vibration and heavy loads.

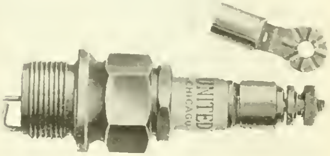
The frame is made of rolled steel. The large gear and the drum are cast in one piece. The pinion is made of bronze. The overlapping coils of rope on the drum are designed to produce a rapid lifting speed with a uniform effort at the crank. As the rope coils in layers upon the drum the diameter becomes larger, the hoist develops more speed and the load is raised faster but with no extra effort on the part of the operator. The hoist is designed on the principle of geared wheels. By a train of spurs and bevel gears the device is so constructed that a load of 5 tons can be easily lifted by one man at the crank. The Columbian hoist occupies but 8 in. of floor space back of the driver's seat and cab.



Columbian hand hoist in operation

United Spark Plug

THE United Manufacturing & Distributing Co., Chicago, is manufacturing a spark plug for truck and tractor engines with a "Lockt" terminal feature which prevents the terminal nut from unscrewing. This is accomplished by alternate depressions and ridges in the cable terminal, corresponding to grooves and ridges in the terminal nut. A spiral spring incased above the porcelain keeps the ribbed top of the plug tight up against the terminal clip. United plugs are made to fit every tractor and truck.



United spark plug and terminal

Toledo grease cup

Toledo Grease Cup

The K-M Mfg. Co., Toledo, Ohio, is producing the Toledo grease cup. This has no exposed threads, the pressure being applied by means of a hollow stem which is threaded into the nipple of the grease cup. When the lower part of the grease cup is turned around, the plunger is forced upward, compressing the grease.

Overhauling: One of the Big 8 of Truck Upkeep

(*Continued from page 30*)

this method a truck which is disabled while on its route is towed to the garage and put into running shape in a few hours when it formerly often took a few days.

Overhauled Every 10,800 Miles

The fleet of 5-ton gasoline trucks operated by C. Feigenspan, Inc., one of the large brewing companies located in Newark, N. J., are brought into the company's shop once each year and practically rebuilt. The trucks average about 900 miles per month, so that each is brought into the shop after it has covered approximately 10,800 miles. During this overhaul period, the motors are torn apart and repaired as good as new before being replaced in the truck. Every part of the chassis is carefully examined and repaired or new parts fitted as required. The overhauling takes from 4 to 6 weeks, including the painting of the body. As soon as one truck leaves the shop, another is brought in, so that the repair work does not seriously interfere with the delivery equipment on the whole. This 4- to 6-week period of truck idleness might seem unduly long, but the Feigenspan company has found that it eliminates many of the annoying delays which are sure to occur if a vehicle is allowed to run until something happens to it. Then, if it is not gone over thoroughly, other symptoms appear which require additional short lay-off periods to remedy, and these in the long run consume more time than one good annual overhauling.

Olin J. Stephens, Inc., is another large retail coal dealer in New York City operating trucks which are completely overhauled and repainted once a year. This overhauling is practically a rebuilding, every part being inspected and new ones fitted if necessary. The motor is removed from the chassis and taken down and made as good as new before it is replaced.

The rebuilding work takes from 3 to 4 weeks, during which time, of course, the truck is out of service. The Stephens company has found that such a course is economical, since very few of its trucks break down during the rush periods, when a truck out of commission would seriously disarrange the whole schedule.

Wood for Concrete Floors

The comfort of the drivers performing repairs must also be considered if the cost is to be reduced. Hard concrete floors do not have enough spring to make them comfortable for the mechanics working day in and day out. Besides, they get very cold in the winter time. Both of these objections have been overcome by the Motor Haulage Co., in its shop through covering the entire shop floor with 2 by 12-inch planks laid on sleepers placed in the concrete, as shown in one of the accompanying illustrations. The same company has also found it economical to card index the spare parts carried in stock so that they may be readily inventoried and as easily taken from stock when required. The Motor Haulage Co. maintains forty-seven 5-ton Pierce-Arrow trucks, for which it carries on hand $12,000 worth of spare parts, enough to build two complete truck chassis.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

Proper Tools Required

The installing of suitable tools and machinery for proper repair work and the movement of parts from place to place in the shop is also required if the cost of doing the work is to be reduced as far as possible. Portable cranes for moving engines and other heavy parts are very desirable, as is also sufficient bench space with vises, emery wheels and other small tools. The cleaning of parts to be repaired is another matter which should be taken into consideration. In one of the accompanying illustrations, a kerosene pressure spray tank, as installed in the garage of the New York Post Office Department has been found most economical. A portable crane is employed to remove the parts to be cleaned to the spray equipment.

A good example of a large fleet owner's repair shop, that of the Peter Doelger Brewing Co., New York City, operating thirty-nine gasoline and electric trucks and fifteen Ford roadsters for salesmen. The shop is light, orderly arranged and equipped with a great many labor-saving devices, such as overhead and portable cranes, lathe, drill press, etc.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher.
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The Commercial Vehicle
Read by Fleet Owners
Vol. XX. July 1, 1919. No. 11

Problems Which the Fleet Owner Doing Overland Haulage Work Must Solve

Study of Proposed Routes First Necessity—Poor Plan to Run Lines Over Unimproved Roads—Business Ability Is Required

THE motor truck owner who wishes to expand his fleet and begin a trucking business over routes leading from a large distributing center to the outlying territory must follow certain well defined steps in order to insure that his efforts will prove successful. In the first place, it is entirely erroneous for the truck owner to attempt to start such a business on the say-so of a truck salesman, who feels certain that because similar lines have proved successful in other parts of the country, the proposed line will also prove successful. The operation of trucks is a business just like any other business insofar that it must be founded upon known conditions rather than assumed conditions.

Study First Necessity

This makes it necessary for the truck owner to make a complete study of the business conditions along the proposed routes. Such a study must not be merely a cursory one, but a thorough one. The truck owner should obtain the names and addresses of all concerns which are possible prospects for the service he has to offer. Knowing these, he should then visit them personally in the first instance and determine the approximate tonnage they would have moving in both directions, provided the truck owner gives the service he proposes.

Such a study will enable the truck owner to determine how many and what size of trucks can be used on any route with a reasonable degree of success and with a sufficient profit to make the line self-sustaining.

The question of roads is a most important one and when competition with the railways, electric trolley lines or boat service is keen, routes should not be started over poor roads unless there is an element of necessity of speed in delivery or other contributing conditions which would warrant an increased rate. Most of the overland haulage lines that have gone out of business have failed either because of poor business management, ignorance of the methods of getting business or attempting to run lines over unimproved highways. Any attempt to run trucks on a definite schedule over unimproved highways is liable to result in a high cost of operation and maintenance which does not result in sufficient profits unless the rate secured is above the normal average.

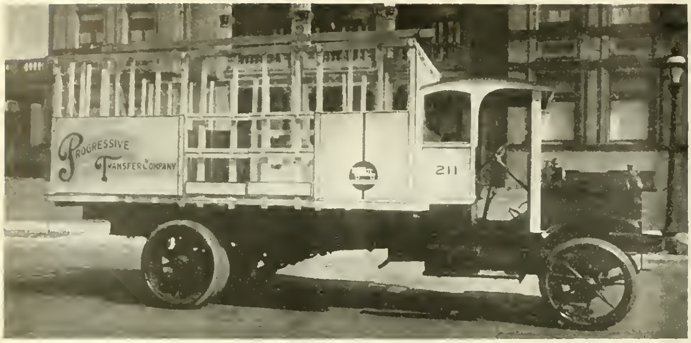
HIGHLIGHTS OF PROGRESSIVE TRANSFER CO.'S METHODS

1—Made complete study of business conditions along proposed routes.
2—Did not start routes where roads were poor.
3—Went after business in businesslike manner by publishing booklets, rate chart and sending out form letters.
4—Determined rates on minimum rather than maximum truck work ability.
5—Made provisions for return loads.
6—Standardized on one make of truck
7—Made drivers own stock in the company in order to retain their interest in the welfare of the company.

Shippers Need Education

The fleet owner should also realize that the great majority of shippers have been moving their goods by means of railways for years past and that considerable argument is required to get some of the old timers to change the methods they have employed for the greater part of their lives.

The truck owner should realize in the first place that the burden of the success of his line rests upon himself, and that he must go out and get his business instead of expecting it to come to him. There are several methods of getting business. These include the personal solicitation method and the writing of form letters or the publication of periodi-



One of the twelve 5-ton Whites recently purchased when the Progressive company standardized on trucks of that make. Note the St. Louis type of rack body employed and that the type of the company name and trade mark are the same as used on the company's letterhead stationery

cal booklets or rate charts enabling the prospective shipper to know just what kind of service the truck owner will offer and how much he will charge for that service. Take, for instance, the case of the Progressive Transfer Co., St. Louis, Mo. That company published and sent to prospective customers a small eight-page 4 by 6 in. booklet in which it outlined the service it would render and gave other information of value to the shipper. One of the early issues of the booklet referred to is shown in the small illustration on page 30 of this magazine.

Tariff Booklet Helped

The company also published a complete local freight tariff booklet similar to that published by railroad companies. In it it gave the classification of the various goods handled in the territory covered and the rates and minimum charges for hauling such goods. This tariff folder was sent to all prospective customers and thereby acquainted them with the service and the charges which the motor truck company offered.

The company also made use of a form letter as shown on page 31 of this issue. All of these methods, coupled with obtaining business by the personal solicitation of prospective shippers, have resulted in the company building up a business with a total weekly tonnage of 1126 on five routes radiating out of St. Louis. As shown in the illustration at the top of page 7, three of the routes extend across the Mississippi River into the State of Illinois, and the other two routes, westward into the State of Missouri. The determination of the routes as shown was made only after a thorough investigation had been completed to indicate the possible tonnage moving between St. Louis and the nearby industrial centers.

Rate Determination Important

The determination of rates is also a most important question, since rates which are too low are certain to result in an insufficient income to allow for the slack periods which occur in all businesses. It is best for the truck owner to determine rates upon minimums rather than upon maximums, since even the best worked-out route does not carry a maximum tonnage for every day of the year. In this respect, the Progressive Transfer Co. worked out two very complete rate charts, one for its 2-ton trucks and another for its 5-tonners. These rate charts, with all of the items by which they were calculated, are shown respectively on pages 30 and 31 of this issue. It is to be noticed that in the case of the 2-ton chart, the average speed of the trucks is taken at 15 miles an hour and that of the 5-tonners at a trifle over 8.5 miles an hour. It will be noticed that sufficient leeway has been furnished in determining the work ability of the two classes of trucks for the loading and unloading time. In the case of the 2-ton truck the time of loading and unloading has been set at 50 minutes per round trip and that of the 5-ton truck at 60 minutes per round trip.

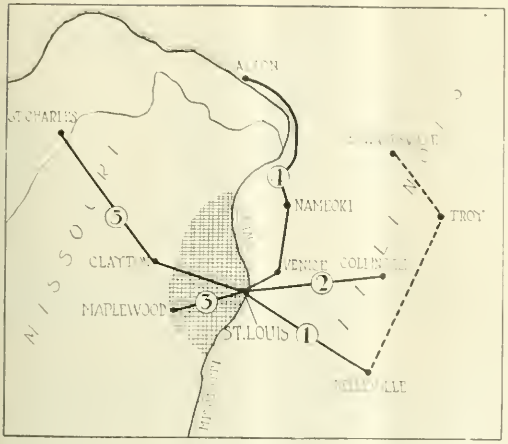
In the operation of such a company as that of the Progressive Transfer Co. the care which the trucks receive is also an important item and has been well worked out by that concern by requiring that every driver take out stock in the company. With this done, it has been unnecessary for the company to bond its drivers. The plan has worked out very successfully and very few losses have been sustained in the way of merchandise or in excessive abuse of the trucks. The general welfare of the company has been greatly promoted by the interest taken in it by the driver stockholders. While the drivers are not bonded, the company carries insurance on its trucks and on the loads carried to prevent losses due to damage or collision beyond the control of the driver.

Another important item which has considerable to do with the success or failure of such a line handling the goods of other concerns are the methods by which records are kept of the goods handled and the charges paid. One of the freight bills used by the Progressive company is reproduced on the top of page 31. That bill is made out in triplicate, one copy going to the drvier, one to the shipper, and the third to the files of the Progressive company. By such a form as that shown, a complete record of the amount of work done daily and by each driver is always available. The file copy enables the company to settle disputes should they arise at the end of the month when bills are rendered to the large shippers.

Forms for Transferred Goods

When goods which are picked up originally by the Progressive Transfer Co. are carried over a portion of one of the routes and then transferred to some other company for their final delivery, a different form of record is used. This is rather a longer form than the freight bill shown and has a heading, "Received in Good Order from the Progressive Transfer Co." All of the goods turned over to the outside transferman for final delivery are written down on such a form which is made in duplicate, one for a

One of the long loading and unloading platforms along the walls of the company's central pick-up station and garage in St. Louis. The office is at the extreme right



The five routes from St. Louis and where they run to. The dotted line is a proposed route which will be started when the roads, at present in very poor condition, are put into proper shape

THE FIVE TRUCK ROUTES AND TONNAGE CARRIED ON EACH

Route No. 1, from St. Louis to Belleville, Ill., serving Belleville, Edgemont and Signal Hill, Ill.	290 Tons
Route No. 2, from St. Louis to Collinsville, serving Collinsville	36 Tons
Route No. 3, from St. Louis to Maplewood, Mo., serving Maplewood, Webster Groves, Richmond Heights, Kirkwood, Tuxedo Park and Valley Park, Mo.	300 Tons
Route No. 4, from St. Louis to Alton, Ill., serving Alton, East Alton, Venice, Madison, Granite City and Mitchell, Oldenburg, Wood River and Nameoki, Ill.	400 Tons
Route No. 5, from St. Louis to St. Charles and Chaminade, Mo., serving St. Charles, Chaminade, University City, Clayton, Overland, Vinita Park, Meridan, Creve Couer and points on the Olive Street Road, St. Louis County	100 Tons
Total Weekly Tonnage	1126 Tons

Résumé of the five routes, giving the cities served and the present weekly tonnage carried on each. It is expected that the tonnage will increase to 500 tons weekly on each route by the end of 1919

record file of the Progressive company and the other for the concern making the final delivery. In each case, the name and number of the truck are always put down on the record so that in case of a claim for damages at a later date the driver who handled the goods may be readily identified.

Another important consideration is the layout of the main depot to enable the route trucks to deposit their loads and pick up new ones in a minimum of time. This has been worked out to good advantage by the Progressive company, which secured a 90 by 127 ft. building, formerly used as a railway depot. The loading platforms were arranged along both sides of the building, leaving the center free for the maneuvering of the incoming and outgoing trucks. When small amounts of goods are shipped, they must be brought by the shipper to the main depot of the Progressive company. This enables the large route trucks to be used on the routes instead of picking up goods in small quantities at various points throughout the city. If, however, the shipper is sending a full truck load, time can be saved by picking it up at the plant of the shipper.

The service offered by the Progressive company has proven very satisfactory and freight consignees in the city of St. Louis, in St. Louis County, and Illinois, points across the Mississippi River, as far as 40 miles from St. Louis, no longer have to wait days or weeks for goods consigned to them, nor do they have to worry about the many troublesome details involved in railroad transportation of their merchandise.

A new inter-city truck motor service has been inaugurated, with St. Louis as a pivot, to relieve the consignee of all fear of the delay in transportation or of loss of his goods.

The Progressive Transfer Co. is now operating interurban motor truck lines as far as Alton, Collinsville and Belleville, Ill., on the east, and as far as St. Charles, Mo., on the west. A big modern freight depot has been opened by the company at 620 South Seventh Street, and from here the trucks start on their cross country journeys five times a day.

The Depot Layout

The building formerly was used as a railroad freight depot, and so is especially adapted for the purpose. It is a two-story building, 90 by 127 ft. The trucks enter and depart through separate driveways, which are bordered their entire length by loading platforms. Loading and unloading are greatly facilitated by these platforms, as they are the same height as the beds of the vehicles.

At present five routes radiate from the depot at St. Louis. One truck line, extending from St. Louis to Belleville, Ill., also serves Edgemont and Signal Hill, Ill. One running from the St. Louis depot to Collinsville, Ill., accommodates all points along that route, but does not extend the entire length of the route first proposed, which would serve Troy and Edwardsville, because of the condition of the roads in that section. When the state improves these highways, which will be in the near future, the proposed route will be used in connecting Troy and Edwardsville, Ill., with St. Louis.

Another truck line operating between St. Louis, Mo., and Alton, Ill., serves Venice, Madison, Granite City and Nameoki, Ill. To the west of St. Louis, a truck line operating between the depot there and Maplewood, Mo., serves Maplewood, Webster Groves, Richmond Heights, Kirkwood, Old Orchard, Tuxedo Park and Valley Park, all thriving municipalities of St. Louis County. The other truck line, connecting the St. Louis depot with St. Charles, Mo., and Chaminade, Mo., serves University City, Clay-

(*Continued on page* 30)

One of the Progressive company's twenty-three White 1½-tonners. It, like the 5-tonners, is equipped with a substantial built-in driver's cab for all the year 'round work

Why It Pays to Uniform Truck Drivers

Clean Trucks Cost Less to Maintain Than Dirty Ones, But Dirty Drivers Do Not Keep Trucks Clean

MOTOR truck fleet owners engaged in all kinds of businesses should seriously consider the uniforming of their drivers. While we are well acquainted with the uniformed drivers of department store vehicles and those engaged in the delivery of food products, such as butter, meats, milk, etc., most of us lose sight of the advantages of uniforming the drivers of trucks handling pig iron, or even garbage.

The story is told of the housewife in a suburban residence community who, with other residents of the district, hired a garbage man at $5 a month to cart away her garbage every day. On one afternoon that housewife had a party of her friends at the house, and in the midst of the festivities who should show up but the garbage man, with a most decrepit-looking wagon, and himself dressed in a filthy shirt and trousers held up by a pair of broken suspenders. Her friends joshed her about the appearance of the man, with the result that the next day she dispensed with his services and hired in his place another man who wore cleaner clothes and used a cleaner vehicle, notwithstanding that the services of the first man were otherwise just as desirable as those of the second.

A Clean Driver Means a Clean Truck

There is a moral in that incident for every fleet owner. The psychology of the driver is a problem which no truck owner should overlook. How can an owner ask a driver to keep his truck clean if the driver is not clean himself? As told in previous issues of THE COMMERCIAL VEHICLE, there are many advantages in having a clean truck. If a truck is kept clean repair bills are less than when it is allowed to remain dirty. Loose parts are discovered and tightened in time; cracks are discovered which would not be found until too late if covered with the muck and mire of dirty roads, and grease and oil, and a driver takes better care of a clean truck than a dirty one. He also does better work with a clean truck, for such is one of the laws of nature.

Uniforming is one of the best and cheapest methods of keeping the driver clean, and with a clean driver the truck is also generally kept clean, with the advantages just mentioned. Uniforms for truck drivers should be practicable, comfortable, neat, cleanable or washable, and not too expensive.

The type of uniform, and the manner in which it is furnished by the company owning the trucks, or bought and owned by the driver, are subjects which must be determined in each individual case, according to the character of the work done by the trucks.

Clean Uniforms Satisfy Customers

As one example of how the driver uniform problem has been solved, the Otto Stahl Co., New York City, which delivers fresh and cooked meat products to customers in New Jersey and Long Island, where long and dusty truck runs are necessary, has found that clean uniforms are required to satisfy its customers. When deliveries were confined to New York City only, or before motor trucks were used, that company equipped all of its drivers with white uniforms. These were changed every day, at the expense of the company. However, that proved too expensive, and as a result blue and brown uniforms became more popular.

When the trucks were installed the drivers formed a union, thus automatically taking over this expense item onto their own shoulders. The blue uniforms were adopted.

Three suits, as shown in the accompanying illustration, are kept on hand by each of the drivers. These cost from $3.50 to $4 each. On the average, they are changed every other day, though no set rule demands this schedule. The drivers operating in New York City find that each suit keeps clean from 3 to 4 days.

In the morning, when the truck is being loaded, the driver wears a soiled uniform during the loading of the meat products onto the truck body. In this way the driver starts out on his route with a clean uniform.

This shows a blue uniform with white stripes. It is made in coat and trousers, is washable and costs from $3.50 to $4. Each driver buys his own uniform and keeps from three to four on hand so that he always has a clean one ready

LIVESTOCK HAULAGE BY MOTOR TRUCKS TO EIGHT IMPORTANT STOCK YARDS DURING THE YEAR 1918

	Cattle		Calves		Sheep		Hogs		Totals	
	Total Drive-ins	Drive-ins by Truck	Total Drive-ins	Drive-ins by Truck	Total Drive-ins	Drive-ins by Truck	Total Drive-ins	Drive-ins by Truck	Total Drive-ins	Drive-ins by Truck
Indianapolis	37,550	9,388	41,479	20,739	26,639	13,319	462,313	346,734	567,981	390,180
Omaha	25,848	12,924	Included in Cattle		44,811	33,600	188,417	169,575	259,076	216,099
Cincinnati	28,691	14,345	31,668	28,601	30,818	27,736	139,972	125,975	231,149	196,651
St. Joseph	11,044	5,522	Included in Cattle		37,137	18,568	121,138	96,910	169,319	121,000
Kansas City	16,572	12,429	14,049	10,539	16,959	12,719	96,337	72,253	143,917	107,940
Ft. Worth	85,739	21,435	58,093	29,047	25,932	12,966	56,886	42,663	226,650	106,111
Louisville	23,760	5,940	9,600	4,800	2,256	1,128	155,748	77,874	191,364	89,742
Peoria	4,791	3,594	5,736	4,302	728	546	98,875	74,156	110,130	82,598
Totals	233,995	85,577	160,625	98,028	185,280	120,582	1,319,686	1,006,140	1,899,586	1,310,327

Fleet Owner Opportunities in Livestock Haulage

Use of Fleets Instead of Individual Trucks Permits Larger Trucks To Be Employed with Special Bodies—Cost to Farmers Also Reduced

THE motor truck owner in the rural territory within 50 to 60 miles of the principal livestock yards of the United States has the opportunity of forming a lucrative business in the exclusive haulage of livestock to those markets. The evolution of such haulage by means of motor trucks during the past few years has been away from the individual use of trucks in such work to the employment of fleets of three to five and even more vehicles. Some companies operating four or five trucks exclusively in hauling livestock are already in operation and there are opportunities for the formation of many others.

There are distinct advantages for the use of fleets rather than the individual truck in such work. When a special business is made of livestock haulage, the truck owner can afford to buy larger trucks to carry a greater number of animals per load and thereby reduce the charge per animal to the farmer. With this reduced cost, the fleet owner can better meet the competition of the individual truck user, since it is more expensive to haul a small number of animals than a large number.

When the livestock haulage is entered into as the sole business of the fleet owner, he can afford to purchase special bodies designed particularly for the work. The individual owner cannot do this because he usually has other work to do which requires a body not so well adapted to hauling a maximum number of animals. One of the special types of bodies designed particularly for hauling cattle is shown in the accompanying illustration. That body differs from the usual type in that the animals are carried crosswise of the body instead of longitudinally. By the special neckpieces provided on the side, the animals are prevented from crowding and from moving in the body while in transit. By the use of skids the animals may be unloaded onto the ground at either side or the rear at yards where special unloading chutes are not provided.

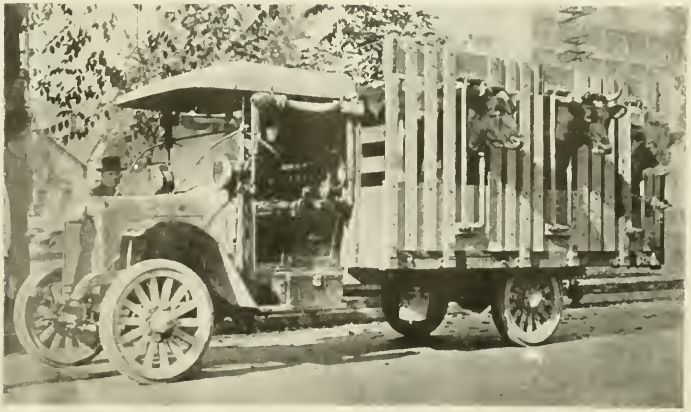
The development of the use of trucks in livestock haulage has been from the small Ford roadster capable of holding two or three small calves or the small two-wheeled trailer holding one cow to the large 2- to 3-ton truck capable of holding from six to eight cattle or thirty calves, sheep or hogs. While most of the roads in the rural communities at the present time do not permit of the use of trucks of over 3-ton capacity during the entire year, even 5-ton trucks may be employed in the near future as soon as our great road building program now outlined is well on the way.

That there is sufficient business for the fleet owner who makes a specialty of hauling livestock is proven by the figures given on the total drive-ins at eight of the principal yards and the total drive-ins by motor truck as shown in the table at the top of this page. It is seen that of the total of 1,899,586 cattle, calves, sheep and hogs driven into the stockyards mentioned during 1918, only 1,310,327 were hauled by motor trucks. This in itself shows an unrealized motor truck opportunity of 589,259 animals, not counting any increase in business during 1919.

There are many advantages in the use of trucks for hauling livestock, as explained in greater detail in THE COMMERCIAL VEHICLE for June 15, 1919. The most important of these are that the truck is cheaper and quicker than rail in most cases. It is cheaper because there is less loss of weight by truck than by rail and the farmer has the additional advantage of getting his stock to market when the price is highest.

The greatest opportunities lie in the haulage of hogs, sheep and calves in the order given. While cattle may be driven in on the hoof for short distances, this cannot be done economically with sheep or hogs in hot or cold weather on account of the excessive shrinkage in weight.

Truing Up Wheels is the first of a new series of tire conservation booklets issued by the Goodyear Tire & Rubber Co., Akron, Ohio. In it is shown the abnormal wear a tire undergoes when run on wheels out of alignment. It also shows how bumping into curbs, hitting bumps in the road, turning out into gutters and similar strains are likely to throw a wheel out of true and how tires run on wheels that are badly out of line travel with a skidding action that wears down treads very rapidly.



One of the newer types of special livestock truck bodies in which the cattle are carried crosswise of the body instead of being crowded in in any manner, as is the usual practice in an ordinary stake body

One of the Big 8 in Truck Operation

5—DEPRECIATION

THE TWO WAYS TO FIGURE DEPRECIATION

1—By the life of the truck in miles
2—By the life of the truck in years

THERE are two ways for the fleet owner to calculate his motor truck depreciation. One is by the estimated life of the truck in miles and the other by the life of the truck in years.

In the early days of motor truck operation, the method of figuring depreciation by years was most generally followed, since the same method was used in calculating the depreciation on other forms of machine equipment. As the use of trucks increased, the method of figuring depreciation at so many cents or fractional cents per mile has gained many adherents because of its more scientific basis. The cost of depreciation per mile is determined by dividing the cost of the truck investment by the number of miles the truck will cover during its use for life.

But even when the depreciation is figured on the mileage basis, it must in turn be reduced to a yearly basis, since depreciation is written off the books of almost every company at a certain period each year.

The Why of Depreciation

The entire question of depreciation is a most difficult one to answer, since there are so many and often undeterminable conditions to be taken into account. To understand the two methods of figuring truck depreciation, it is perhaps best first to consider what depreciation really is and why it must be calculated. If a truck costs $3,000 to buy, it would obviously be wrong to charge the entire amount to the first year's operation, but it is a real part of the cost of motor transportation.

To be more nearly accurate, therefore, an attempt is made to spread this amount over the entire period of the truck's life. Here we encounter the first undeterminable condition, for who can say just what the life of a truck will be?

One truck which is given especially good care, operated by a careful driver, run over city streets with no overloads may last 8 to 10 years. The identical truck when given poor care, operated by a careless driver, run over poor roads with heavy overloads may last only 3 years. Yet the motor truck owner when he purchases his truck must determine in advance how long his truck will last, either by the number of miles or by the number of years before it will become necessary for him to purchase a new vehicle.

Some Excessive Depreciation

Some contractors charge the full amount of the investment to the first year's operation, although this method is hardly reasonable except when the job on which the contractor is working is to be completed within the year and the contractor expects to work the truck for everything he can get out of it during that year without bothering about its efficiency in the year following. Other users estimate the lives of their trucks very conservatively, in some cases setting the estimated life at 1 or 2 years less than the expected life to take care of unforeseen accidents or excessive wear due to abnormal conditions during certain periods of the year. In most cases the life of the truck is assumed to be about 5 years, and when the yearly method of depreciation is employed, 20 per cent of the cost of the truck is written off annually.

Simple Rate of Depreciation Needed

This sum is known as the depreciation charge and consists of a charge to cover the decrease in value which is assumed to have taken place during the year. In point of fact, a motor truck does not depreciate at a uniform rate of 20 per cent per year or any other fixed percentage per year. The first year's depreciation in marketable value is very much more than 20 per cent and in most cases not more than from 50 to 55 per cent of the original truck cost can be secured even after the truck has been run only 1 day because it is then a second-hand or used vehicle, so far as market conditions are concerned. On the other hand, its depreciation in actual value for the work to be done is much less than 20 per cent if the life is assumed to be 5 years, for there is comparatively small depreciation during the first year of the truck's use because of the newness of the vehicle and the advantages secured by the stiffness of the moving part being overcome and worked in during the first few months of the truck's life.

Again, a truck which is properly cared for should and usually does last considerably more than 5 years. The practice of writing off depreciation at a uniform rate, however, is customary and expedient because of its simplicity. Over a period of years it arrives at identical results as would a more scientific but more complicated system of calculation. It is unlikely that any complicated method of figuring depreciation will be properly used by any considerable number of busy motor truck owners.

The Amortization Fund

The depreciation sum thus written off is taken from the earnings of the truck and should be set aside in a fund for the purpose of purchasing a new truck when the old one shall have been scrapped. Theoretically, this sum is each year invested in 6 per cent bonds or other security, but in practice it may remain in the treasury of the fleet owner or be put back into his business. The sum is known as an amortization fund and justifies taking from the treasury a sum equal to the purchase price of the truck to buy a duplicate vehicle at the end of the 5 years' life of the old one. Thus, in reality, there is no new investment, but the original one stands indefinitely, each successive vehicle paying 6 per cent interest on the investment and earning its own amortization.

Keep Repair Costs Separately

Some authorities urge that truck repair costs should be paid out of the depreciation charges and that in a cost system for motor trucks there should not be separate repair and depreciation charges, inasmuch as money spent for repairs is spent to prevent depreciation. This view is erroneous, for while constant repairing will increase the life of a truck indefinitely, the time will come when the main parts of the vehicle have become so worn and every metal part will be so seriously affected by the fatigue of metals that the cost of repairing will mount so high that it will be cheaper to buy a new truck than to attempt to keep the old one in proper running condition. While this time may be assumed to occur at the end of a 5-year period, experience has shown that with proper care this time may be postponed for a much longer period.

It is therefore apparent that any fleet owner must study his own conditions before he can determine upon any given number of years as the life of his vehicle, provided he uses the yearly method of depreciation. He must consider the length of the life of the same or similar types of vehicles operated by other owners in the same line of business and in the same city before he can set an estimated life upon his own truck. He must also take into consideration the kind of care which his truck will receive and the condition of the roads over which it will run. If the vehicle is to be overloaded continuously, its life will be naturally shorter than would otherwise be the case.

The Actual Depreciation Amounts

With the life of the truck thus estimated, the next step is to actually calculate the yearly depreciation in dollars and cents. In this calculation it is customary to figure the depreciation on the cost of the chassis, body and other equipment, but not the tires. For instance, if a 3½-ton truck cost $3,350 in the chassis with tires fitted and with a body costing $250, the amount on which the depreciation should be figured would not be $3,350 plus $250, or $3,600, but would be the cost of the chassis complete with tires, plus body cost, minus the cost of tires. If in the case just mentioned the complete set of tires cost $445.50, the sum on which depreciation would be figured would be $3,600, minus $445.50, or $3,154.50. By this method of calculation it is assumed for the sake of simplicity that the chassis, its body and other equipment fitted to the truck depreciate at the same rate. While this may not be true in all cases, it is perhaps the easiest method to follow because of its simplicity and because of the relative small amount represented by the cost of body and the equipment as compared with the cost of the chassis minus the tires.

The cost of the tires is not included in the total investment of the truck or the sum on which depreciation is figured, because tires depreciate much more rapidly, it even being possible that two or three complete sets of tires may be worn out during one year of truck operation. Since tires are guaranteed for some certain number of miles and sell at some certain fixed cost, the cost of tires per truck mile operated may be determined readily by dividing the cost of the tires by the mileage for which they are guaranteed. If it should happen that the tires do not give the guaranteed mileage, the fleet owner may obtain an adjustment for the mileage which was not secured, so that in any event the cost per mile will be the same.

Explaining this in another way, suppose that a tire was guaranteed for 8000 miles and sold for $100. This would give a cost per mile for that tire of .0125 cent if the full 8000 miles guaranteed were secured. If, however, the tire ran only 6000 miles before it had to be removed or gave three-quarters of the guaranteed mileage, the owner could obtain an adjustment from the tire company of $25 for the one-quarter of the guaranteed mileage which was not secured. This would give a tire cost per mile of $75, divided by 6000 miles, or the same .0125 cent per mile.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined...... April 15
1—Driver .... May 1
2—Tires .... May 15
3—Gasoline .... June 1
4—Overhauling .... June 15
5—Depreciation .... July 1
6—Insurance .... July 15
7—Interest .... August 1
8—Garage .... August 15

The same method of figuring tire costs may be employed when the depreciation is calculated on the estimated life of the truck in miles. When the latter system is employed there is again the undeterminable condition of just how many hundred thousand miles any given motor truck will run before it will have to be broken up for scrap. The life of any truck in miles is dependent on the work which it does and the care which it receives. It is also somewhat dependent upon the size of the truck, since the smaller vehicles more like passenger cars which are operated at higher rates of speed will not give the same number of miles of life as the slower-moving vehicles of larger capacity. Here again the fleet owner must determine in advance some estimated mileage for the life of his truck. Some users calculate that a medium or high-priced truck will last for from 100,000 to 150,000 miles of operation. For instance, Charles D. Heavey, who operates a fleet of 5-ton Pierce-Arrow and Peerless trucks in the contracting business in Philadelphia, estimates the life of his Pierce-Arrows at 150,000 miles. Then again, as told on page 14 of this issue, cost figures compiled by J. E. Picken, transportation engineer for the Federal Motor Truck Co., Detroit, for the Detroit Transportation Association, shows the average life of a 3½-ton truck in the public haulage business in Detroit to be about 100,000 miles.

This life of truck of 100,000 miles seems to be a fairly reasonable one to assume, provided average conditions of care, operation, roads and loading hold true. In some extreme cases the life of a truck may even be as low as 25,000 miles or as high as 150,000 miles. One of the reasons for adopting the mileage basis as the method of figuring depreciation is that it is natural to suppose that a greater mileage will cause a greater depreciation and that it therefore should be equally natural to figure depreciation on the mileage basis. When this basis is used the total sum of the depreciation laid aside during any one year would be obtained by multiplying the number of miles covered in that year by the unit depreciation per mile. The latter figure is obtained by dividing the cost of the chassis, body and equipment, less tires by the assumed life of the vehicle in miles.

Life and Miles Per Day

For the convenience of the fleet owner in determining the relation between the life in years and the miles per day when a total life of truck of 100,000 miles is assumed, the following table has been calculated by dividing 100,000 by 300 for that number of working days in the year and again by the average miles covered each day:

Life of truck in years...	3	4	5	6	7	8	9	10
Miles per day	111	83	67	56	48	42	37	33

Either of the yearly or mileage methods outlined above may be used, although the mileage basis is considered preferable by the majority of truck owners who keep operating costs because of its more scientific method of attainment. The main thing is to be certain that the truck owner has a sum of money with which to buy a new truck at the time when it becomes more economical to throw away the old one than to attempt to keep it in repair. In either method there is the possibility that the life of the truck may be underestimated or overestimated. Of the two evils it is perhaps preferable to underestimate the truck life rather than overestimate it, because in the first case a sufficient sum of money has been laid aside to purchase a new truck at the end of the life of the old one, while in the second case additional money from that laid aside yearly would have to be secured to buy the new vehicle.

While in some instances many truck owners have underestimated the life of their trucks and have completely wiped them off the books several years before they had to be scrapped, such a condition may be avoided by assuming a longer life for any additional vehicles which are to be put into the same work. When the truck outlives its estimated life and is entirely wiped off the books before it is taken out of service, the additional work done by the vehicle is considered a clear profit and is added to the earnings of the particular truck at the time it is scrapped and when the total depreciation or amortization fund is employed to buy a new vehicle to take its place.

Detroit Public Haulage Men Increase Profits by Giving Surplus Work to Associates

Problem of Idle Truck Time Solved by Detroit Transportation Assn. When Real Co-operation Succeeds Cut-Throat Competition

THE Detroit truck and cartage man has recently discovered that in giving his excess business to his less busy fellow truck owner he is able to earn $2 where but $1 was earned before. There are over 100 truck and cartage firms operating 600 trucks in Detroit doing this every day — giving away business — and by doing so they are minimizing operating expenses, doubling profits and have solved the idle truck problem.

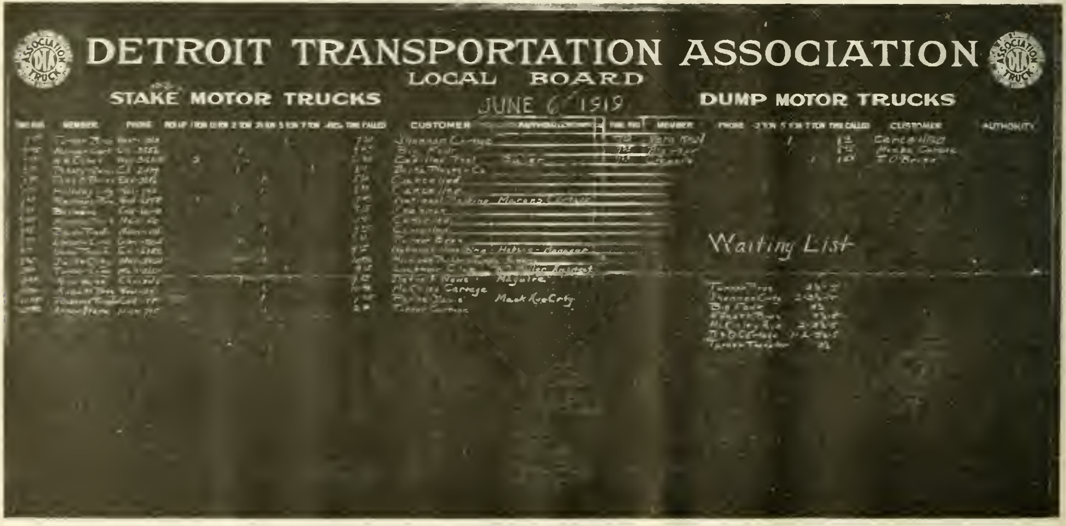
Business reciprocity is the foundation upon which the Detroit Transportation Assn. is built. In the successful application of that policy, the Detroit association stands unique among similar organizations in the country. Although less than 1 year old, it has brought the majority of Detroit trucking and cartage interests together. Instead of the bitter competition of the past with its resultant price cutting and kindred evils, the truckmen are operating as one harmonious group.

Insignia of the Detroit Transportation Assn. It is printed on heavy glazed cardboard and is mounted in the cabs of the members' trucks

Through the club feature, which started as a minor advantage but which is now one of the big departments of the association, the truckmen have come to know each other by their first names. The fact that the heads of two big rival firms had never met each other added bitterness to business competition that vanished when they became better acquainted at a club banquet. Instead of fighting for business, they are now aiding each other in every way possible. They have profited by one of the great axioms of the association which is convincing its members by practical results that there is plenty of business for everyone in Detroit if a systematic and organized effort is made to get it.

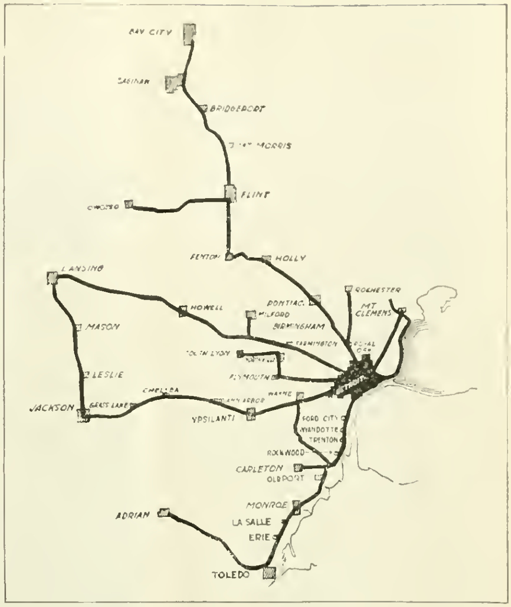
Right at the start the Detroit association has eliminated competition among the trucking interests. The truckmen are not competitors in business but associates in business. Working through their association they are practising business reciprocity and eliminating the idle truck hour; solving the return load problem, partly through reciprocity and partly through the operation of a return load bureau; fighting adverse truck legislation; practising co-operative buying; investigating and studying operating costs; conducting a clearing house for the trucking interests; conducting a free information bureau on all truck and transportation matters; waging war on price cutters and boosting for better pavements and good roads.

Besides the feature of the mutual exchange of business, the local association differs from others inasmuch as it takes in only local cartage and highway transport men, whereas the majority of other associations take in all truck operators. Any man or firm engaged in truck transportation for a living, however, is eligible to membership. The association is maintained by the assessment plan. Active members pay an initiation fee of $25 and monthly dues of $10. The sustaining members, who are non-voting and non-office holding, pay $50 a year. Truck



The large blackboard on which the list of the members with idle trucks is made daily. When an idle truck is given work, the name of the customer is written down on the same line, so that the board gives an up-to-the-minute daily record of the business done. The idle trucks are given work in the order in which they are listed, the first being at the top, etc.

Above is the club or reception room of the association, where members may gather to discuss business problems. On the table is a full assortment of all the motor truck magazines, including The Commercial Vehicle



Twelve motor transport routes aggregating over 500 miles now running in and out of Detroit to nearby industrial centers which previously received all of their goods by rail freight, trolley express or boat, but which now receive a large volume by motor truck

manufacturers, truck dealers and accessory companies are eligible to membership. This is a new feature, and while the sustaining membership at present is not large, it is meeting with the approval of the truck industry and many companies are taking out memberships.

Before going into the details of the association's method of operation, it might be well to outline the things it has already accomplished and the conditions existing in Detroit just prior to the association's organization.

The association has killed a bill in the state legislature limiting trailers to one to each truck and is now putting through a substitute measure which permits of more than one trailer. If the bill had passed it would have radically affected the highway transport work and would have proven a handicap which would have put many motor truck lines in the state out of business.

Eliminated a City Ordinance

It knocked out a city ordinance which also limited trailers and in addition limited the weight of loads and compelled owners to put on a lot of devices like the hind-view mirror and the rear sign signaling device.

It drafted, and the city council passed, a substitute measure in which all objectionable features were removed and otherwise made the new legislation a benefit rather than a detriment.

It threw its entire resources into the recent $50,000,000 good roads campaign, a feature of which was the staging of a good-roads show at the Board of Commerce. The association put on Detroit's first Motor Transport Day, the event being held May 19 for the purpose of awakening Detroit business interests to the realization of economy, reliability, and quick delivery of the Ship-by-Truck idea. Over 1000 motor trucks with fifteen bands were in line and an extensive advertising campaign was conducted.

It has aided in the organization of eleven motor truck lines connecting Detroit with the neighboring cities and it might be stated here that every one of the eleven lines is showing a fair profit.

Prior to the organization of the Detroit Transportation Assn. cartage conditions in Detroit were in bad shape, due to the operation of a great number of disreputable price-slashing cartagemen who were working their trucks for less than the actual cost of operation.

The average truck owner is a notoriously poor businessman, or has been in the past. He very seldom kept a record of operating costs but conducted his business in a slipshod manner; consequently he never figured on depreciation or a sinking fund. When his truck wore out he usually went out of business or, more often, fell down on the payment of his third or fourth note, having purchased his machines for 25 per cent or less down, with 18 months to pay the balance.

A corner of the business office of the Detroit Transportation Assn., which is located in the heart of the downtown business section of the city, where it is easily accessible to the members and also to manufacturers and other shippers requiring service

In August, 1918, representatives of eighteen cartage firms got together and a preliminary organization of the Detroit Transportation Assn. was effected. From the start it required a great deal of missionary work. It was hard to convince the cartage men that their slipshod and price-slashing methods were not only afflicting great injury upon the reputable and established cartage men, but were ultimately putting their own firms out of business. There were many converts to the cause and in less than 3 months the association's membership numbered fifty.

How Idle Trucks Are Eliminated

The Detroit association aims to give its members every service possible. Its two great departments are the study of cost of truck operation and provision of an organization aiming to solve the idle truck hour and the return load problem. The idle truck hour has been practically solved. This is done by a neutral exchange of business among members. In the office of the association there is maintained a large blackboard on which all idle trucks are registered.

For instance, if the Brown Cartage Co. has a 5-ton truck which is not in operation, Mr. Brown will telephone the association to that effect. His truck is then listed on this blackboard. The Jones Cartage Co., on the other hand, may have all of its trucks in operation and receive a hurried call for a 5-ton truck. Mr. Jones telephones the association for help and Mr. Brown is immediately notified that Mr. Jones has work for the idle truck. The association tells him where the load is to be obtained, and when his driver calls for it he notifies the firm. He is pledged to represent the Jones interests instead of his own. Mr. Jones receives no commission for giving Mr. Brown the work, it being purely a matter of business reciprocity. Thus it will be seen that the trucks of both companies are kept in operation and the idle truck hour is eliminated.

Probably no association in the United States has conducted such an extensive investigation into the cost and maintenance problem. Night schools are conducted weekly and are addressed by the transportation engineers of the big truck manufacturing companies. The engineers are asked to come prepared to provide operating cost in detail, and these are presented to the meeting on a large blackboard. The members are invited to criticize. The cartage men are thus instructed in the method of handling not only cost and maintenance problems, but all other problems which they will run up against after their business expands. These problems include accidents, discounts, allowances on disputes, general expenses, incidental expense, office expense, bad accounts, advertising, depreciation on office fixtures and improvements, lost time, compensation, insurance, license matters, and taxes.

After attending one or two sessions many a truck operator was brought to the sharp realization that he has been conducting his business at a loss. He was brought to the realization that the trucking business was not merely the hauling of goods from one point to another as a method of making his living, but that the business was as important and must be looked after with the same care for details as any other business interest. The accompanying figures on the cost, maintenance and operation of a 3½-ton stake truck serve as a fitting illustration of the thoroughness with which the Detroit association is conducting its research work. The figures were compiled by J. E. Picken, transportation engineer for the Federal Motor Truck Co.

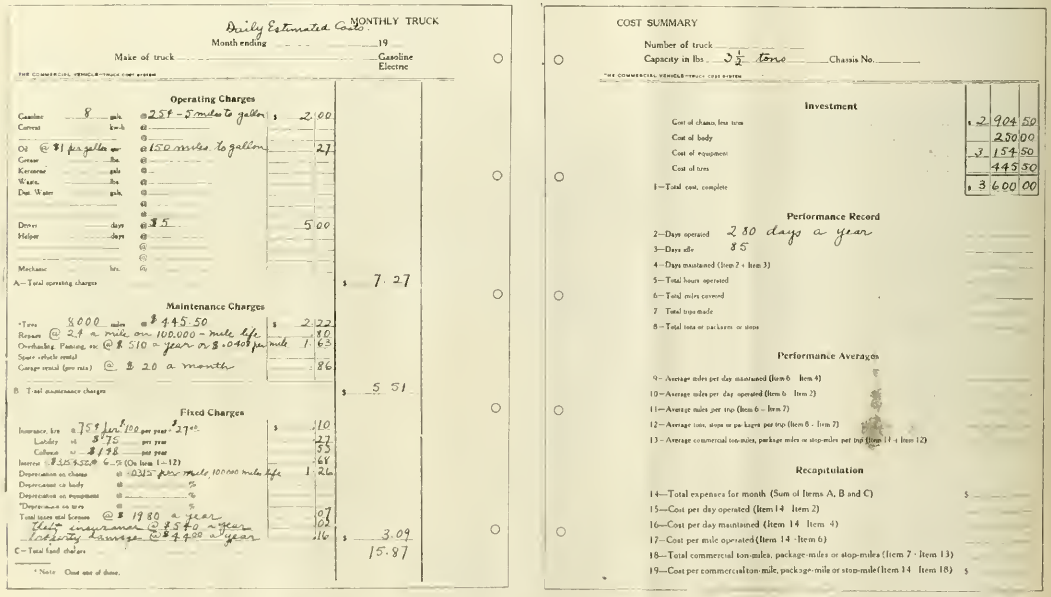
Three Departments for Work

The organization of the association is divided into three main divisions. They are the stake truck division, dump truck division, and highway transport division. Each of these departments holds its individual meetings and all matters regarding the operation of stake, dump and highway transport vehicles are classified under their respective heads and come before their respective departments for debate and settlement.

The highway transport division has been but recently added. It is devoting its efforts toward the promotion of rural express lines out of Detroit. Already eleven companies operating rural express routes are doing business in and out of Detroit and all are members of the association. The work of this division is gradually overshadowing that of the other two departments. In addition to aiding the highway transport men, individual truck owners who carry an occasional load to a neighboring city are assisted in finding a return load.

For instance, if the Brown Cartage Co.

(*Continued on page 25*)



Daily Estimated Costs. MONTHLY TRUCK

Month ending ______ 19__

Make of truck ______ Gasoline Electric

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline	8 gals.	@ 25¢ – 5 miles to gallon	$ 2.00	
Current	kw-h	@		
		@		
Oil @ $1 per gallon		@ 150 miles to gallon	.27	
Grease	lbs.	@		
Kerosene	gals.	@		
Waste	lbs.	@		
Dist. Water	gals.	@		
		@		
		@		
Driver	days	@ $5	5.00	
Helper	days	@		
		@		
		@		
Mechanic	hrs.	@		
A—Total operating charges				$ 7.27

Maintenance Charges

*Tires	8000 miles	@ $445.50	$ 2.22	
Repairs @ 2¢ a mile on 100.000-mile life			.80	
Overhauling, Painting, etc. @ $510 a year or $.0408 per mile			1.63	
Spare vehicle rental				
Garage rental (pro rata) @ $20 a month			.86	
B—Total maintenance charges				$ 5.51

Fixed Charges

Insurance, fire	@ 75¢ per $100 per year = $27.00		$ .10	
Liability	@ $75 per year		.27	
Collision	@ $148 per year		.53	
Interest $3154.50 @ 6% (On Item 1 ÷ 12)			.68	
Depreciation on chassis	@ .0315 per mile, 100,000 miles life		1.26	
Depreciation on body	@	%		
Depreciation on equipment	@	%		
*Depreciation on tires	@	%		
Total taxes and licenses	@ $ 1980 a year		.07	
Theft insurance	@ $5.40 a year		.02	
Property damage	@ $44.00 a year		.16	$ 3.09
C—Total fixed charges				15.87

*Note. Omit one of these.

COST SUMMARY

Number of truck ______

Capacity in lbs. 3½ tons ______ Chassis No. ______

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires	$ 2,904.50
Cost of body	250.00
Cost of equipment	3,154.50
Cost of tires	445.50
1—Total cost, complete	$ 3,600.00

Performance Record

2—Days operated 280 days a year
3—Days idle 85
4—Days maintained (Item 2 + Item 3)
5—Total hours operated
6—Total miles covered
7—Total trips made
8—Total tons or packages or stops

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)
10—Average miles per day operated (Item 6 ÷ Item 2)
11—Average miles per trip (Item 6 ÷ Item 7)
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)
13—Average commercial ton-miles, package miles or stop-miles per trip (Item 11 × Item 12)

Recapitulation

14—Total expenses for month (Sum of Items A, B and C) $
15—Cost per day operated (Item 14 ÷ Item 2)
16—Cost per day maintained (Item 14 ÷ Item 4)
17—Cost per mile operated (Item 14 ÷ Item 6)
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18) $

Average operating costs of a 3½-ton truck in Detroit as worked out for the Detroit Transportation Assn. by J. E. Picken of the Federal Motor Truck Co. The costs are put down on the forms of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks so that the figures will be comparable with other costs previously published in this magazine. The total cost per day of 40 miles is shown at $15.87, exclusive of overhead business charges

Whitewash Your Truck Garage Walls

It Will Make Building Lighter, Help to Keep Floors Clean and Make Repairs Easier — How to Make a Whitewash Machine

An Easy Way of Whitewashing a Garage Wall

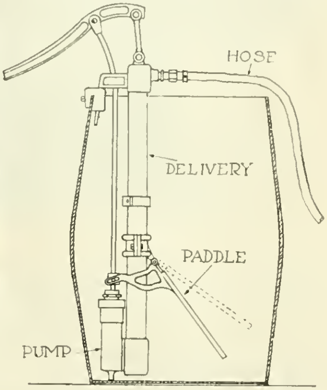
The device is mounted on a four-wheel swivel-castor truck and is pushed around the sides of the walls as the spraying work is in progress. This is a much easier method than the old style pail and brush method, in which much time is wasted in replenishing the pail and dipping the brush. The barrel holds 60 gallons of the whitewash fluid

FLEET owners will find that they can better their lighting facilities as well as improve the looks of the garage by whitewashing the walls. The reflected light from the whitewashed wall adds much to the ordinary lighting facilities. Another point in favor of this method is that it enables quick cleaning of the floors, where oil and grease have collected. When the spray of the whitewash settles on the floor of the garage, it dries into a fine powder, or into its original form of lime. This powdery lime acts the same as it does when placed in or near water. It soaks up the oil and grease accumulation, leaving it in a flaky or caked condition, after which it may be easily scraped off the floor.

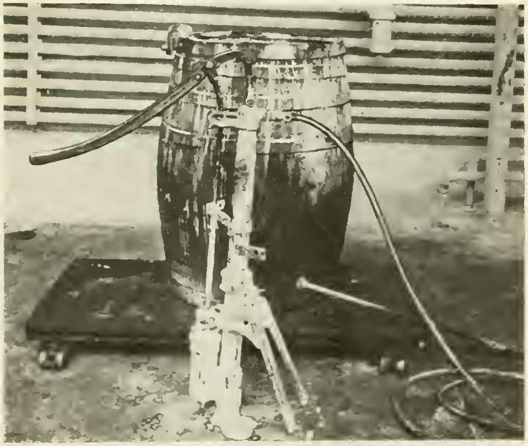
The device consists of a barrel and ordinary hand-operated pump with a rubber hose connection, mounted on a four-wheeled swivel-caster truck. To facilitate handling while spraying, the hose has been clamped to a small iron pipe. At the end of this pipe is a nozzle to break up the fluid into a spray.

The whitewash is a solution of 30 pounds of lime to 55 gallons of water. This solution is forced through the hose by means of a pump, worked by a pivoted handle. The up stroke of the piston in the pump sucks the solution up and the down stroke forces it through the pipe up to the hose. The upward movement of the connecting rod on the piston also sets in motion two paddles which stir up the lime and water so as to keep it thoroughly mixed. The connecting rod passes through a guide, which in turn holds the whole device tight to the side of the barrel. The device is also secured inside the barrel.

The accompanying illustration shows the application of the device in the New York City Autocar Service Station. There it was found that not only were lighting facilities much improved, but the garage in general looked cleaner after each application and it was easier to keep the floor clean.



Cross-sectional view of whitewash barrel, showing how pump is mounted and the position of the paddles



A Tree-Spraying Pump Is Used

All that is needed is a barrel, a pump similar to that used in spraying trees, and a long rubber hose, pipe and nozzle. In the above view the pump is removed from its regular position inside the barrel. The spray of the whitewash settles on the floor where it dries into a powder that is easily swept up

Centralization of Repairs Saves Time, Money and Duplication

Horton Ice Cream Co.'s New Two-Story Garage

This is the main repair station where the overhauling and heavy work are centralized on the seventy-nine trucks and twenty-four passenger cars stored by the Horton company in three separate garages

CENTRALIZATION of its motor truck repair work has worked out most advantageously for the Horton Ice Cream Co., New York City. That company maintains a fleet of seventy-nine trucks and twenty-four passenger cars in three separate garages, two of which are located in New York City, and one in Brooklyn. As a result of its decision to centralize the heavy repair work of its trucks, a new two-story brick and concrete building has been erected at 131st Street and Park Avenue, New York, where everything conducive to the best in truck maintenance has been installed. It has been estimated that it now takes only one-third the time that was required before to repair the Horton trucks at the three separate garages. Everything needed for heavy repairs has been concentrated in one building, instead of in three widely separated places, where machine shop facilities could not be as complete as now on account of the lack of space.

Loading Platform and Ramp Leading to Second Floor of Horton Garage

The entrances to the first and second floors of the garage are adjoining. Both lead directly to the salt and ice house next to the garage

Fewer mechanics are needed, now that they are all working in one place. As a result, the Horton company has gained all around by constructing its new building. There, all inspection and overhauling are in the hands of one person, who is directly responsible for the running condition of the trucks and salesmen's passenger cars. The new garage is also the supply station for all the spare truck parts needed in the three garages.

Before the erection of the new building, the Horton company was forced to do its repair work under conditions less favorable than at present. Though the garages at Twenty-third Street, New York City, and in Brooklyn were large enough for storage and light repairs, there was little space left for machine shop facilities that could take care of the work that is at present being done in the new building.

The new garage was designed for storage and repair work, the latter being of primary importance. It has been the object of the Horton company to locate its garages near its ice cream plants, to save idle or empty vehicle time running between the two buildings. The new garage is but a few blocks away from the up-town ice cream plant. It is planned, however, to build a plant on ground adjoining the garage property, thus carrying out still further its scheme of concentration. At present the ice and salt are kept under one roof in a building adjoining the garage. The loading platforms are large enough to take care of ten trucks at one time. The ice and salt are put into the ice cream barrels by means of chutes extending out over the platforms. There are two entrances from the street, one to the salt bin and one to the loading platform on the other side of the building. Both lead to the garage entrances in the back.

The garage has a 92-ft. front and a 100-ft. depth. There are three entrances, one on the front street and two on the street side, one leading to the first floor and another leading to the second floor. The latter is reached by means of a 10-ft. wide ramp, whose entrance adjoins that on the first floor in the back of the building. The ramp is on an 8-deg. angle and is 50 ft. long. The two rear entrances are the only ones used. On account of the elevation of the land, the first floor was built below the street level. As a result, the front entrance is 3 ft. higher, thus necessitating the use of a short, abrupt ramp from the floor to the street. Trucks using this entrance for an exit were forced to go at high speed in order to surmount this grade. As a result of this speed, it was considered that there was too much liability of injury occurring to pedestrians passing by, so the entrance has been closed.

The Horton Garage Is Well Lighted

The walls and columns are whitewashed, and there is ample window space, together with excellent overhead lighting

Trucks Reach Second Floor by Ramp

This ramp has an 8-degree grade, steep enough to try out brake adjustments and also to start the engines while the trucks are in motion. The entrance to the first floor adjoins the ramp. Provision is made for a second ramp which will lead to a third floor on top of the present ramp

The first floor is used entirely for the storage of trucks used by the 125th Street plant. The vehicles are parked along the walls, there being room enough for forty trucks, as shown in the garage floor plans on pages 18 and 19. Lighting conditions are excellent. The walls and ceiling are whitewashed and the window space is ample. There are six double windows on the street side, six single windows between the rear entrance and the boiler room, and six single windows in the wall facing the entrance. The last six are located off an open alleyway. The boiler room is located in that corner of the garage touched by the street and the entrance to the salt pit. There is a circular stairway leading to the second floor. It is located opposite the doorway leading to the open alleyway. The oil tanks are placed below the ramp, in space that would otherwise be wasted. The gasoline tanks are sunk in the ground near the entrance, with the air vent leading up along the outside of the building to above the roof.

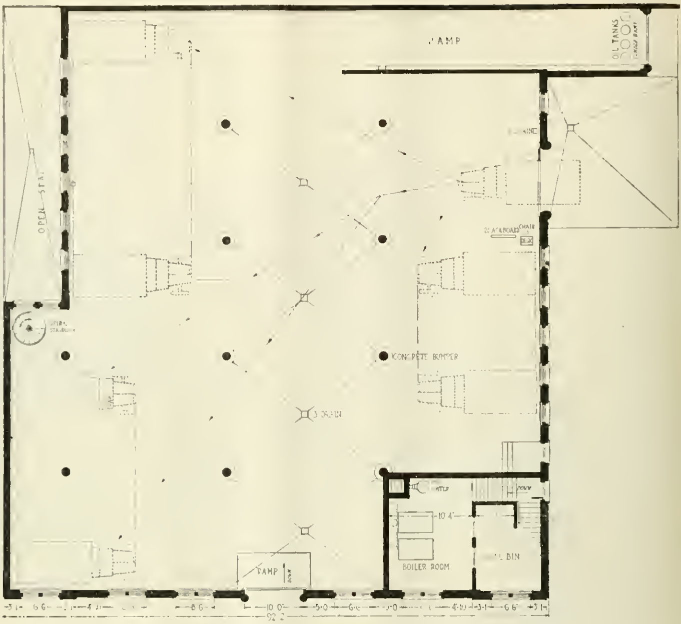
Ten Columns to the Floor

There are ten 1½-ft. diameter columns with 3-ft. concrete protecting bumpers arranged in 16 by 20-ft. squares. The floor slants on the four sides to four drain holes extending from front to rear. These empty into a common drain pipe and are 18½ ft. apart. As a result, the trucks can be washed in any part of the floor.

The second floor is set aside for truck repairs entirely. The equipment is complete and the working conditions are excellent. In addition to ample window space and overhead lighting facilities there are six large skylights equipped with ventilators, opened or closed by the pulling of a chain. The benches are located along the entrance and front sides in front of the windows. The machine shop is also placed near the windows and the repair bench at the entrance side of the garage. The superintendent's office, running supply department and coat room are partitioned off between the machine shop and the washroom, which is directly above the boiler room. The washroom is also equipped with a shower bath.

The main stockroom, which is 40 ft. long and 10 ft. wide, is located on the opposite side of the garage. It runs from the front to the circular stairway and is separated from the garage by means of a firebrick wall. It is lighted by means of a single window at the front and overhead electric lights. It has a fireproof sliding door entrance. There, all tires and parts are kept on shelves which run the length of the room on both walls. This department contains nearly everything that may be needed by the three garages, such as bolts and nuts, tools, tires, parts, etc. The running supply department, mentioned above, is equipped only with tools, spark plugs, rags and other things that are called for daily.

The machine shop equipment consists of a shaper, hack saw, arbor press, two lathes, a drill press and an emery wheel, all power-driven. There are also a portable crane and three engine stands.

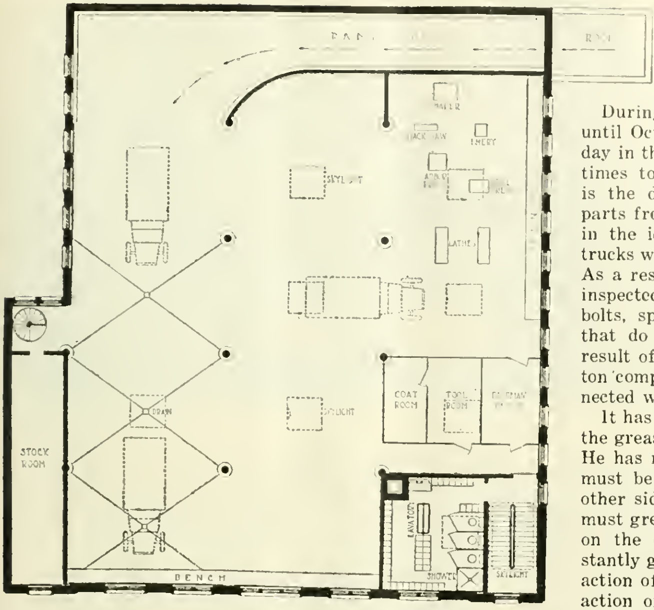


The First Floor Is Used for Storage Only

Only one entrance and exit is used, the second one leading directly to the street having been found impractical on account of the short abrupt angle to the ramp used there. The trucks are washed nightly without being moved from their specified places. This is accomplished by means of a slanting floor which leads to four main drains in the center

The Horton Trucks Are Parked Near the Repair Benches

Much time and labor are saved thereby. The lighting facilities are also better, and inspection and repairing of trucks are made easier on account of the favorable conditions



The Repair Shop Is Well Laid Out

The benches are arranged along the window space and the machine shop is located so as to receive the best of lighting facilities. The stockroom, the laboratory, shower bath, coatroom, toolroom, and foreman's office are also located on the second floor, where most of the work in the Horton garage is done during the day

On account of the peculiar conditions under which the trucks are operated, which includes the carrying of salt and ice, the care and period inspection of the vehicles are most rigid.

During the rush season, which lasts from May until October, the trucks are on their routes every day in the week. They are usually overloaded, sometimes to the extreme. Added to these conditions is the danger of corrosion of the various truck parts from the salt spray, caused by the melting ice in the ice cream barrels. It is stated that these trucks when in motion are constantly in a salt spray. As a result, all parts that do not rotate have to be inspected carefully each day for corrsion. Spring bolts, springs, steering gear, axles and all joints that do not rotate receive rigid scrutiny. As a result of its experience in previous years, the Horton company practically solved all the troubles connected with salt spray.

It has appointed one man to take entire charge of the greasing of the trucks. That is all he has to do. He has received instructions that every grease cup must be turned until the grease oozes out on the other side, thus insuring complete lubrication. He must grease the springs, between the leaves and also on the outside. The spring clips are kept constantly greased so as to prevent "freezing" from the action of the salt spray. As a result of the acidity action of salt water, the truck bodies are painted once a year. The greaser is paid at the rate of $26 a week because of the importance of his work.

Following out its scheme for complete lubrication of the outside chassis units, the company has installed the same rigid rule for the lubrication of the engines. Each driver is given complete charge of the oiling of his own engine. As a result, there is no excuse for burned-out bearings, etc. As an

There Is Room for Over Forty Trucks in the Horton Garage

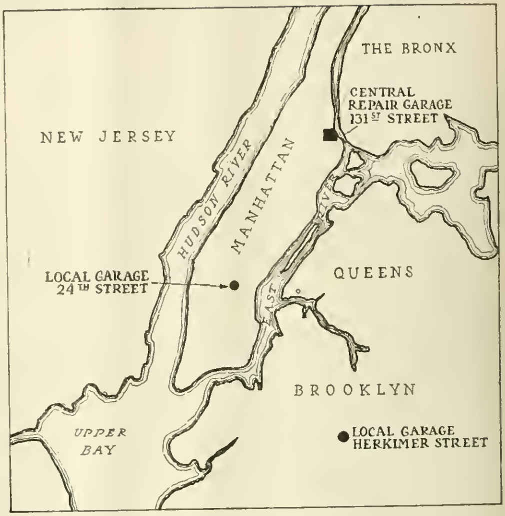
The first floor is used entirely for storage purposes. The cars are parked around the side walls so as to leave an open alleyway for quick exit in the morning when the trucks go on their routes. Each column has a concrete bumper at its base and is equipped with an electric light socket so as to facilitate inspection of the trucks at night added precaution, each truck is equipped with a 1-gallon can of oil for emergencies. This is carried in the tool chest on the runningboard. Before this system was installed, the drivers would buy any needed oil at other garages, making it hard to keep the books in good condition. Then again, occasional dishonesty in the matter of purchases would crop up. Now, there is no chance for outside purchases. As each operator is also a salesman, it is of advantage to him to see that his truck is kept on the route. Therefore he is always alert to any pending troubles to his truck.

At the end of the day he fills out a daily report card in which he notes the loads carried, the amount of gasoline, oil and grease taken, the total mileage, and all stops not included in the regular route, or stops due to any troubles.

On account of the various sizes and types of vehicles used, the Horton trucks are not maintained under one schedule. They are segregated according to their load capacities and types, and maintenance schedules are adapted for each individual type.

The Fleet Makeup

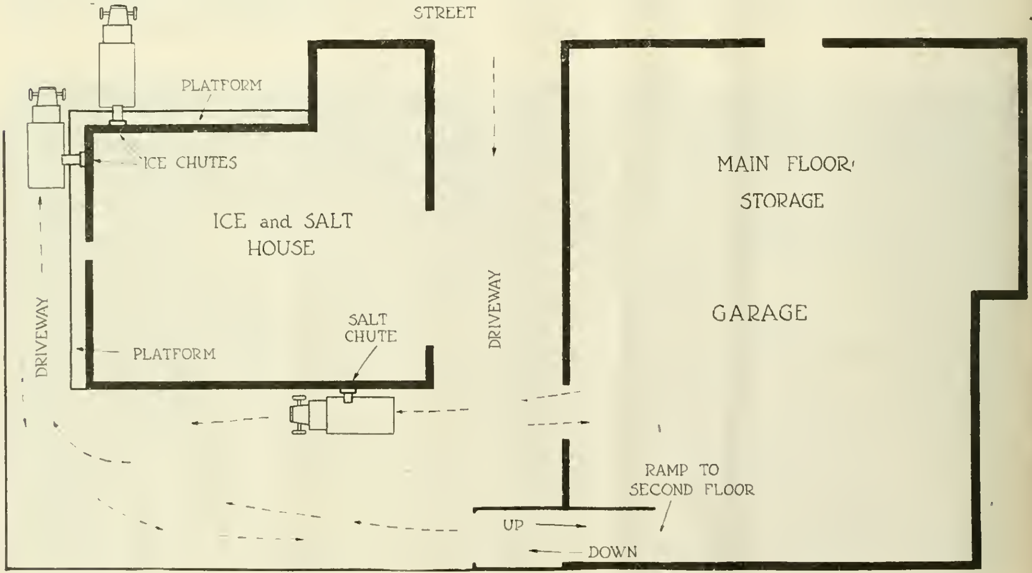
The fleet makeup consists of thirty-one 5-ton Pierce-Arrows; sixteen 2-ton Autocars; one 3-ton Federal; one 2-ton Chase; ten 1-ton Hudfords; one 5-ton Diamond-T; one 3-ton Packard; ten 2-ton Macks; two 5-ton G. V. electrics; two 5-ton Walker and two 2-ton Walker electrics; one 2-ton Reo, and one 1-ton Studebaker. The 1 and 2-ton vehicles are under a daily inspection and repair system, while the larger trucks are inspected thoroughly every 3 weeks. The electrics are stored and kept in repair at the Exide public garage.



Location of Horton Garages

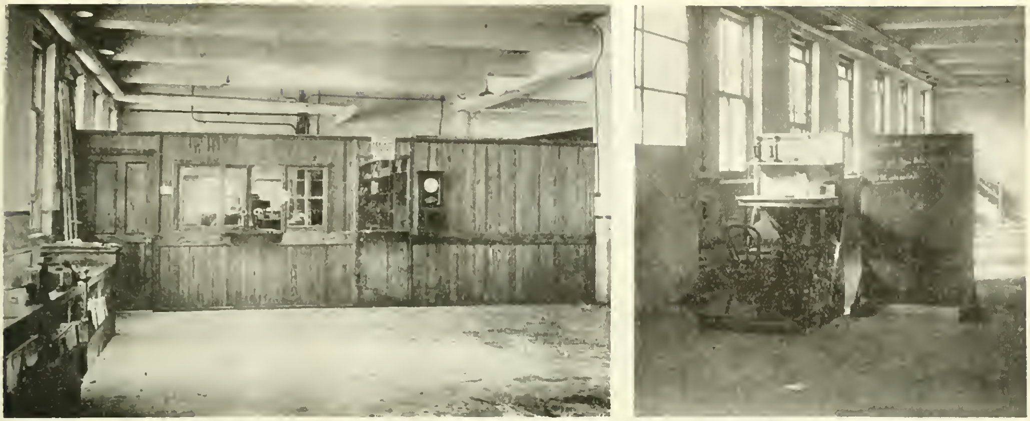
Two are in New York City and one is in Brooklyn. The main repair station is a little over 5 miles away from the Twenty-fourth Street garage and about 10 miles from the other one

The annual overhauling starts in October and lasts until May. During the summer, when the trucks are busy every day, there is little chance of any heavy overhauling, except on special occasions. The trucks are com-



Plan Showing Ice and Salt House in Relation to Horton Garage

There are two entrances from the street, one leading to the salt bins, directly across from the garage, the other leading to the ice house and loading platforms. The trucks, after leaving the garage, stop at the ice chute and then pass on to the ice loading chutes. The loading platform on the street side is used only for unloading ice



Two Ways of Keeping Cost Records

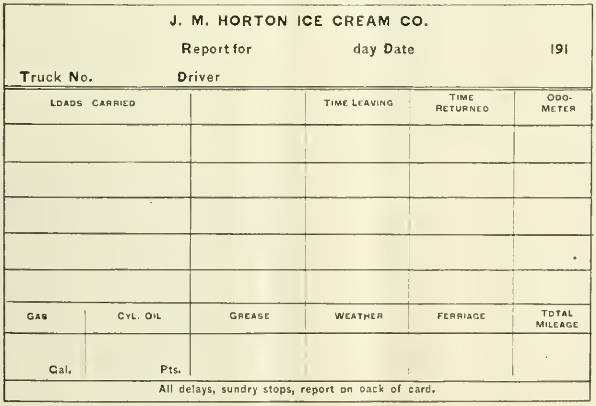
The illustration at the left shows the superintendent's office next to the machine shop, where accurate records are kept on the amount of work done in that department. All tools and other parts needed each day in the machine shop are kept in a small room next to the office and convenient to the repairmen. The illustration at the right shows the checker's desk and blackboard located on the first floor. All incoming and outgoing trucks are checked up on the garage record book, and consumption of fuel, oil, etc., is also noted. The drivers make all suggestions for repairs on the blackboard

pletely torn down and the bodies painted. All body work is done by companies specializing in that work.

The foreman goes carefully over the drivers' reports each day and notes the oil and gasoline taken by each truck. These are compared with former records, and if any marked changes in oil or gasoline consumption occur, the matter is looked into at once to determine the reasons.

Each of the garages on Twenty-third Street and in Brooklyn has two mechanics. All small adjustments, etc., are taken care of there. The new and main repair station has four mechanics, four handy men, two washers and a greaser. All repair work is done during the day and washing and greasing at night.

The Horton company has looked ahead to the future by making provision for a third floor to its garage. This will be reached by another ramp, which will be built on top of the present one.



J. M. HORTON ICE CREAM CO.

Report for day Date 191

Truck No. Driver

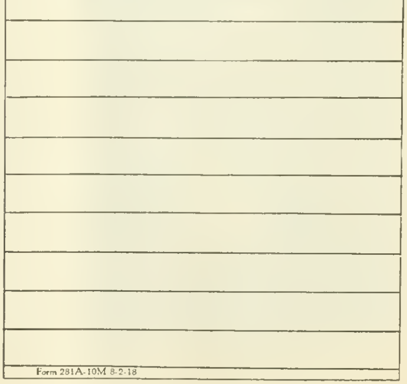
LOADS CARRIED		TIME LEAVING	TIME RETURNED	ODOMETER

GAS	CYL. OIL	GREASE	WEATHER	FERRIAGE	TOTAL MILEAGE
Gal.	Pts.				

All delays, sundry stops, report on back of card.

Daily Report Card of Horton Drivers

This report includes the loads carried; the starting and ending times; odometer reading; gasoline, oil and grease consumption; weather conditions; ferriage; total mileage, and all stops not included in the regular route. The weather item is for the purpose of watching ice cream sales under varied conditions



All stops not included in regular route, or stops due to Machinery, wheel or tire trouble, report fully here.

Form 281A-10M 8-2-18

Factors Which Should Be Considered in Measuring Motor Truck Ability

Performance on High Gear No Criterion—Intermediate Speed Efficiency More Important—A Discussion of the Subject by the S. A. E.

PERFORMANCE on high or third or fourth gear is no true test of motor-truck ability, according to L. P. Kalp, assistant supervisor of engineering for the Standard Parts Co., Cleveland, Ohio, who presented a paper entitled "The Relation of Motor Truck Ability to the Trend of Design," at the truck session of the summer meeting of the Society of Automotive Engineers, held on Tuesday, June 24, at the Ottawa Beach Hotel, Ottawa Beach, Mich. The same contention was upheld by H. L. Horning, chief engineer of the Waukesha Engine Co., who told of a test made by his company which conclusively proved that the real measure of truck ability was its performance in first and second speed work.

The test was made with a 5-ton truck overloaded to 8 tons in order to approximate the actual conditions under which some short-sighted fleet owners operate their trucks. The course over which the test was made was 16.8 miles in length, and was made up of all kinds of roads, including good macadam, ordinary dirt road, a few miles of concrete, and one hill ½ mile long, on which the maximum grade was 9 per cent. There were also 2 miles of crushed stone. The truck engine used in the truck was one of the older models produced by the Waukesha company in order to determine just what economies might be effected by changing its accessories and the method of handling the fuel to the cylinders.

Economies Effected by Test

On the first trip the engine was run without any changes to give the average conditions under the big overload noted. On the first trip of 16.8 miles 8 gal. of gasoline were consumed. Then another trip was made with a slight carbureter adjustment, and the gasoline consumed reduced only slightly. Two more gallons were cut off, making the total consumption on the third trip 7 gal., when the vacuum fuel-feed system was disconnected and the gasoline fed by gravity.

Heating Gas Reduces Consumption

After the vacuum system had been replaced by the gravity feed a combination heat manifold was fitted and the gasoline consumption cut to 5.5 gal. While the use of the heated gas apparently would reduce the horsepower approximately 25 per cent because of the loss in the amount of hot gas fuel fed to the cylinders as compared to the greater weight of the cold fuel, no such loss in horsepower was detected, and, in fact, the engine appeared to have more rather than less horsepower. The gasoline was still further reduced on a subsequent trip by reducing the engine compression slightly, so that the final and lowest gasoline consumption was 5.06 gal., or 5 gal. and ½ pint. This reduction from 8 gal. to the 5.06 gal. was made on the average present-day engine, and is to be interpreted by the fleet owner as the manner in which he can save money by doing the very same thing.

HIGH LIGHTS OF THE S.A.E. TRUCK DISCUSSION

1—Performance on second, third and fourth speed gears is real test of motor truck ability.

2—Pneumatic - tired motor trucks should be designed particularly for the use of such tires.

3—Trucks designed for use with solid tires will not give the maximum ability when fitted with pneumatics.

4—When solid - tired trucks are fitted with pneumatics, larger engines are needed to give the additional speed made possible by the use of pneumatics.

5—Two - ton pneumatic - tired trucks operated by the Goodyear Tire & Rubber Co. have given good results when fitted with engines usually employed on 3½-ton trucks. The 2-ton trucks thus equipped have carried 3½-ton loads with satisfaction.

6—While higher in first cost, metal wheels for the larger sized trucks may prove real economy because of long life.

7—Present truck engines must be changed or otherwise modified to burn present-day fuels to secure maximum ability.

Good Results with Kerosene

Going a step farther, the same truck with the same load was run over the same route and kerosene used instead of gasoline. The engine compression was reduced to 60 pounds per square inch and the heated manifold retained and, strange to say, the truck performed almost as well on kerosene as it did on gasoline, the final kerosene consumption being 5.12 gallons or 5 gallons 1 pint.

As to ability, the test showed that while the truck was governed to a speed of 18 miles per hour maximum, the greatest speed attained was only 16 miles and the average speed during all the tests between 5½ and 8 miles an hour. Under such conditions, it is apparent that the fleet owner cannot expect to secure the greatest work ability from a truck designed to give the maximum ability on high gear at speeds between 16 miles and 18 miles an hour when under the average conditions of use, the truck runs a greater portion of the day at speeds corresponding with the first and second speed gear work. In other words, the wise fleet owner will select a truck for its ability on first and second speed running rather than on high or third or fourth speed when the truck happens to be fitted with a four-speed gearset.

Ability Judged on Low Speeds

This judging of the work ability of a truck by its performance on the lower speeds is most important, as was pointed out in greater detail by Mr. Kalb. Ability in a truck costs money. As the ability of the truck is increased, the cost per commercial ton-mile is also increased. But under present road conditions where truck ability may mean the difference between a profit and a loss, truck ability is a desirable object, even though it does cost more than a lower ability. High gear ability, which is not so desirable because the trucks do not run at speeds corresponding with the high gear work, may be reduced in favor of low-gear ability by the use of four instead of three speed gearsets having an extreme low gear ability sufficient to climb any grade or pull through any hole where the tires can secure sufficient adhesion on the road surface.

The fuel problem affects the truck ability, other things being equal, and may be increased in one of two ways. It may be increased first, by reducing the amount of fuel burned to the amount of work done, and second, by increasing the ability of the engine to burn lower grade fuels.

Pneumatics Widen Truck Field

Mr. Kalb also took up the question of the use of pneumatic instead of solid tires, and pointed out that the great variance in the conditions of speed and load set up by the two classes of tires required that the employment of such tires made it necessary that the trucks be designed separately and distinctly for the two classes of service. When the speed of a truck is increased from 12 to 25 miles an hour, the problem of wind resistance with the large truck bodies assumed considerable importance and required that the power of the truck engine on the pneumatic-tired truck be increased approximately 1/100.

LEWIS P. KALB
Assistant Supervisor of Engineering, Standard Parts Co., Cleveland

B. B. BACHMAN
Chief Engineer, The Autocar Co., Ardmore, Pa.

While wind resistance is more important on trucks with pneumatic tires than those with solids, the big majority of solid-tired trucks in use indicates that, for the moment at least, truck ability may be gauged and determined by a consideration of but two factors, road resistance and gravity. Performance can therefore be measured simply by their ability to overcome these two forms of resistance. Both road and grade resistance are in direct proportion to the weight carried and can be expressed in unit terms, such as pounds per pound and pounds per ton of total load.

If the tractive force which the driving wheels of a truck are capable of exerting be expressed in the same terms, it then becomes a simple matter to compare the resistance to be overcome with the force available for doing it. This unit tractive force is, therefore, the best index of the ability of the motor truck.

Mr. Kalb called attention to the incorrectness of the idea held by some truck owners that a truck's ability is affected by the location of the driving wheels and the distribution of the load. The fact is, that it makes no difference whether the drive be through the front wheels, rear wheels or all four wheels, or whether the load be carried on the truck or on a trailer the total resistance and therefore the force required to overcome it will be the same.

High-Gear Ability

To determine in advance just what the ability of a truck should be would appear a rather difficult task. In general, it can be said that high-gear ability should be sufficient to overcome average road resistance with a sufficient surplus to climb the grades that are encountered with such frequency that gear shifting would be objectionable. The low-gear ability should be sufficient to overcome practically the worst conditions of grade and road. A study of the abilities of existing trucks shows that practice varies widely upon this point. In the smaller sizes, ranging from 1000 to 2000 lb. capacity, there seems to be a tendency toward passenger car ability. This seems quite logical, for most of these trucks run on pneumatic tires and at speeds which call for that ability necessary for acceleration and overcoming wind resistance.

The roads in this country are being consistently improved and do not require the abilities that were needed 5 years ago. Of course, the use of trucks in country districts is increasing, but it is hardly right to penalize the great majority of trucks which are operated on improved roads for the sake of the few that operate in rural districts over unimproved roads.

The fuel problem is one which is becoming more serious daily, and the constantly increasing number of trucks in service is certainly not tending to alleviate the situation. If this growth is to continue unhampered, something must be done both to improve truck economy as well as to enable trucks to operate upon the poorer grades of fuel which are now available. I know of no better way for accomplishing these two objects than a reduction of high-gear abilities. Not only will fuel consumption be lessened by reducing the piston displacement per ton-mile, but by reducing the power factor of the engine it will be possible to operate satisfactorily on much heavier fuels. The truth of this statement is shown by the fact that marine engines, whose power factors are much lower than those of passenger cars or trucks, operate satisfactorily on kerosene. This has never been successfully done with either trucks or passenger cars.

The Ideal Design of Truck

The ideal design of a truck is one which combines maximum economy with adequate ability. Now, since trucks operate at least 90 per cent of

(*Continued on page* 32)

H. L. HORNING
Chief Engineer, Waukesha Engine Co., Waukesha, Wis.

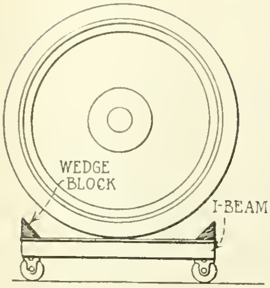


Fig. 3—A steel platform on castors. When just the weight of the wheel is supported on the platform, the wheel may be pulled off easily

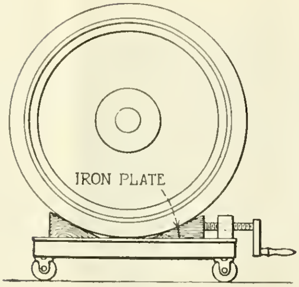


Fig. 4—A more elaborate type of platform with a stationary wedge piece and a movable wedge operated by a screw and a crank handle

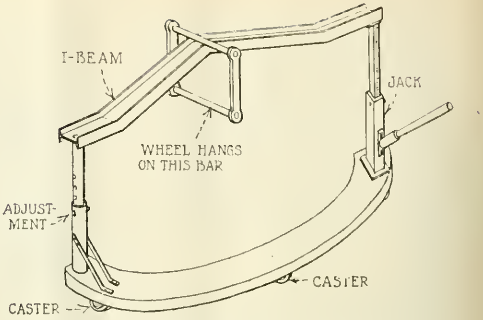


Fig. 5—A special device built in the form of a truss with an adjustable leg at one end and a jack at the other to provide the lifting effort. The wheel is chained to the hanging bar

Five Ways to Remove Truck Wheels

How to Build Five Simple Devices to Make the Work Easy

REMOVAL of truck wheels is a bothersome task if the right methods for doing so are not known. The various methods of accomplishing this should be of particular interest to fleet owners and repairmen. As truck wheels weigh as much as ¾ ton, as is the case on large trucks, it is impossible to lift them bodily.

Probably the simplest means of removing a heavy rear wheel is by the use of a greased plank, Fig. 1. The wheel is jacked up so a smooth plank with a heavy coating of grease may be slipped underneath it. Blocking also is put in place under the axle so that when the wheel is removed there is a substantial support reinforcing the jack in case anything happens to it, and also it stands ready to assume the weight as soon as the jack is removed. This detail of the procedure is not essential, but is simply forehandedness.

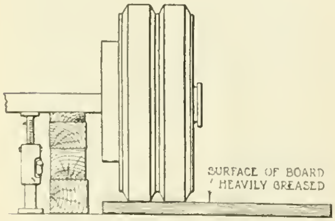


Fig. 1 The wheel is first jacked up by raising the rear axle V, placing blocking as shown to hold the truck up should the jack slip. The jack is then lowered until the wheel rests on the greased plank

The retaining nuts holding the wheel are removed and then the jack is adjusted by slowly moving the handle until only the weight of the wheel rests on the board, the remainder of the weight being carried by the jack. At this moment the wheel is pulled off.

The use of a portable overhanging crane is shown in Fig. 2. The wheel is blocked up so that it is well clear of the floor and then the chain is attached and the hoist operated until it is just carrying the wheel. Then, having removed any retaining nuts, the wheel may be withdrawn.

Fig. 3 shows a sturdily-constructed steel platform mounted on castors. It is used in the same manner as the greased board. It is placed under the wheel and the jack manipulated so that only the weight of the wheel rests on the platform. Then the wheel is taken off. The wedge blocks are simply to prevent the wheel from rolling sidewise.

Fig. 4 shows a more elaborate type. As in the previous case it consists of a heavy steel platform mounted on castors. One of the wedge blocks is stationary and the other is moved in and out by a crank-operated screw. In operation the axle first is jacked up so the platform may just be slipped underneath, then the wedge is screwed in until it just lifts the weight of the wheel off the axle, when the wheel may be pulled off.

Fig. 5 represents the type, totally different. The wheel hangs on a bar which is suspended from an I-beam cross-piece. The up-and-down adjustment of the wheel is maintained on one side by a sliding sleeve and pin arrangement and on the other by a large jack, its size being to obtain the requisite height, its great lifting capacity being only incidental. With modifications almost any jack would do. The base consists of a U-shaped member bent into the form of a semicircle and supported by three castors.

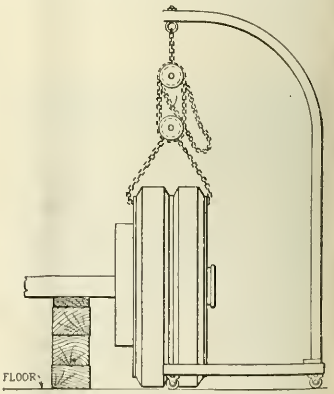


Fig. 2—One of the most conventional methods to remove truck wheels is by the use of a portable overhanging crane with a semicircular-shaped base to straddle the wheels so that a direct upward pull may be secured

How Detroit Truckmen Increased Their Profits

(*Continued from page* 14)

is scheduled to take a trip on Wednesday to Pontiac, Mr. Brown notifies the association. Letters are immediately sent to Pontiac merchants and manufacturers stating that on Wednesday a truck will be in Pontiac and asking that the association be advised at once if they have any Detroit shipments ready. In the majority of cases it has been found that the merchant or manufacturer is only too glad to take advantage of this opportunity to save express charges, and the association encounters little difficulty in securing a return load for Mr. Brown's truck.

The association is also taking full advantage of its purchasing power. It is buying oils for its members at a saving of from 10 to 15 cents a gallon, and gasoline at a saving of from 1 to 2 cents a gallon under market prices. This is accomplished through an arrangement with gasoline service stations in various parts of the city which are willing to give a discount when promised association business.

The members are furnished with a list of service stations with which an agreement has been made and they are given advantage of the reduced prices upon presentation of association membership card. The same system has been extended to garages which are giving rates on welding, cylinder cleaning, etc. Tires and accessories are also obtained by members at reduced prices by the same method. This purchasing department is rapidly expanding its scope and is becoming a great inducement for securing new members.

The management of the association is in charge of F. L. Henk, who is an authority on transport and freight matters. Mr. Henk is a young man who for many years has been connected with the freight department of the Michigan Central Railroad, and this training has made him eminently fitted to handle this class of work.

The officers of the Detroit Transportation Association are: E. Foster Moreton, president; E. L. Baier, vice-president; C. E. Pudrith, treasurer, and F. L. Henk, managing secretary.

Trucks Help to Reduce Cost of Food Distribution

THE high cost of distribution of farm products and the part which motor trucks are playing to reduce it are well illustrated by some facts and figures gathered by F. W. Fenn, Secretary of the Motor Truck Committee of the National Automobile Chamber of Commerce. He states that H. W. Collingwood, editor of the *Rural New Yorker*, who has made a life-study of the subject of marketing, is authority for the statement that on the average the farmer receives only 35 cents for goods sold to the consumers for $1. Another authority on the subject, John Dillon, head of the Bureau of Foods and Markets of New York City, corroborates the same statement, declaring that the ultimate consumer pays two-thirds of every dollar he spends for the cost of distribution and only one-third for the goods themselves. In other words, it costs a minimum of 65 cents to handle 35 cents worth of foodstuffs.

Mayor Shank of Indianapolis, Ind., recently bought in Grand Rapids, Mich., several carloads of potatoes at 50 cents a bushel. The potatoes were bought from jobbers who paid the farmers raising them 40 cents a bushel. Mayor Shank sold the same potatoes in Indianapolis for 75 cents a bushel when the same grade of potatoes in the open market were selling at $2 a bushel. He thus handled for 35 cents a bushel potatoes which the middleman got $1.50 for handling.

Trailers Pay in Oregon

Jordan Valley is in Oregon, just over the line from Idaho. The Valley is a very rich country but practically inaccessible to railroads. Consequently, a great amount of hauling is done from Caldwell, Idaho, to Jordan Valley, for Caldwell is on the O. S. L. line. The road from Jordan Valley closely follows the State line, first on one side and then on the other; then across the Snake River to Caldwell, 70 miles. It is a little more than a mountain trail but heavy loads are taken over it by motor trucks. The Jordan Valley Mercantile Co. operates the 3½-ton Federal shown above with a four-wheeled trailer on the haul, taking country and mountain products from Jordan Valley and bringing back supplies and general freight needed by the people of the Valley. Wool is one of the big loads carried and when this picture was taken, the Federal and trailer has just arrived in Caldwell with 5 tons of wool. A load of freight was ready for the return trip

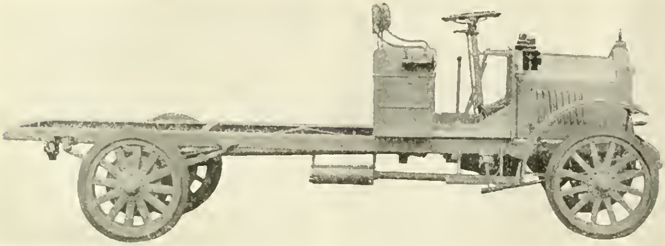
In a recent report of the California Fruit Growers' Assn. it was shown that the grower received on an average of $1.60 a crate for oranges during the past 4 years, while in the same period the consumer paid an average of $4.80. In New York City, milk cost 14 cents a quart, yet the farmer received only 5½ cents. In South Bend, Ind., tomatoes were selling for $3 a bushel, while the farmer, 135 miles away, received only 60 cents a bushel.

Wool is bought from the farmer at 60 cents a pound, yet it costs the consumer $4.75 when it is bought as yarn. In Fargo, N. D., yarn was selling at $2.50 a pound at the same time that the farmer was getting 60 cents a pound. Later, when the War Industries Board fixed the price at 57 cents a pound, yarn sold at $4.75.

These examples are but a few which show the tremendous cost of distribution by our present-day methods. The motor truck is one means whereby this high cost of distribution may be reduced by making it possible to inaugurate a closer direct relationship between the producer and the consumer. The motor truck will also open up territory not now served by any form of transportation and thereby encourage farmers in those territories to raise larger crops, the market for which will be brought close to hand through the medium of motor trucks, traveling over the highways.

Bill Booklets is an interesting set of booklets brought out by the Cutler-Hammer Mfg. Co., Milwaukee, Wis. These booklets tell the story of the C-H magnetic gear shift in a new and interesting way.

Selden Replaces 1-Ton Worm-Driven Model with New 1½-Tonner



Side view of new Selden 1½-tonner

SELDEN SPECIFICATIONS

Capacity, tons	1½
Price	$2,185
Wheelbase, in.	140
Tires, front	34 x 3½
rear	34 x 5
Bore, in.	3¾
Stroke, in.	5
N. A. C. C. hp	22.50
Speed, r.p.m.	1300
m p h.	18
Gear ratio in high gear	7 to 1
Final drive	Worm

A ONE AND ONE-HALF ton, worm-driven model has been added by the Selden Truck Sales Co., Rochester, N. Y., to its line of trucks whose capacities range from 1 to 5 tons. The new model is known as the Selden Special. With the exception of a rigid frame construction, the model is similar to its predecessors. From now on the manufacture of the 1-ton worm-driven model, TWL, will be discontinued. The other two internal-gear-driven 1-ton models, TXR and TXL, will be continued.

The 1½-tonner is made up of standard parts, which include a Continental engine, Parish & Bingham frame, Wayne wood wheels, Bush radiator, Bosch magneto, North East starting and lighting, Willard battery, Pierce governor, Stromberg carbureter, Brown-Lipe clutch and gearset, Sheldon front axle and Timken rear axle, Perfection springs, La Vigne steering gear and Spicer universal joints.

The four-cylinder engine has a three-point suspension. The cylinders are cast in block with the valves at the right. The crankshaft is carried in three bearings. The powerplant is a unit with the gearset. Water circulation is by means of a thermo-syphon system and a vertical tube radiator of the built-up type with cast tanks and removable core mounted on ball trunnions. These eliminate all strain due to frame weaving and road shocks. The clutch is of the dry multiple-disk type with Raybestos linings. The gearset is of the selective sliding gear type with three speeds. The carbureter is fed by gravity from a 20-gal. tank under the seat. The engine is lubricated by a combined force feed and splash system. A horizontal plunger pump, driven by an eccentric from the camshaft, forces the oil through the copper tubes direct to the timing gears and over the rear main bearings. It then drains back into the oil pan, thus maintaining a proper level for the special lubrication of pistons and connecting rods.

The governor is of the centrifugal type, driven from the engine. Ignition is taken care of by a single high tension magneto with a fixed spark control. The starting and lighting system may be had by the purchaser at an additional cost.

Both driving torque and propulsion are taken through the springs. Final drive is from the engine through the clutch, transmission and tubular propeller shaft, through the worm and wheel to the axle shafts to the rear wheels and from the chassis frame through to the springs.

The service and emergency or hand brakes are internal expanding on the rear wheels. The wheels are of the artillery wood type and the tires are solids and single all around. Pneumatic equipment is supplied at extra charge to the owner.

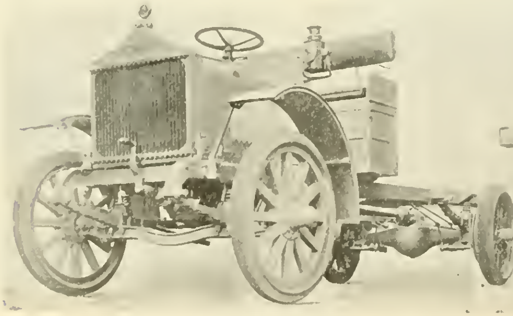
The frame is of pressed steel and of rigid construction. The channel section is 4 9/16 in. deep, 3½ in. wide and the stock is 7/32 in. The steering gear is of the worm and nut type, irreversible, and with an 18-in. diameter steering wheel. The gearshift and emergency brake levers are located centrally and drive on the right. The engine is controlled by hand throttle on the steering post and also by a foot accelerator.

New Dearborn 1½-Ton Model Is Worm-Driven

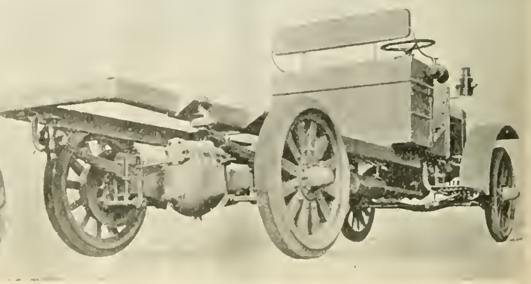
DEARBORN SPECIFICATIONS

Capacity, tons	1½
Price	$1,980
Wheelbase, in.	126
Tires, front	34 x 4
rear	34 x 5
Bore, in	3½
Stroke, in.	5
N. A. C. C. hp	19.60
Speed, r.p.m	..
m.p.h.	..
Gear ratio in high gear	..
Final drive	Worm

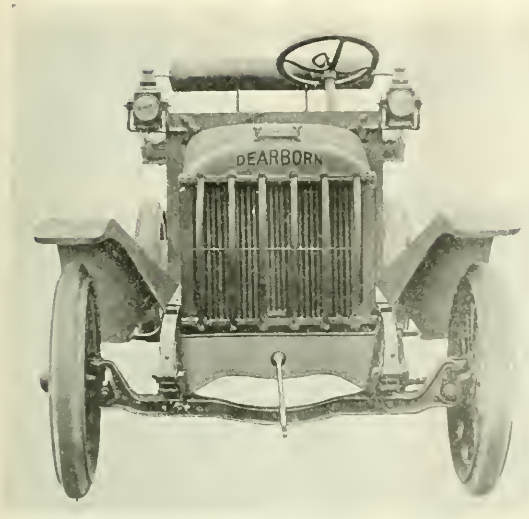
THE Dearborn Truck Co., Chicago, is producing a 1½-ton, worm-driven model. This truck made its first appearance at the Chicago truck show in February. It is an assembled proposition, consisting of standard parts throughout, such as Continental engine, Bosch magneto, Stromberg carbureter, Tuthill springs, Lavine steering gear, Fuller clutch and gearset, Prudden wheels, Columbia front and Standard rear axles,



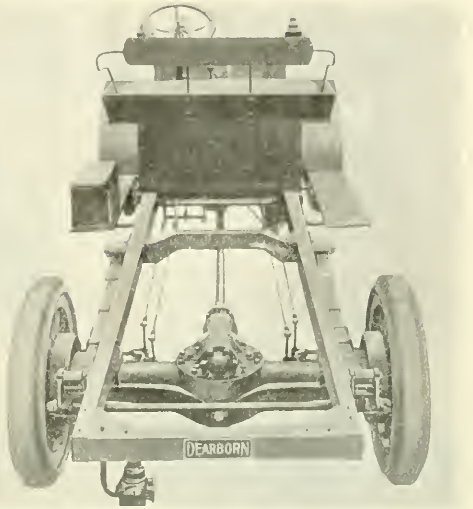
New 1½-ton Selden truck



Rear view of new worm-driven Selden



New Dearborn 1½-tonner



The new Dearborn is worm-driven

Arvac universal joints, and Chicago radiator.

The four cylinder engine is a unit with the clutch and gearset. The cylinders are cast in block and the crankshaft is mounted on three bearings. The water is forced through the engine by means of a thermo-syphon system and a vertical finned tube radiator. The radiator case is of cast iron and demountable. Protection is afforded by means of extra heavy V bars, supported by heavy rubber cushions held by a coil spring on each side. This tends to eliminate the usual shocks received when mounted directly on the frame. Dismounting of the radiator requires the removal of only two bolts and a tie rod. Fuel is fed to the carbureter by a Stewart vacuum system from a 16-gal. tank under the seat. Engine oiling is taken care of by a combination force feed and splash system.

Driving torque and propulsion are taken through the springs. Both the front and rear springs are simi-elliptic with the center hump securely clipped to the spring plate. Spring lubrication is secured through the use of Brown automatic oiling bolts. Drive is taken from the engine through the clutch and gearset to the tubular driveshaft, through the worm and wheels to the frame and springs.

Ignition is taken care of by a single high-tension magneto with a hand spark control. No other electrical equipment is supplied. The clutch is of the multiple disc, dry-plate type. The selective gearset has three speeds.

The service and hand brakes are internal expanding. The frame is of pressed steel and of flexible construction. It is 4½ in. deep and is reinforced by cross members and heavy gusset plates in the corners.

Wood wheels with oval spokes are used all around. The tires are solid and single all around.

Jones Enters Truck Field with a 1-Ton Capacity Model

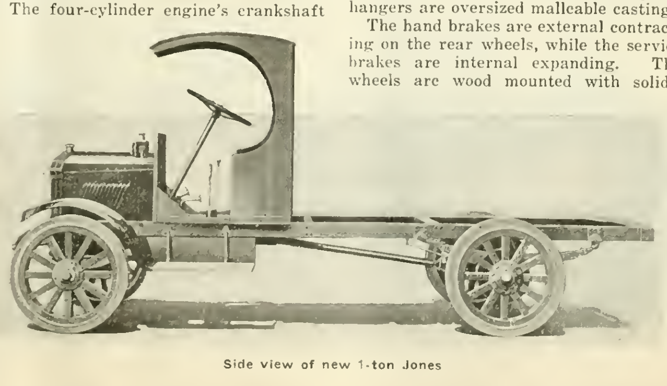
JONES SPECIFICATIONS

Capacity, tons	1
Price	$1,395
Wheelbase, in.	130
Tires, front	34 x 3½
rear	34 x 4
Bore, in.	3½
Stroke, in.	5
N. A. C. C. hp	19.6
Speed, r.p.m	..
m.p.h.	..
Gear ratio in high gear	..
Final drive	Int.-Gear

A NEWCOMER into the truck field is the Jones 1-tonner. This is an internal-gear-driven model and includes standardized units, such as a Continental Red Seal engine, Eisemann magneto, Pierce governor, Stromberg carbureter, Fedders radiator, Borg & Beck clutch, Covert gearset, Russel axles, Pennsylvania springs, Pruden wheels and Warner steering gear.

The four-cylinder engine's crankshaft is mounted on three bearings, the cylinders being cast in block with the valves at the right. The engine is a unit with the three-speed gearset. Water circulation is effected through use of a thermo-syphon system and a cellular radiator, whose case is of sheet brass on the top and cast iron on the sides. Lubrication is by means of a combined force feed and splash system. The oil pump operates from the camshaft. Fuel is fed by gravity from a tank under the seat. The centrifugal governor is driven from the engine and ignition is taken care of by a high-tension magneto. Spark control is fixed. The clutch is of the dry-plate type with Raybestos facing material. The gearset is of the selective sliding-gear type. Driving torque and propulsion are both taken through the rear springs. Both the front and rear springs are half-elliptic and the spring hangers are oversized malleable castings.

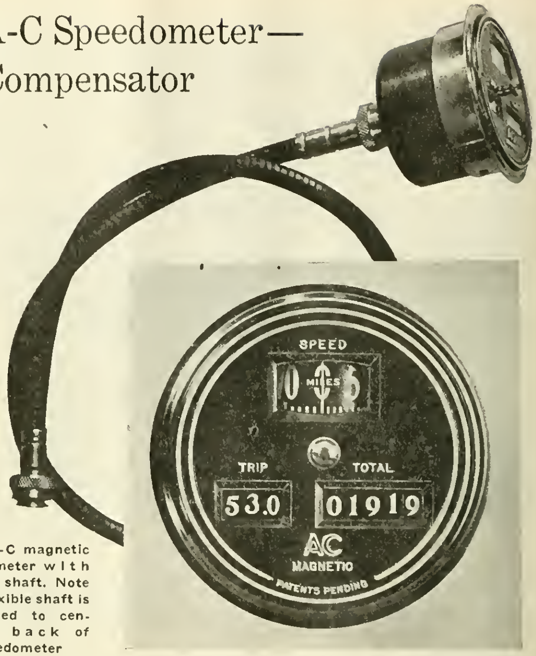
The hand brakes are external contracting on the rear wheels, while the service brakes are internal expanding. The wheels are wood mounted with solids.



Side view of new 1-ton Jones

Temperature Control on New A-C Speedometer—Fitted with Thermostatic Compensator

Bay City Light Weight Winch—McGraw Giant Size Solid Truck Tire—Continental Assembly and Welding Table—Union Tool Chest



New A-C magnetic speedometer with flexible shaft. Note how flexible shaft is connected to center of back of speedometer

THE A-C speedometer brought out by the Champion Ignition Co., Flint, Mich., is a magnetic type of marked simplicity, and with an ingenious method for regulating and maintaining accuracy in spite of variations in temperature conditions.

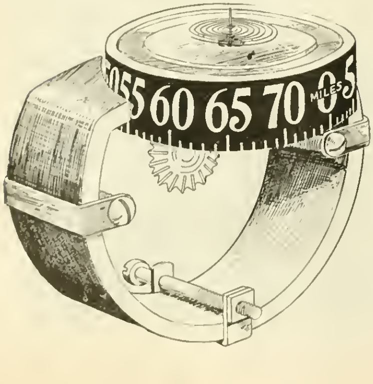
The speedometer operates entirely on the magnetic principle, having a stationary permanent horseshoe magnet held securely in the interior of the instrument in a manner which is similar to magneto and galvanometer construction. The magnet is stationary and the armature rotates within it, being driven by the flexible shaft which is connected with the driving mechanism of the truck. The armature revolves in the magnetic field between the poles of the horseshoe magnet, the magnet poles being ground to receive it.

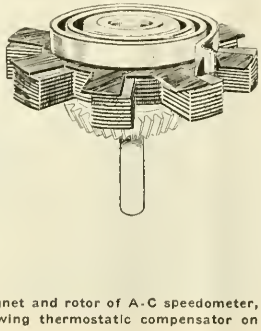
The armature is segmented into the poles, the magnetic current passing through them and thrown or shunted in the direction of rotation carrying with it a non-magnetic element in the form of an inverted aluminum cup having on its periphery the scale which indicates the velocity of the vehicle either in miles or kilometers per hour. The light weight of the aluminum cup renders it so sensitive to the magnetic drag that the instrument starts to register at a speed of 1 m.p.h. The speedometer is graduated up to 75 m.p.h., with graduations indicating every mile. The indicating element is a hair line crossing the glass window through which the speed is read in much the same way as the hair line on a slide rule indicator.

Objections to magnetic speedometers in the past have generally centered around the fact that the magnet expands in warm weather, thereby removing cold to a greater distance from the armature. This slight variation is compensated for in the A-C instrument by an automatic thermostatic control which changes the relation of the armature laminations one to the other, thereby advancing or retarding the magnetic flux as may be necessary. In this way the speedometer will give correct reading regardless of the temperature conditions. There is an adjusting screw for making the primary setting on the magnet and this is set at the factory and then sealed so that it cannot be tampered with by the ordinary user to throw the speedometer out of adjustment.

The construction of the instrument is such that the speed recording elements are contained in one-half of the housing and the odometer component in the other. The only connection between the two is a worm shaft which operates the odometer. The odometer will register mileage covered by the vehicle up to 100,000 miles and repeat on the total, which in this instrument is placed on the right hand side, it being considered more natural to read totals summed up to the right. The trip register, which can be reset at will, either forward or backward, to any desired figure, is placed at the left. It registers in miles and tenths of miles to 100 and repeats, the tenth figure being the same color as the unit figure, but divided by a decimal point, just as it would be read in a touring guide book. The reset guide or button is placed in the center of the face, which makes the instrument symmetrical. The resetting knob is very much the same as the stem wind knob on a watch and it is quick in action, requiring only a straight pull out, whereupon the reset may be rapidly made.

The two halves of the speedometer are assembled and united by a steel band forced over the broad flange surface of the instrument by pressure. The moving parts are fully jeweled, having two large jewels of sapphire and garnet. There are several design features which are unique in the instrument, a valuable point being the correction of the flexible shaft to the back so that it can be hidden completely from view in mounting on a car. The neck to receive the shaft is concentric with the instrument and has a ⅞-18 S. A. E. (spark plug) thread. The ferrules have a tapered fit, making alignment perfect.





Magnet and rotor of A-C speedometer, showing thermostatic compensator on rotor

The speedometer is held into the instrument board of the truck by a patented band clamp having slots tapered so that when turned, projections go into the slots and cause a forward movement of the clamp, thereby securing it. It is locked by tightening a screw.

The front face of the instrument is metal, being die cast of aluminum with an enamel finish of gun metal shade. The escutcheon flange is either nickel or enamel, or can be made in any desired finish. The back part of the instrument is also die cast and oxidized black. The reset knob in the center is nickeled. The figures on the indicating and registering member are white on black as a standard, but can be had reversely. The Caslon type of figures are used because of the ease with which they can be read quickly.

A special flexible shaft has been made for this instrument and greater durability and strength are claimed for it. The cable is made of alternately wound mono-coil music wire of four layers, each layer having four strands totalling 3/16 in. in diameter. The cable ends are secured by a patented process and guaranteed by the manufacturer not to break loose. The coupling nuts are made large for good contact. The casing is of tempered material wound with two-strand wire and coiled tightly to hold grease in case of severe bends and still keep its shape. All of the parts are rust proof. The flexible shaft runs at 168 r.p.m. at 10 m.p.h., varying directly with the velocity of the car, or in other words, 1000 revolutions at 60 m.p.h. The travel of 1000 r.p.m. is the basis for figuring all gearing with which to drive it.

Bay City Winch

A NEW light-weight winch, styled model M, for truck and tractor use, has been brought out by the Bay City Foundry & Machine Co., Bay City, Mich. This vertical winch can be used for a variety of purposes, such as pulling loads on the truck platforms, skidding machinery, pulling trucks out of the mud and sand, etc. The price is $175, including two sprockets and a roller chain.

The design of this new model follows closely that of type F, in which there is a vertical capstan. Lead of the rope may be in any direction. It is compact, occupying 1½ ft. of loading space and is either hand operated or operated by the engine through connection to the driveshaft. The niggerhead size is 6 in. It has a self-locking worm wheel construction which eliminates the necessity of a brake and prevents backward turning of the winch head due to failure of the brake or breaking of the drive chain.

Bay City light-weight winch

New McGraw Giant Solid Tire

McGraw Solid Tire

A GIANT size solid truck tire for heavy duty and fast haulage, under the name of McGraw Hi-Tread, has been placed on the market by the McGraw Tire & Rubber Co., Cleveland, Ohio. Notwithstanding the extra depth of rubber in the tread, the bond between the steel rim and rubber, it is stated, is so strong that laboratory tests on which 100 tons hydraulic pressure is exerted against the walls of the tire have failed to dislodge the tread. Increased resiliency is obtained by the extra rubber in the tire. The McGraw company also manufactures a regular profile tire. The prices are as follows: 36 x 5, $57.65; 38 x 5, $61; 36 x 6, $70.25; 38 x 6, $74; 40 x 6, $78.20; and 36 x 7, $87.50.

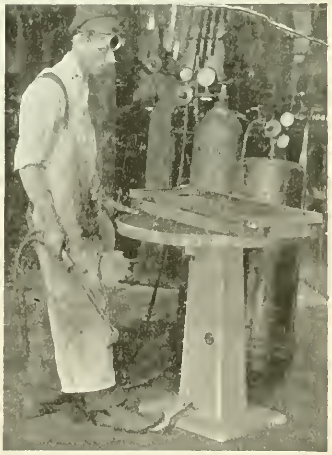
Continental Welding Table

AN assembly and welding table, designed to bring the work to the man instead of the man going to the work, is being manufactured by the Continental Auto Parts Co., Knightstown, Ind. This table is found useful as a time and labor saver on ordinary assembly, lay-out, jig and die work, welding, painting, and all kinds of bench work. Model 24 with a 24-in. diameter sells for $70, while Model 32 with a 32-in. diameter sells for $85.

The table revolves on ball-bearings and is quickly released by merely pressing on the foot pedal. It locks in thirty-six different positions, and as a result it is not necessary to remove the hands from the work while changing the position of the table. On the ordinary type of work bench it is necessary to constantly lift and change the work in order to get at various parts. Time is lost and the effort required is tiring to the mechanic.

In welding the Continental table is especially useful. Usually the welder allows his torch to burn while making the necessary changes in the position of the article which he is welding. The revolving table allows the entire job to be turned instantly. The top of the table being machine finished it makes lining up of the parts to be welded easy. In hand riveting operation, the table is heavy enough to use as an anvil.

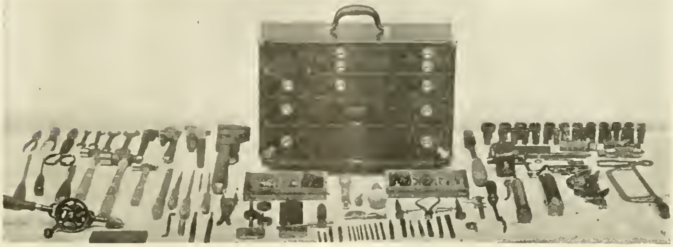
This table comes in two widths, 24 and 32 in. The height is 32 in. and the weights are 320 lb. for the smaller width and 425 lb. for the larger.



Continental Welding Table

Union Tool Chest

A NEW garage tool chest, designed specially for the mechanic, has been brought out by the Union Tool Chest Co., Rochester, N. Y. It is portable, being equipped with a handle. Separate drawers and compartments are set aside for the different tools and smaller articles.



Union portable tool chest for garages

Problems of the Overland Haulage Fleet Owner

(Continued from page 7)

One corner of the repair shop where both major and minor repair work is carried out. The mechanic is shown fitting a connecting rod crank-pin bearing to the main shaft. The engine crankcase on the right is supported on a special stand

ton, Overland, Vinita Park, Meridan, and other points on the Olive Street Road.

Standardized on Whites

The inter-city fleet of the company when first operated consisted of fourteen 5-ton trucks, including Whites, Indianas and Packards. Later the company decided to standardize on the White. Twenty-three 2-ton Whites and twelve 5-ton Whites were purchased. When the Progressive Transfer Co. is in full swing, which will be in a very short time, the firm intends to operate not less than half a hundred Whites, and will serve more points further out from St. Louis in Missouri and also other points across the Mississippi.

Four Brothers Run Company

The company is financed, officered and managed by four brothers. W. H. R. Hecht is president and general manager of the firm. Martin A. Hecht, who, with his brother, Edward A. Hecht, formerly were in the transfer business, is vice-president and manager of inter-city service. Edward A. Hecht is secretary and manager of transportation. August G. Hecht, who has just resigned as professor of floriculture at the Massachusetts State Agricultural College at Amherst, Mass., to connect himself with the company, is treasurer and local delivery manager.

The offices of the company are located on the second floor of the St. Louis depot and warehouse, at 620 South Seventh Street, in the heart of one of St. Louis' busiest railroad freight districts.

To interest the drivers of the trucks in the welfare of the company, and to take the place of bonding them, every driver is required to purchase stock in the company. This plan is working out very successfully, and as a result of it, very few losses are suffered in the way of merchandise or by abuse of the trucks. The general interest taken by the driver-stockholders greatly promotes the welfare of the company.

The Progressive

Vol. 1 Mid-Summer, 1918 No 2

Special Features

"Inter-Urban Truck Service"
A National Necessity
A Patriotic Duty

"Some Facts About Parcel Post"

The cover of one of the Progressive company's booklets published for the benefit of its prospective customers. The booklet shown is 4 by 6 inches and has eight pages

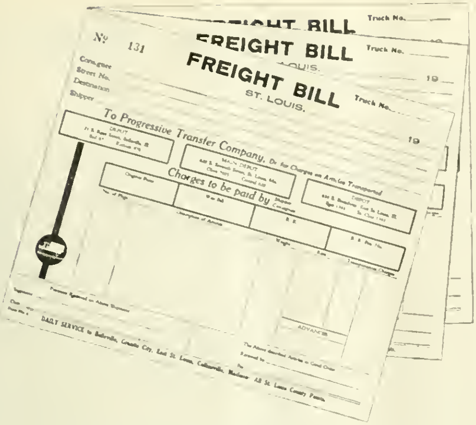
However, this is not the only precaution taken against loss. A blanket insurance policy is carried to cover all losses of merchandise either in transit or in the depots. The system used in recording the losses is simple and effective. The number of every truck that leaves the St. Louis depot is recorded in the office, and once a month the insurance agent calls at the office and the Progressive Transfer Co. pays the premium pro rata on the number of trucks that left during the month.

The return load idea is being carried out to the fullest extent by the company.

2-TON TRUCK RATE CHART

Length of Haul Round Trip (m.)	Running Time Round Trip (min.)	Loading and Unloading (min.)	Total Time Per Trip (min.)	No of Trips Per Day	Time Consumed (min.)	Tons Per Day	Fixed Charges Per Day	Operating Cost Per Day 14.7c. m.	Total Cost Per Day	Cost Per Cwt.
5	20	50	70	7	490	14	5.95	.74	6.69	.0238
6	24	50	74	7	518	14	5.95	.88	6.83	.0243
7	28	50	78	6	468	12	5.95	1.03	6.98	.0290
8	32	50	82	6	528	12	5.95	1.18	7.13	.0297
9	36	50	86	5	430	10	5.95	1.32	7.27	.0363
10	40	50	90	5	450	10	5.95	1.47	7.42	.0371
11	44	50	94	5	470	10	5.95	1.62	7.57	.0378
12	48	50	98	5	490	10	5.95	1.77	7.72	.0386
13	52	50	102	5	510	10	5.95	1.91	7.86	.0393
14	56	50	106	5	530	10	5.95	2.06	8.01	.0400
15	60	50	110	4	440	8	5.95	2.21	8.16	.0510
20	80	50	130	4	520	8	5.95	2.94	8.89	.0555
25	100	50	150	3	450	6	5.95	3.63	9.58	.0789
30	120	50	170	3	510	6	5.95	4.41	10.36	.0863

The 2-ton truck rate chart devised by the Progressive company. The average speed of the truck is taken at 15 miles an hour. Note that 50 minutes for loading and unloading is allowed for every round trip



FREIGHT BILL

Truck No.

No. 131

FREIGHT BILL

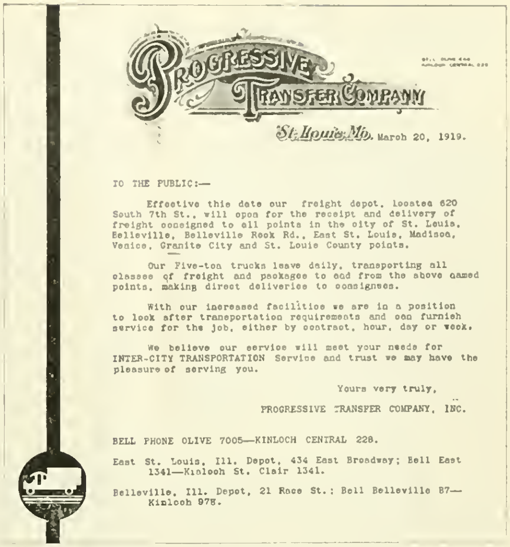
ST. LOUIS.

19

To Progressive Transfer Company, Dr. for Charges on Articles Transported

Charges to be paid by

The type of freight bill used by the Progressive company. It is made out in triplicate, one for the driver, one for the consignee and one for the record files of the Progressive company. Note how the form is broken up by boxes so that the different information may be seen at a glance



PROGRESSIVE TRANSFER COMPANY

St. Louis, Mo. March 20, 1919.

TO THE PUBLIC:—

Effective this date our freight depot, located 620 South 7th St., will open for the receipt and delivery of freight consigned to all points in the city of St. Louis, Belleville, Belleville Rock Rd., East St. Louis, Madison, Venice, Granite City and St. Louis County points.

Our Five-ton trucks leave daily, transporting all classes of freight and packages to and from the above named points, making direct deliveries to consignees.

With our increased facilities we are in a position to look after transportation requirements and can furnish service for the job, either by contract, hour, day or week.

We believe our service will meet your needs for INTER-CITY TRANSPORTATION Service and trust we may have the pleasure of serving you.

Yours very truly,

PROGRESSIVE TRANSFER COMPANY, INC.

BELL PHONE OLIVE 7005—KINLOCH CENTRAL 228.

East St. Louis, Ill. Depot, 434 East Broadway; Bell East 1341—Kinloch St. Clair 1341.

Belleville, Ill. Depot, 21 Race St.; Bell Belleville 87—Kinloch 978.

One of the form letters which has helped in securing new business for the Progressive company. The style of printing in the letterhead is reproduced in the lettering on the struck body to cash in on the advertising value of the trucks on the street

In obtaining return loads, if the shipment consists of miscellaneous goods, the loads are ready for the incoming trucks from the St. Louis depot at the sub-depots at 21 South Race Street, Belleville, Ill., and at 434 East Broadway, East St. Louis, Ill. If the load consists of one large and heavy shipment, the truck goes direct to the shipper. In jobs for iron foundries and other companies which call for the transportation of unusually large and heavy freight, such as iron castings and moldings, the trucks do not unload at the sub-depots at the various out-of-town points, but deliver the load directly to the consignee.

Charges to the shipper for the transportation of his goods by the Progressive Transfer Co. are decidedly lower than the cost of transportation by rail. One cent per hundredweight per mile and higher, with a minimum of 50 cents per trip, is the fixed charge for all classes of goods, from a cigar box to an elephant. No deduction is made from the cost to trip, is the fixed charge for all classes is 40 miles or ten blocks.

Martin A. Hecht, vice-president and general manager of inter-ctiy service, has published a four-page booklet naming the local freight tariff rates of transfer between the Mississippi-Warrior Waterways Co.'s dock and railroad depots in St. Louis, Mo., and the depots of the Progressive company in St. Louis. These rates affect merchandise transported by the Progressive company's trucks from the waterways docks on the Mississippi River, at St. Louis.

5-TON TRUCK RATE CHART

Length of Haul Round Trip (m.)	Running Time Round Trip (min.)	Loading and Unloading (min.)	Total Time Per Trip (min.)	No of Trips Per Day	Time Consumed (min.)	Tons Per Day	Fixed Charges Per Day	Operating Cost Per Day 22c. m.	Total Cost Per Day	Cost Per Cwt.
5	35	60	95	5	495	25	6.54	1.10	7.65	.0158
6	42	60	102	5	510	25	6.54	1.32	7.86	.0157
7	49	60	109	5	545	25	6.54	1.54	8.08	.0161
8	56	60	116	5	580	25	6.54	1.76	8.30	.0166
9	63	60	123	4	492	20	6.54	1.98	8.52	.0213
10	70	60	130	4	520	20	6.54	2.20	8.74	.0218
11	77	60	137	4	548	20	6.54	2.42	8.96	.0224
12	84	60	144	4	576	20	6.54	2.64	9.18	.0229
13	91	60	151	4	604	20	6.54	2.86	9.40	.0235
14	98	60	158	3	474	15	6.54	3.08	9.62	.0320
15	105	60	165	3	495	15	6.54	3.30	9.84	.0328
20	140	60	200	3	600	15	6.54	4.40	10.94	.0364
25	175	60	235	2	470	10	6.54	5.50	12.04	.0602
30	210	60	270	2	540	10	6.54	6.60	13.14	.0657

A trifle over 8.5 miles an hour is taken for the average speed of the 5-ton truck. The chart shows the number of trips, time per trip, the cost per day for trips of from 5 to 30 miles. If the length of day is changed, the figures will be changed correspondingly

Owners Take Advantage of Once-a-Week Service

MANY small truck owners in Bloomington, Ill., have taken advantage of the once-a-week service attention offered truck owners in that city by Murray & Medbery, one of the pioneer garage owners in Bloomington. If a truck owner does not use his vehicle on Sundays, he has it run into the Murray & Medbery truck department on Saturday evening and calls for it again early Monday morning. The mechanics of the service department give the truck a thorough inspection and make what adjustments or repairs are needed.

The charge for such service is made at regular hourly rates for repairs. A uniform charge for the service has not been considered expedient because it would place a premium on reckless driving and careless handling of the truck. In other words, the owner of a truck whose driver gives it good attention does not have to pay as large a sum as the owner whose driver is careless in its operation.

The work done is recorded on a special card furnished for the purpose. The card is made out in duplicate and one mailed to the owner each week so that he can keep an accurate record of the monthly cost of the maintenance work.

Factors Which Should Be Considered in Measuring Motor Truck Ability

(*Continued from page* 23)

the time on high gear, the interests of economy will be served if we keep high-gear ability down to the minimum. As stated previously, the low-gear ability of a truck should be sufficient to overcome the worst conditions of road and grade. This is a requirement which it is impossible to fulfill entirely. The best that can be done is to utilize all of the ability that the adhesion of the driving tires will permit. This can be done by making the low-gear ratio sufficient to almost slip the wheels under full engine torque.

Coefficient of Adhesion

The coefficient of adhesion of solid tires to dry macadam is about 0.60, while on a sand or mud road it would not exceed 0.45. It is on the latter type that the greatest ability is required. Therefore, if the tractive force be made about 45 per cent of the load on the rear wheel, we will have the maximum ability that the traction of the driving tires will permit.

The proportion of total weight on the rear tires is about 77 per cent. The low-gear ability coefficient should therefore be 0.346 lb. per lb. and the low-gear ratio of the transmission should then be 5.8 to 1. Such a low-gear reduction as this would, of course, require a four-speed gearset. About the maximum ratio obtainable with a three-speed gearset is 4 to 1, and anything greater than this would cause very unsatisfactory gear changing. Four-speed gearsets have in the past been the exception, and even those which did exist did not have anything approaching the proper low-gear ratio. In fact, the idea of utilizing all of the available traction on low gear seems to have become popular in the last few years. At present there is a decided trend in this direction which we can expect to grow very rapidly when engineers and truck users have had time to realize the possibilities.

The Class B truck is, in a way, responsible for the rapid growth of the idea, although not for its inception, as it afforded truck owners a large scale demonstration of the principle. Anyone who has seen the B truck negotiating roads and grades over which other very good trucks were unable even to move could not but be impressed.

Increasing low-gear ability will, of course, require a proportionate increase in the size of torque-carrying members back of the transmission, such as propeller-shafts and live axles. However, the design of such parts to meet these conditions is a very simple and exact proposition. Since the torque required for slipping the wheels is a definite proportion of the load upon the tires, the torque and load-carrying members of the axle can be proportioned accordingly. Since it is impossible to impress a torque upon the axle greater than the adhesion of the tires will transmit, it will be impossible with an axle so designed to over-stress the torque-carrying members no matter how large an engine or how low a gear ratio is used.

Propeller-shaft brakes also cease to be a bugaboo, for tire adhesion limits braking torque just as much as it does propelling torque. Even without increasing the strength of the torque-carrying members increased low-gear ability should tend to reduce rather than to increase the strain on these parts. With adequate low-gear ability it is no longer necessary to speed up the engine and drop in the clutch suddenly to get out of bad holes. Instead, an even, steady torque is applied, which does much less harm than the shock of a suddenly applied torque. I know of an instance where the breakage of live axles was actually eliminated in a fleet of trucks operating in a severe service by increasing the low-gear ability.

Reducing Overloading

An objection has been raised to increased low-gear ability on the ground that it will tend to encourage overloading. Experience leads me to believe that the amount of overload that a driver will carry depends, not on the low gear, but upon the high-gear ability. When a driver finds that overloading necessitates more frequent gear shifting and consequent loss of speeds, he will be quite likely to make sure that his truck is properly loaded thereafter. Decreasing high-gear and increasing low-gear ability should therefore tend to discourage rather than to encourage overloading.

Another objection to increased low-gear ability is that it makes low-gear operation too slow. This objection is hardly a valid one, for unless the conditions demand the use of low gear, the truck can be operated on second speed, which is faster than the low gear of a three-speed transmission. In fact, if we consider the low gear as an ability reserve, the other three speeds will in each case be faster than the equivalent speeds of a three-speed transmission. A truck with a four-speed gearset will therefore have a higher average speed than one with only three rates.

To judge the merits of high and low gear ability, let us compare the hill-climbing abilities of two trucks, one with a three-speed transmission with a low gear reduction of 4 to 1 and the other with a four-speed transmission having a low-gear reduction of 5.8 to 1. Assuming that the road resistance is 0.03 lb. per lb., the three-speed truck will be able to climb a grade of 4.2 per cent on high gear. On low gear this truck will be able to climb a grade of 24.2 per cent. The truck with the four-speed transmission will be able to climb a grade of 3.3 per cent on high gear. On low gear this truck will be able to climb a grade of 31.5 per cent.

Now where is there a driver who can distinguish between a 3 and a 4 per cent grade? The difference between a 24 and 31 per cent grade, however, is quite appreciable. There is not the slightest doubt in my mind that the average driver would consider the four-speed truck the more powerful as well as the speedier and more economical of the two.

The maximum ability of a truck is that on low gear, and consequently the power of a truck will be judged more by its low-gear than by its high-gear ability for the same reason that the speed of a truck is judged from its maximum or high-gear speed.

Pneumatic Tires on Trucks

There is another trend in the motor truck field in connection with which the matter of ability should be given some careful consideration. That is pneumatic tires for large trucks. In the first place, the strongest reason for the use of pneumatic tires on heavy trucks is to be able to increase the speed and consequently the ton-miles per day without injury to the vehicle. From a standpoint of dollars and cents, I do not see how pneumatic tires can be sold to replace solid ones unless this is accomplished. Undoubtedly the cost of pneumatic tires is higher than that of the solid type, and unless the owner is able to get an increased return on his total investment, due to an increase in ton-miles, he cannot be induced to invest the extra money in pneumatic tire equipment. Increasing the truck speed means an increase in engine speed or a reduction in gear ratio. It certainly is not desirable to increase engine speed, for, as surely as this is done, an increased amount of trouble will result.

Now any reduction in gear ratio will result in lowered ability. No one knows whether road resistance is more or less with pneumatic than with solid tires. This much we do know, however. When the speed of a truck is appreciably increased, the ability should approach closer to that of passenger cars. Road and grade resistance are no longer the only forms of resistance to be overcome. Not only does wind resistance become a considerable factor at higher speeds, but the car must have an ability reserve to accelerate to this increased speed within a reasonable length of time.

Bigger Engines Needed

Thus, the use of pneumatic tires calls for not only increased speed but increased ability. Power being the product of force by velocity, it is evident that the engine must develop horsepower. It being inadvisable to increase the engine velocity, it is evident that the engine must develop greater horsepower. It being inadvisable to increase the engine speed, there is only one thing left to do, and that is to increase the size of the engine. This means a corresponding increase in the transmission drive shafts and in fact in all the power-transmitting parts of the chassis. There is no doubt that the use of pneumatic tires will permit an appreciable reduction in the weight of all load-carrying parts of the chassis. I am inclined to believe, however, that this saving will be offset by the increase in the engine and other power-carrying members, so that there will be no ultimate saving in weight or cost.

Let us compare a 3½-ton truck intended to operate on solid tires, with one designed especially for the pneumatic type. The specifications of the solid-tire truck may be assumed somewhat as follows:

Total weight of vehicle, lb.	15,300
Rear tire size, in.	36 x 5 dual
Speed, miles per hr.	14
Engine size, in.	4½ x 5¾
Piston displacement, cu. in.	365.8
Axle ratio	8¾ to 1
Engine speed, r.p.m.	1,141
Ability coefficient, lb. per lb.	0.07

For the pneumatic-tire truck, let us assume a speed of 20 miles per hr. At this speed we should have an ability of about 0.08 lb. per lb. in order not to exceed 1200 r.p.m. engine speed. With 44 x 10-in. rear tires, the axle ratio should be approximately 7¾ to 1 and the piston displacement would then be 578 cu. in. This is approximately the displacement of a 5½ x 6 or a 5¼ x 6½-in. engine and is even larger than is used for a 5-ton truck on solid tires.

I do not wish to be understood as opposing pneumatic tires for trucks. In fact I believe that the increased use of pneumatic tires will greatly widen the field of usefulness of motor trucks and should be encouraged by all truck builders. The point that I wish to bring out, however, is that high-speed pneumatic-tire trucks and slow-speed solid-tire trucks are fundamentally two very different propositions and should be treated as such. To operate successfully on pneumatic tires a truck should be especially designed for that service and should partake more of the characteristics of a large passenger chassis than do the trucks now operating on solid tires.

10,000 to 20,000 Miles on Pneumatics

In a further discussion of the use of giant pneumatic tires on large trucks, Mr. Hale of the Goodyear company stated that some of his company's trucks running between Akron and Cleveland were fitted with 10-inch tires in the rear which gave from 10,000 to 12,000 miles and with 8-inch tires in the front which gave between 15,000 and 20,000 miles. He also said that his company found it desirable to fit 3½-ton engines in 2-ton trucks with pneumatic tires and 5-ton engines on its 3½-ton vehicles.

P. W. Klinger of the Dayton Steel Foundry Co. presented a paper in which he discussed "Steel Truck Wheels." He pointed out that metal wheels were higher in cost than wooden ones and yet might prove more economical on certain large sizes of trucks because of their greater length of life. He then discussed some of the problems in the making of metal wheels and pointed out how resiliency, lack of right-angled corners in castings and distributing instead of concentrating the road shocks were highly desirable features. To the question that metal wheels have their hubs forced out of round during the application of pressed-on tires, he stated that such distortion did exist but to such a slight degree as to be negligible. He said such distortion did not exceed from 3/1000 to 5/1000 of an inch and that this did not affect the true running of the wheel bearing.

Standard Speed Ratings Recommended by the N. A. C. C.

Of interest to the truck owner are the recommendations of the National Automobile Chamber of Commerce to change the standard speed ratings and standard body weight allowances for motor trucks as given below. During a recent meeting of the Motor Truck Committee of the Chamber it was suggested that the present table of standard speed ratings be changed from that shown to the table printed adjacent and similarly, that the present table of standard body weight allowances be eliminated and the accompanying new table adopted.

OLD STANDARD SPEED RATINGS.

Rated Load Capacity Tons	Pounds	Maximum Speed Miles per Hour
½	1,000	16
1	2,000	15
1½	3,000	14
2	4,000	13
2½	5,000	12
3	6,000	11
3½	7,000	10½
4	8,000	10
4½	9,000	9½
5	10,000	9
6	12,000	8
7	14,000	7
8	16 000	6
9	18,000	5½
10	20,000	5

OLD STANDARD WEIGHT ALLOWANCE

Tons	Load Capacity Pounds	Body Weight Allowance Pounds
½	1,000	600
¾	1,500	750
1	2,000	900
1¼	2,500	1,000
1½	3,000	1,050
2	4,000	1,200
2½	5,000	1,350
3	6,000	1 500
3½	7,000	1,600
4	8,000	1,700
4½	9,000	1,750
5	10,000	1,800
6	12,000	1,900
7	14,000	2,000
8	16,000	2,100
9	18,000	2,200
10	20,000	2,300

PROPOSED STANDARD SPEED RATINGS.

Gross Weights, Chassis, Body and Freight Load Pneumatic Tires up to	Speed, Miles per Hour
28,000 lb.	25
Solid rubber tires, up to	
4,000 lb.	25
8,000 lb.	20
12,000 lb.	18
16,000 lb.	16
20,000 lb.	15
24,000 lb.	15
26,000 lb.	15
28,000 lb.	15

PROPOSED STANDARD WEIGHT ALLOWANCES.

Load Tons	Body Weight Allowance, Pounds
1	1,200
1½	1,200
2	1,500
2½	1 500
3	2,000
3½	2,000
4	2,000
5 and over	25,000

The Editor's Viewpoint

The Lowly Greaser

CONSIDER the lowly motor truck greaser. His task is a menial one. He does the same thing day in and day out. His overalls are generally dirty from getting out and under in search of the elusive grease cup which is often placed in what seems the most inaccessible position possible. He is looked upon as one of the least of the men necessary to maintain a fleet of motor trucks. He is generally given a pail of grease and told to fill all of the empty cups he can find, it being assumed that he knows by heart just where every cup is to be found.

But now that our attention has been called to this individual, is he not really one of the most important men whose services are required in connection with truck maintenance? Let us consider what happens when he is lax in his work. If he does not fill every grease cup that he can find, some important part may be denied the lubrication to which it is entitled and which if it does not receive means a quick wearing of that part and perhaps several other parts in conjunction with which it works. Lack of lubrication means excessive wear and excessive wear means a high cost of repair or replacement parts.

Then, again, if he fills a partly-empty grease cup that has dirt in it with new grease, the grit and dirt is simply forced out into the bearing, where it sets up friction instead of reducing it, which results in partial loss of the value of the lubricant.

And more important still, what happens when he passes over a place where a grease cup should be, but from which it has fallen or shaken off under excessive road vibration? Of course, that part goes without lubrication until the truck superintendent happens to find that the cup is gone. By that time, perhaps, it is too late and the part which should have lasted for several years is worn out in several months and has to be replaced. This increases the truck maintenance cost unnecessarily.

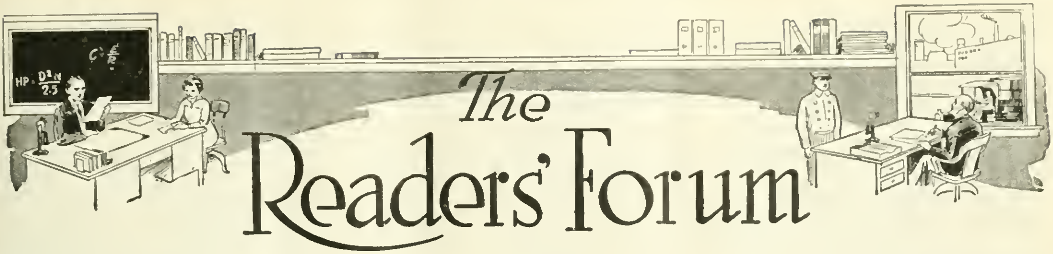
When the truck greaser is looked at from such an angle, it seems that the fleet owner should pay more attention to him and his work. The importance of his task should be better realized and more attention given to it. The greaser should be impressed with the inevitable results of slipshod work on his part. He should be shown how to fill and clean grease cups properly and exactly where to look for every grease cup fitted on the truck chassis on which he works. He should be given greater responsibility and with that greater responsibility a higher wage and a more important standing among the men necessary to keep a motor truck in proper running trim. On the other hand, the fleet owner should always remember that one dollar spent on grease properly applied may save ten or twenty dollars in the cost of repairs.

Carrying Extra Oil on the Truck

ONE New York City concern operating over fifty trucks supplies each truck driver with a gallon can of engine lubricating oil which he carries with him on the truck to pour into the engine crankcase should it need additional oil while away from the home garage during the day. The truck drivers of the concern mentioned are held responsible for all bearing trouble, and as most bearing trouble is due to a lack of sufficient lubricating oil, have provided each man with enough extra oil to get him home from any ordinary trip without having to buy it on the road.

This method of furnishing extra oil to each driver does not permit him to blame engine trouble to a lack of oil and he can offer no excuses whatever if bearings are burned out because of insufficient lubrication. It is considered almost a crime if such trouble does develop, and as a result very few such cases have occurred.

In any event, the idea is well worth consideration by other fleet owners because of the good results which have been obtained in this one instance. Carrying the oil on the truck at all times does not enable the driver to claim that he did not have sufficient money with him to purchase any necessary oil should trouble develop. It also insures that the proper grade of oil is always used and does not complicate the bookkeeping problem in the garage, such as would be the case were the various drivers to purchase at different prices the various grades of oil nearest to that usually employed.



The Readers' Forum

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

TRUCK OPERATION GOVERNS COST

Must Consider Roads, Material Hauled, Loading Devices, Etc., in Costs

To the Editor, COMMERCIAL VEHICLE:

Will you please tell us:

1—What is the proper rate for charging for the delivery of merchandise in 1½- and 2-ton trucks in city work?

2—Would you advise a flat rate of charge according to mileage?—C. H. MORSE, S & M Garage, Taunton, Mass.

Answers to your questions in the order given are as follows:

1—We cannot give you any accurate operating costs on 1½- and 2-ton trucks in city work unless you tell us more about the actual conditions under which the trucks will be operated. We should like to know what the trucks will haul; how many miles they will cover daily; the kind of roads over which they will operate; how they will be garaged, and what loading and unloading facilities will be provided. If you can outline approximately the conditions under which the trucks will operate and give us the wages of the driver per day and those of the helper, if any, together with the information mentioned above, we shall be glad to prepare an estimated cost of operation for you.

2—You might charge a flat rate according to mileage, although we would not advise this method until we knew more about the class of goods to be handled and the method of delivery to be followed. You might also furnish the truck and driver at a set rate per day with a limiting factor that the truck is not to cover over a certain mileage. You might also charge a flat rate per ton moved or package delivered, depending upon the class of work. In this case the flat rate would be obtained by averaging the estimated daily mileage.

FOUR OVERLAND HAUL CONCERNS

All Operating Between Baltimore and New York Via Wilmington

To the Editor, COMMERCIAL VEHICLE:

Can you give us the names of some companies which operate between New York City and Wilmington, Delaware? Probably the route would be Baltimore to New York with a stop at Wilmington. —C. SPIRO MFG CO, New York City.

Following is a list of companies operating between New York and Baltimore, via Wilmington: Greeley Auto Trucking Co., 57 West Twenty-fourth St., New York City; Rialto Motor Van & Express Co., 268 West Forty-first St., New York City; Federal Transit Co., Market St., Philadelphia; Hinsdale Motor Freight Corp., 188 Washington Street, New York City.

TRUCK OPERATION AFFECTS COST

Conditions of Truck Work Must Be Studied Individually

To the Editor, COMMERCIAL VEHICLE:

I intend to operate a line of motor trucks to haul farm products from Benedict to Minot, N. D. Will you please inform me of the cost of operating a 2-ton truck in ordinary country work? Do not consider the cost of the truck or operator, but give figures on the cost of gasoline consumption and maintenance. —KNUT CHRISTENSION, Benedict, N. D

It is very difficult for us to give you anything more than an approximation as to the cost of gasoline consumption and maintenance, since we do not know anything of the conditions under which the trucks will be operated.

On pages 26 and 27 of THE COMMERCIAL VEHICLE for April 15, 1919, you will find a reproduction of both sides of one of the monthly cost sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. That sheet gives the necessary items which must be taken into account in the determination of any truck cost figures.

We might give you the following approximate figures on the cost per mile for gasoline, lubricants, maintenance, repairs and tires of a 2-ton truck:

	Cost per Mile
Gasoline, 7 miles per gallon at 27 cents per gallon	$0.039
Lubricants, 350 miles per gallon at 50 cents per gallon	.0014
Maintenance and repairs at $300 per 12,000 miles	.025
Tires with 7,000 mile guarantee at $300	.0428
	$0.1082

TRUCK AND TRAILER STATISTICS

Approximately 480,000 Trucks in Use in the U. S. on Jan. 1, 1919

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us answers to the following questions:

1—Please tell us approximately how many motor trucks are in use at the present time in the United States and the estimated number that will be in use during the next year.

2—Tell us the approximate number of trailers in use in the United States at the present time and the estimated number that will be in use during the next year.

3—What is the status of the truck and trailer for use in interurban transportation over the highways.—GEORGE A. BRINKE, Louisville Industrial Foundation, Louisville Ky.

Answers to your questions in the order given are as follows:

1—Reliable estimates place the number of trucks in use in the United States on January 1, 1919, at 480,000. The estimated production of motor trucks for 1919 was set during January, 1919, at 290,000. It is possible that this large production will not be reached on account of the ending of the war and the consequent canceling of huge truck orders for war purposes. It is probable that between 150,000 and 200,000 motor trucks will be manufactured during 1919. This would give a total number of trucks in use on January 1, 1920, of 680,000, minus approximately 10 per cent worn-out trucks, or a total number in use of 612,000. A figure of 600,000 trucks in use on January 1, 1920, would be a good approximation. Accurate figures on the number of trucks in use in the United States cannot be had because only twenty-three of the forty-eight states register trucks separately from passenger cars.

The motor truck industry really began operations during the year 1910. From that time up to the end of 1918 motor truck production in each of the years was approximately as follows:

Year	Trucks Produced
1910	9.500
1911	16.000
1912	25 000
1913	28,000
1914	35.000
1915	74.000
1916	98.000
1917	190 000
1918	250,000

2—Due to the same laxity of registrations of trailers as holds good for motor trucks, only an approximation can be made as to the number of motor truck trailers in use in this country at the present time. It was estimated by THE COMMERCIAL VEHICLE that approximately 10,000 trailers were in use in the United States on January 1, 1916. The great majority of these, however, were old horse wagons converted into use behind or upon the rear decks of motor vehicles or light-two-wheeled trailers hauled behind passenger cars. The approximate production of trailers since 1916 is somewhat as follows:

Year	Trailers Produced
1916	3,000
1917	7,000
1918	10,000

This would give a total production of approximately 20,000 trailers during the 3 years mentioned, which with the 10,000 in use previous to 1916 would give approximately 30,000 trailers of all kinds in use on January 1, 1919.

It was estimated in the January 1, 1918, issue of THE COMMERCIAL VEHICLE that the orders for military trailers would be close to 200,000, including all designs of two- and four-wheeled trailers for carrying ammunition, guns, tool shops, shoe repairing outfits, traveling kitchens, sound conductors and the like. It is not known, however, how many of such trailers were actually manufactured for all the departments of the government. War Department figures up to January 1, 1919, show that only 5,288 trailers of all types had been shipped overseas for military use from the beginning of the war to December 1, 1918.

3—A very comprehensive two-part article on the subject of the use, design and construction of motor truck trailers was published in THE COMMERCIAL VEHICLE. Part I was in the November 1, 1915, and Part II in the November 15, 1915, issue. In THE COMMERCIAL VEHICLE for January 1, 1918, an article entitled "**War Proves Great Stimulus to Trailer Industry—1918 Will Be Its Biggest Year,**" outlines the developments in the trailer industry during 1917. Since that issue many articles have been published regarding the use of trailers in city and overland haulage work.

These articles and the issues of THE COMMERCIAL VEHICLE in which they appear are as follows:

Trucks Prove So Successful Worsted Mill Now Relies Entirely Upon Them for Supplies, October 15, 1918, pages 5 to 8. That company makes use of a trailer when it is neccessary to haul hulky loads. It is used in connection with a 5-ton truck.

Fresh Meat Distributed Overland by Trucks, January 1, 1919, page 33, is a short story telling how the Sullivan Packing Co., Detroit, distributes meat by the use of a truck and a four-wheeled trailer. Morris & Co., Chicago, use a truck and semi-trailer for delivering meat.

Trucks Keep Down Cost of Shoes, January 1, 1919, page 35. The George E. Keith Co., Brockton, Mass., is using a 4-ton truck and 5-ton trailer to haul wood.

Thirty-one Parcel Post Lines now in Operation, January 15, 1919, page 24. The Post Office Dept. has found it economical to haul large loads of produce by means of trucks and trailers. An example of this is given in this story telling of a truck and trailer used to haul potatoes between Zanesville and Hebron, Ohio.

The Field of the Motor Truck and Trailer in Cotton Haulage in the South, February 15, 1919, pages 17 to 20. Floyd & Co., Savannah, Ga., cotton buyers and sellers, use five trucks and five trailers of the four-wheeled type for hauling cotton from the railroad station to the ware houses and from the warehouses to the compresses.

Hauling Goods Overland Between Dallas and Fort Worth Proves Successful, March 15, 1919, pages 5 to 9. The Motor Freight Lines, operating between Dallas and Fort Worth, make use of trailers to carry its loads between the two cities when they are too big to be sent by means of truck only.

Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections, April 1, 1919, pages 16 to 19. A Sioux Indian has found it profitable to use a trailer in connection with his truck to haul livestock between the Reservation to the Indian Agency.

Motor Trucks Enable New England Drayage Co. to Triple in 3 Years the Tonnage Handled, April 15, 1919, pages 30 and 31. The Youlden, Smith & Hopkins Co., Boston, Mass., is operating fifteen trucks and three trailers to haul wool and cotton for making cloth.

Trucks Plus Good Roads Move Food Crops Both Quickly and Economically, May 15, 1919, pages 5 to 9. Wheat in bags is being hauled in trucks and trailers in the Sacramento Valley. Trailers are also being used in that section for hauling other food products.

FAIR TRUCK HAULAGE CHARGES

1 Cent a Mile for 100 Pounds Gives a Reasonable Profit of About 15%

To the Editor, COMMERCIAL VEHICLE:

I have been hauling stock from Green Valley, Ill., to Peoria, Ill., a distance of 25 miles. I have been charging 50 cents for 100 pounds. The grocery stores in Peoria have asked me to haul their freight on the return trip. Will you please inform me what would be a reasonable charge per 100 pounds for such work. Would 20 cents per 100 pounds be out of the way?—H. S. JONES, Green Valley Garage, Green Valley, Ill.

Regarding a proper charge for hauling groceries on your return trips from Peoria to Green Valley, it would seem that a cent a mile per 100 pounds would be a very proper charge. In your case, this would be 25 cents per 100 pounds for the 25-mile haul. This rate would enable you to meet all of your operating and overhead expenses and give you a profit from 15 to 20 per cent.

ONE-WAY TRAFFIC REGULATIONS

Operators in New York Must Pass Two Examinations for License

To the Editor, COMMERCIAL VEHICLE:

Will you please supply us with the following information:

1—*Truck Drivers' Licenses*—Please outline the New York State law regarding licenses for motor vehicle drivers, as well as New York City ordinances on the same subject.

2—*Traffic Regulations*—Please supply us with all available data regarding the working of New York City's one-way-traffic plan, with a digest of the city ordinance and police regulations regarding the work.

3—*Licenses of All Motor Vehicle Operators*—Are we correct in assuming that New York State requires all motor vehicle operators to be licensed regardless of whether they drive trucks for hire or operate their own vehicles?—F. E. ERSTMAN, Motor Truck Owners' Assn., Chicago, Ill.

The answers to your questions are as follows:

1—The license for the operator of a motor vehicle not owning that motor vehicle is $5 a year, with a renewal charge of $2 a year. The operator must be over 18 years of age, and in applying for the license must send with the application a photograph of himself taken not earlier than 30 days before the application is filed. Before such application is acted upon and the license granted, the operator must undergo both a written and practical demonstration examination which is held at convenient points throughout the State as often as necessary.

If the owner of the truck drives it himself, he may obtain an operator's license at an initial cost of $1 and at an additional cost of $1 for each year's renewal. No examination is necessary for such a license.

2—The regulations for the street traffic in New York City as issued by the Police Department under normal conditions give the right of way to North and South traffic except on important East and West thoroughfares. A vehicle turning into a street to the left shall pass around the point of intersection and the left-hand corner curb. In overtaking a street car discharging or taking on passengers, a vehicle shall not pass closer to the side of the car than within 6 feet.

The one-way-street regulations are permanent on some streets and on others only hold good during certain periods of the day. Some one-way-streets allow one-way-traffic ½ hour before commencement and ½ hour after termination of theater performances. Other streets on which no traffic is allowed are generally roped off for that purpose.

3—Part of this question has already been answered in the answer to Question No. 1, although at the present time there is a law before the legislature in Albany which seeks to double the license fees for operators and to require owner operators to take the same examinations as given to drivers of trucks or passenger cars for hire.

Osborn Introduces New Highway Bill

Differs from Townsend Bill on Several Big Points

WASHINGTON, D. C., June 25—The establishment of a Department of Federal Highways and definite trunk-line roads across the United States, together with an appropriation of $1,700,000,000 for this work, are the chief provisions of a bill introduced in Congress yesterday by Representative Osborn of California. The bill, which is urged by the Los Angeles Chamber of Commerce, differs to some extent from the Townsend bill, which provides for a Federal Highway Commission. Mr. Osborn's bill would create a Department of Federal Highways in place of a commission. It definitely states the number of trunk lines to be established, specifically names the officers and their salaries, increases the appropriation from $450,000,000 to $1,700,000,000 to be appropriated in 7 years. It also grants the power to appropriate highways anywhere in the United States by condemnation so that the Federal Government will not be dependent upon the individual states for assistance in development of the highways. The bill is declared to be more far-sighted by its backers, who believe that the highways of the nation will be of the utmost importance within 10 years, and will demand the establishment of a Department of Federal Highways over a complete national highway system.

It is a bill creating a Department of Federal Highways with a secretary in charge similar to the other Government departments and cabinet positions, and provides for the establishment of not less than three main trunk-line roads from the Atlantic Ocean to the Pacific Ocean and not less than four main trunk-line roads from the northern to the southern boundary of the United States. It includes also not less than two main trunk-line roads in each state, together with intersecting roads connecting the entire National Highway System. Appropriations provided amount to $1,700,000,000 in all, $100,000,000 to be appropriated immediately and $200,000,000 per year for the 7 succeeding fiscal years. The system will not include any highway in a place having a population of 5000 or more except where the houses are more than 200 ft. apart. The construction, maintenance, repair and improvements, together with the selection of these highways, will be the duty of the secretary of the department.

Provision is made so that any lands in the United States may be appropriated as rights of way for the highway, either by contract or condemnation. The Secretary of War is authorized to turn over such equipment as may be necessary for the construction and maintenance of the national highways.

The bill also includes amendments to the Federal Road Aid Act, one of which provides for striking out the maximum of $10,000 which is allowed per mile for payment of roads and which would leave the act without a definite maximum sum specified. Bond issues may be made under the provisions each year for the amount of the appropriations.

WASHINGTON TRUCK PARADE

WASHINGTON, D. C., June 23—On June 28 there will be a parade of motor trucks in this city which will show how our commerce is transported from its source to the point of consumption. Among the trucks in line will be huge army trucks, parcels post trucks, rural express trucks, and trucks which carry live stock to the stockyards.

CHICAGO TRUCK RUN

CHICAGO, June 20—Plans are under way for what is probably the most extensive demonstration of the truck to the farmer ever undertaken. The plan is to start from Chicago in July with a caravan of some forty or fifty trucks, all designed for farm use. In addition to these there will be ten or twelve accessory trucks, showing tires and other truck accessories. It is not unlikely that there will be close to seventy-five vehicles all told.

The itinerary is being worked out and will cover Iowa, Missouri, Illinois, Wisconsin, Minnesota, North and South Dakota. Approximately 2 months will he devoted to the trip. Advance publicity men will be sent out and the tour staged like a circus. The purpose is to confine the tour to small town dealers and farmers exclusively. The object is not so much to make dealers as it is to convince the farmer that the truck has come to his assistance as a hauling proposition.

Plans for the tour are being worked out by J. E. Tracy of the Sterling Motor Truck Co., Milwaukee, and W. G. Rightman of the Winther Motor Truck Co., Kenosha, Wis.

PA. CAN BUILD ROADS

HARRISBURG, PA., June 23—With the signing of the Eyre bill, permitting Pennsylvania to construct its own highways, the policy that has prevailed since the Highway Department was established is radically changed. While the state has been permitted to do repair work on its highways up to the present, it was barred from taking over contracts for new construction. By the terms of the bill which has just become a law the highway commissioner is authorized to buy all the machinery he may need to build or rebuild highways; to buy stone quarries and install plants for turning the stone into road material. The state now will be at liberty to sell stone to private contractors. The state now also is permitted to manufacture road material.

Another road bill just signed permits counties to make bond issues and spend the money on state highways.

Truck Train to Start for Coast July 7

Due to Reach San Francisco 2 Months After Leaving

WASHINGTON, D. C., June 16—The first transcontinental trip of an army motor truck train will start from Washington, under direction of the Motor Transport Corps, July 7, and end at San Francisco within 2 months. Before the trucks start on this journey, which is expected to provide tests of the standard motorized army equipments, demonstrate long distance motor post and commercial transportation and provide for other studies and training, President Wilson will dedicate a milestone in front of the White House to represent the starting point for highways radiating out of Washington.

The train will follow the Lincoln Highway as far as possible. It will comprise two complete motor transport corps companies, include five passenger cars, thirty-five trucks, all of army types, two ambulances, six motorcycles, two tank trucks, two kitchen trailers, two water tank trucks, one engineer shop truck and one searchlight truck. Technical personnel from the motor transport corps, engineer corps, medical corps, field artillery and air service will make the journey.

TRANSPORTATION NEEDS

WASHINGTON, D. C., June 18—The Highway Transport Committee of the Council of National Defense has requested the assistance of congressmen in determining the necessary routes for the operation of rural motor express. In a letter addressed to members of Congress, the committee points out the need for every form of transportation at this time and numerous examples of districts in which the transportation facilities are inadequate.

In various Southern districts, it is stated, hundreds of bales of cotton are lying on the ground without cover because of lack of transportation, while in the Northwest millions of bushels of grain lack the necessary transportation to move them.

MOTOR VEHICLES RETURNED

WASHINGTON, June 14—The American Expeditionary Forces have been instructed to return all class B 3-ton standardized army trucks to the United States, together with all new truck dump bodies.

The final disposition of these trucks has not yet been determined, but it is anticipated that they will form a part of the permanent equipment of the United States Army. A total of 18,826 class B trucks were shipped to France up to the signing of the armistice. Many of these have been destroyed in battle or through wear and tear.

Iowans Should Fight Excessive Tax

Will Pay $175 for 6-Ton Trucks Fitted with Solid Tires

WATERLOO, IOWA, June 16—Unless some further action can be taken between now and Jan. 1, 1920, motor truck operators in the State of Iowa will have to pay most excessive fees for their licenses after Jan. 1, 1920. The Iowa Legislature passed a law in April of this year which seeks to increase the license fees on all sizes of trucks and particularly on those of the larger capacity on which the fees are almost prohibitive. The schedule follows:

SCHEDULE OF LICENSE FEES FOR MOTOR TRUCKS FOR THE STATE OF IOWA AFTER JAN. 1, 1920.

A—Motor trucks equipped with all pneumatic tires:

For 1-ton or less capacity..	$15.00 per annum
For 1½-tons capacity......	22.50 per annum
For 2-tons capacity........	30.00 per annum
For 2½-tons capacity......	45.00 per annum
For 3-tons capacity........	65.00 per annum
For 3½-tons capacity......	90.90 per annum
For 4-tons capacity........	105.00 per annum
For 4½-tons capacity......	120.00 per annum
For 5-tons capacity........	135.00 per annum
For 6-tons capacity........	165.00 per annum

B—Motor trucks equipped with two or more solid rubber tires:

For 1-ton or less capacity..	$15.00 per annum
For 1½-tons capacity......	22.50 per annum
For 2-tons capacity........	30.00 per annum
For 2½-tons capacity......	55.00 per annum
For 3-tons capacity........	75.00 per annum
For 3½-tons capacity......	100.00 per annum
For 4-tons capacity........	115.00 per annum
For 4½-tons capacity......	130.00 per annum
For 5-tons capacity........	145.00 per annum
For 6-tons capacity........	175.00 per annum

MOTOR TRANSPORTATION COURSE

ANN ARBOR, MICH., June 14—The University of Michigan is now offering a course in motor transportation. It is probably one of the first of the great universities to place transportation on its course of study. The course will consist of the early history of transportation, the origin and growth of railroads, water transportation in the United States, history of American highways, highway location, fundamental principles of construction of highways, adoption of type of construction, economic considerations in highway construction, the use of highways, developments of motor transportation, statistics and present day importance of highway transportation, good roads development, types of motor transportation, economics of motor transportation and legislation for highway transport.

ST. LOUIS BUS LINE

ST. LOUIS, MO., June 19—The St. Louis Motor Bus Co., an organization under process of formation, has applied for permission from the Board of Public Service to operate a bus service line in St. Louis similar to those in operation at Chicago and at Newark. F. S. Wiemeyer represents the service company. The company plans to operate sixty motor buses, eighteen of which will be put into service immediately. Two lines will be maintained by the company, one running from eastern to western limits of the city, and another, consisting of sixteen trucks, running between the southern and northern limits of the city.

Five per cent of the gross receipts of the concern is offered to the city for a franchise. Permission to operate without a franchise has been asked of the city, in which case the city would not be remunerated. A straight 10-cent fare, with no transfer privileges, will be charged by the company. Buses will run every 5 minutes and will accommodate sixty persons. Double-deck bodies, with the upper deck enclosed, will be used for the bus line.

PORTLAND-SALEM TRUCK LINE

PORTLAND, ORE., June 19—A company operating between Portland and Salem, Ore., a distance of 55 miles, was recently formed. The company operates two heavy-duty Federal trucks which make the round trip every 24 hours, thus providing a day and night service each way. The line serves Fulton, Clackamas, Oregon City, New Era, Canby, Aurora, Hubbard, Woodburn, Gervais, Brooks, Chemawa and other small towns and villages along the route.

GA. DEALERS FIGHT UNJUST TAX

MACON, GA., June 14—Automotive dealers of the State of Georgia have condemned a proposed bill to be introduced in the next legislature to assess a truck license fee as high as $1,000 and $1,500 on trucks of 5- and 7-ton capacity. In order to handle this and other problems, the Georgia Automotive Dealers' Association has been formed with about 200 members. R. C. Dunlap is president of the association.

TWO FIRESTONE TRUCK BUREAUS

SAN ANTONIO, TEX., June 16—A ship-by-truck bureau for the operation of truck lines on short haul routes between towns in the trade territories with San Antonio as headquarters has been established at the local branch of Firestone. While the ship-by-truck movement has become an integral part of economic distribution in many centers of America it is a new departure in San Antonio so far as competing with the railroads and handling transportation on short routes is concerned.

COLUMBUS, OHIO, June 16—The ship-by-truck movement in Columbus is now under full sway. Fostered by the ship-by-truck bureau, a big demonstration was given when 125 trucks paraded the streets bearing banners advertising the purposes of the movement. Following the parade the truck drivers and the backers of the movement, the Firestone Tire & Rubber Co., were entertained at luncheon, where the many advantages of shipping by truck to short distances surrounding centers of population were emphasized.

N. Y.-N. J. Tunnel To Be Started

On July 1 Holland Will Begin on Preliminary Work

NEW YORK CITY, June 19—Preliminary work on the New York and New Jersey Vehicular Tunnel will be started on July 1. Clifford M. Holland has been chosen chief engineer and will take charge on July 1.

It will be about a year before the actual work of digging will start, as it will be necessary to condemn property, settle intricate legal questions and obtain an accurate geological survey and soundings of the river bottom. As previously told in THE COMMERCIAL VEHICLE of March 15, 1919, the tunnel will be constructed at Twelfth Street, New York, and at Canal Street, Jersey City, N. J.

N. Y. TO NEW BRUNSWICK LINE

NEW BRUNSWICK, N. J., June 16—Copleman & Freedman have established a motor truck express route between New York City and New Jersey points of Newark, Elizabeth, Rahway, Perth Amboy and New Brunswick. Five and one-half ton Mack trucks are used on the route and the rates between the two ends of the route and the intermediate points are the same as those charged for freight shipment.

ROAD BUILDING TRUCKS

WASHINGTON, D. C., June 16—Of the 28,000 motor vehicles to be turned over to the Bureau of Public Roads, 22,000 will be trucks. Already 8000 trucks have been delivered to the bureau and, in turn, to the several states which will use them for road construction.

Figures showing distribution of the trucks to the different states are withheld by the Bureau of Public Roads, and any figures which have been published showing the numbers of trucks apportioned to different states are said to be unofficial. The bureau is not making public the figures, because it fears any publication will cause many states that have not received trucks to protest to such an extent that congressional action may interfere and harm the road work.

Under the plan, the bureau declares, every state will receive all the trucks to which it is entitled in accordance with its proportionate subscription for Federal road aid for this year. Furthermore, the bureau declines to make public the figures at present because it has not yet received the complete inventories from the War Department showing the character of the equipment which will be turned over and is, therefore, unable to definitely complete the apportionments for all the trucks and tractors it will receive from the military authorities.

BUSES FOR DETROIT

DETROIT, June 16—The motorbus, such as is operating daily in New York City, is coming to Detroit. Within a few weeks 100 double-deck buses will be operating here and may prove a big factor in solving the city's critical transportation problem.

Capitalized at $1,500,000, the Detroit Motorbus Co. has been organized. Richard W. Meade, formerly president and general manager of the Fifth Avenue Coach Co., New York City, is president of the new company. The other officers are: Vice-president, William J. Kennedy; vice-president, Herbert W. Alden; treasurer, F. W. Hutchings; secretary, Herbert Y. McMullen.

The company proposes to operate under a city ordinance licensing the operation of motorbuses on specified streets. The buses will be similar to those in use in New York City, but lower in height. Each will hold forty-seven passengers and a fare of 10 cents will be charged.

MONTREAL WANTS TO COLLECT MOTOR TRUCK TAX

MONTREAL, CAN., June 18—When the City Council met yesterday, Alderman Dixon, in an interpellation, asked the administrative commission to negotiate with the provincial authorities on allowing the city of Montreal to collect the tax on motor trucks. The interpellation reads as follows:

"Whereas, Owing to the fact that the provincial government collects the tax on said motor trucks, the city's revenue is therefore reduced considerably at a time when new sources of revenue are sought for.

"Whereas, The city is held to maintain the streets on which the said motor trucks are used and it would only be fair that the tax in question should help the city in covering the cost of maintenance and reconstruction of the pavements of said streets;

"Alderman Dixon requests the administrative commission to urge the provincial authorities to allow the city to impose and collect the tax on trucks."

MICHIGAN GOOD ROADS

DETROIT, June 23—A greater yardage of concrete highways has been contracted for this year in Michigan than ever before in the history of the state. In addition, the new stretches of concrete are in many different parts of the state and are parts of new permanent highways. A tendency is manifested in all sections to build concrete, cement or asphalt-top roads whenever gravel roads wear out. While this method of building up trunk line highways is much slower than laying whole stretches across entire counties at one time, it is much more economical, and, therefore, more popular with the communities through which the highway passes.

A 400-Mile Cross-Country Demonstration

The above four pictures show scenes along the route of the 400-mile expedition of the thirty-five trucks which started from St. Louis on June 9 and returned on June 13. The tour was promoted by the St. Louis Automobile Manufacturers' and Dealers' Assn.

The first picture shows a group of people listening to one of the speakers along the route telling of the advantages to be gained by the use of motor trucks for hauling food products and other commodities. The three other illustrations are taken at different points along the route. The expedition proved the value of trucks for all kinds of work. The itinerary as published on page 14 of the June 15, 1919, issue of THE COMMERCIAL VEHICLE *was followed throughout.*

Mass. Amends Trailer and Truck Bill

Fees for Large-Sized Vehicles Three Times Present Ones

BOSTON, MASS., June 23—The Massachusetts truck and trailer bill, which caused so much protest because of its prohibitive fees, was amended June 12, passed in the House, and is now in the Senate. The bill, as amended, materially reduces fees for the larger size trucks, but they are still nearly three times the present fees. Fees for capacities over 7 tons probably relates to trailers, as the law in this state prohibits gross weight in excess of 28,000 lb. The schedule, as applied to trailers, is still prohibitive.

The amended schedule follows:

Before Amendment		After Amendment	
Capacity	Fee	Capacity	Fee
1 ton or less	$10	1 ton or less	$10
Over 1 ton to 1½	15	Over 1 ton to 2 tons	20
Over 1½ to 2 tons	20	Over 2 to 3 tons	30
Over 2 to 2½ tons	25	Over 3 to 4 tons	40
Over 2½ to 3 tons	30	Over 4 to 5 tons	50
Over 3 to 3½ tons	40	Over 5 to 6 tons	60
Over 3½ to 4 tons	50	Over 6 to 7 tons	70
Over 4 to 4½ tons	75	Over 7 to 8 tons	80
Over 4½ to 5 tons	100	Over 8 to 9 tons	90
Every additional ½ ton	50	Any capacity over 9 tons	100

ACME TRUCK PRICES ADVANCE

CADILLAC, MICH., June 16—The Acme Motor Truck Co. will raise the price of its 3½- and its 5-ton models $100 each, effective July 1. The following is the new price schedule:

Capacity	New Price	Old Price
1-ton	$1,950	$1,950
2-ton	2,750	2,750
3½-ton	3,750	3,650
5-ton	4,850	4,750

TEXAS GETS ARMY TRUCKS

AUSTIN, TEX., June 17—The Texas highway department has received shipping instructions covering an allotment of 313 trucks made to Texas by the Government. The first allotment consists mostly of 2-ton Nash Quads and will come from Indianapolis, Jeffersonville, Chicago and Streator, Ill., while 100 of them will be gathered from Texas army camps.

The trucks, in turn, will be awarded by the state highway department to various counties of the state for use in road work.

ARMY TRUCKS TO BE DISTRIBUTED

WASHINGTON, D. C., June 17—The Director of Sales of the War Department has approved the transfer of the entire present surplus of serviceable motor trucks held by the Army in the United States to other Government departments. This disposes of 30,000 trucks. They are to be divided among the Post Office Department, the Public Health Service and the Bureau of Public Roads and Department of Agriculture.

This transfer is in accordance with congressional policies outlined in appropriation acts passed in 1918 and 1919 authorizing the transfer of this surplus stock by the Secretary of War to the Post Office, Agriculture and Treasury Departments. Because of either special design or unserviceable condition a very limited number of trucks will be sold at public auction at the various camps and storage yards at which they have been collected after the sales have been duly advertised through the press.

Erroneous reports to the effect that the War Dept. would offer to the public a large stock of motor equipment has been widely circulated and is denied by the War Department. This transfer just announced effectively disposes of all these rumors.

DEALERS PUSH TRUCK ROUTES

BUFFALO, N. Y., June 17—A $1,000,000 corporation is being formed to establish motor truck service between Buffalo and Utica, N. Y. A committee including H. M. Damon of the Sentinel Motor Corp.; Henry May, Jr., of the Pierce-Arrow; H. E. Seanor of the White Co.; J. N. Firman of the Packard company; and C. L. White, who is organizing a truck department of the Automobile Club of Buffalo, was named to make plans for a general meeting of truck dealers in western New York. At this meeting plans for establishment of truck freight routes, including the one mentioned, will be completed.

Plans have been made by Buffalo truck dealers for a highway transport day in September. Fleets of trucks will parade in Buffalo before showing their practicability by delivering loads to New York and Pennsylvania cities.

VETERAN, A CANADIAN TRUCK

OTTAWA, ONT., June 16—The Eastern Canada Motor Truck Co., Ltd., has been organized with an authorized capital of $500,000. The company will manufacture at the outset a 2-ton truck, with an output of at least 100 during the coming year. The truck will be known as the Veteran, and will sell at approximately $3,000. It is expected that the first delivery of Veteran trucks will be made next August. The officers of the new organization are: Arthur E. MacCarthy, president; Capt. C. Gordon Bell, vice-president and managing director.

Coming Events

1919

Sept. 22-24 ..Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.

1920

Jan. 3-10.....New York City, Motor Truck Show, Twenty-second Regiment Armory, 168th St. and Broadway.

Jan. 24-31....Chicago, Ill., Motor Truck Show, Drexel Pavilion.

Trailer Makers Favor Uniform Laws

Assn. Recommendations Are Sent to Washington

NEW YORK, June 24—The Trailer Manufacturers' Association of America has drafted recommendations covering uniform legislation for the use of trailers, submitting the proposals to the committee in Washington which drew up the uniform traffic bill for introduction into state legislatures.

The draft, pointing to the value of trailer usage in reducing highway freight costs, urges lower license fees for trailers than for trucks, owing to their lesser destructive tractive effect on the roads; repeal of laws prohibiting trailers or more than one trailer to a motor vehicle; changes in state regulations to permit greater gross weights for trucks and semi-trailers than for trailers alone owing to greater distribution of the weight, and to allow greater weights per inch width of tires than in the case of self-propelled vehicles.

TOURISTS WILL UTILIZE TRUCK

BLOOMINGTON, ILL., June 18—Utilization of a motor truck for a transcontinental tour to carry the camp equipage, food, culinary outfit, tents, trucks, cots, etc., promises to become popular as the merits of the idea are realized by tourists.

A party of twelve residents of Mackinaw, Ill., organized by Ralph Puterbaugh, will depart about August 1 for California. There will be a fleet of three passenger cars and a 1½-ton Federal truck mounted on pneumatic tires. The truck will have a special body with sheet iron sides and top in order to be stormproof.

By utilizing the truck, the usual custom of carrying the camp outfit on the running boards of the passenger cars will be avoided, and the occupants of the cars will not be cramped for room. The truck has a speed capacity of 35 miles per hour and will be enabled to keep pace with the tourists in the passenger cars.

WATSON REORGANIZING

CANASTOTA, N. Y., June 17—The Watson Wagon Works of Canastota has increased its capital from $600,000 to $1,000,000. At the present time there are articles before the Secretary of State to change the name of the company from the Watson Wagon Works to the Watson Corp.

The company has bought the Empire Axle Co. plant at Dunkirk, N. Y., where axles will be made; the Marvin & Casler Co. plant, where drill chucks and boring heads are made, and the Sherwood Bros. Mfg. Co., makers of wagons and sleds, which uses wood from its truck bodies as a by-product.

The COMMERCIAL VEHICLE
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher.
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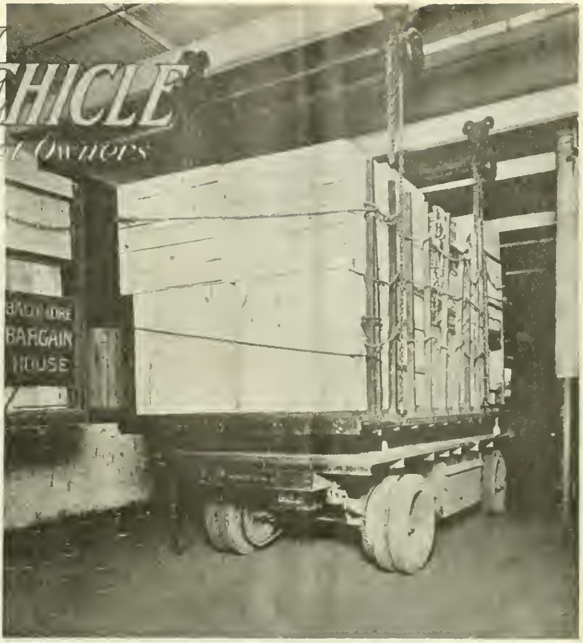
Autocar

The Commercial Vehicle
Read by Fleet Owners

Vol. XX July 15, 1919 No. 12

BODIES That Saved $22,000 Yearly

Equipment Cost $15,000—Paid for Itself in Less Than 1 Year



ONE OF THE BODIES THAT MADE THE SAVING

This picture shows one complete body and the front end of another. Eight bodies are hung along in a line and are loaded over the side from the platform seen in the rear. The method of support and the type of the two rolling differential hoists are clearly shown

JUST think of an investment of $15,000 which returned $22,000 the first year; the same amount during each of the next 2 years and saved in addition approximately $100,000 in the fourth year, 1918, when the war crisis came. To set your mind at rest, the investment was not made in any wild-cat oil stocks, gold or silver mines, or in war munition contracts. Instead, it was a decidedly legitimate business investment and was made in such an ordinary, everyday affair as a type of demountable motor truck body.

The return on the investment was made by the reduction in the cost of operation of the motor trucks with which the demountable bodies were used and are still being used. The depreciation of the investment, which includes the wear and tear on the bodies themselves and on the hoists used to lift them, is very slight, so that the investment gives every promise of returning the same income for many years to come.

Bodies Doubled Truck Ability

The use of the demountable bodies has practically doubled the work capacity of the trucks with which they are used. Without the demountable bodies the trucks averaged about four and one-half loads a day. With the identical trucks and the demountable bodies the average number of loads per day has been increased to eight and one-quarter. Expressing the saving in another way, the use of the demountable bodies has enabled the same work to be done with five less trucks than before the demountable bodies were installed.

The demountable bodies which have made these remarkable savings are used by the Baltimore Bargain House, Baltimore, Md. That concern is one of the largest wholesalers of general merchandise in the United States and did more than 1½ million dollars worth of business in the city of Baltimore alone during 1918 and over $26,000,000 worth of business in other parts of the country, particularly in the South and Southwest. The Baltimore Bargain House manufactures and sells clothing, shirts, overalls, cloaks, suits, tinware, crockery and even furniture. It is one of the largest mail order houses for these classes of goods in the East and distributes its goods to retailers particularly in the South and Southwest.

WHAT DEMOUNTABLE BODIES HAVE DONE

1—On an initial cost of $15,000, have saved $22,000 yearly in the cost of truck operation

2—Made it unnecessary to build a new warehouse which might have cost $100,000

3—Reduced the time of loading from 1½ hours to between 5 and 10 minutes

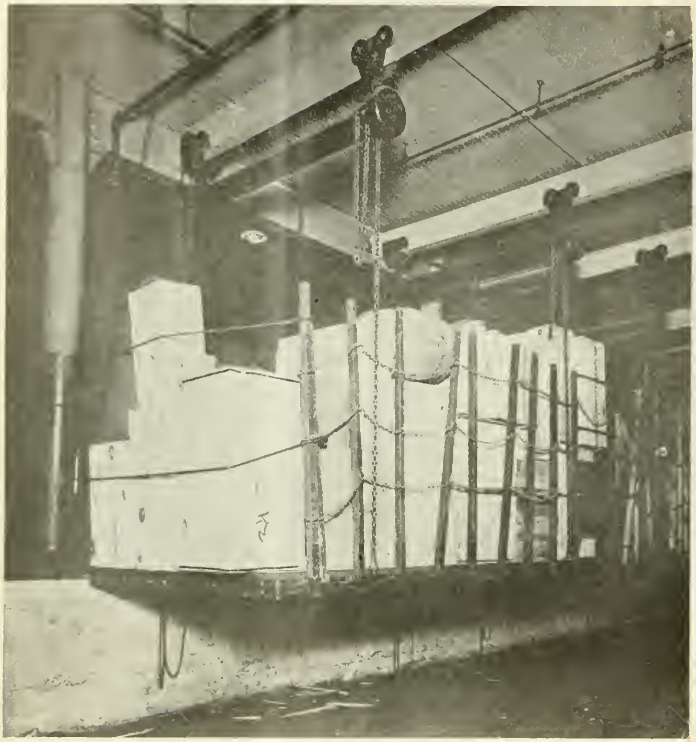
4—Doubled the shipping facilities without adding any more truck equipment

It has its main store in the heart of the Baltimore business section and maintains a large warehouse about 1 mile away from the main store and also a shirt and overall factory in another part of the city.

The Transportation Problem

Its transportation problem consists in moving such goods as are shipped into Baltimore from outside points from the various Baltimore railroad terminals and boat wharves to the Scott Street warehouse or to that portion of the main store which is also used to carry stock and later to ship goods taken from the stocks on hand to the same or other terminals and boat wharves for final delivery to retail concerns in various parts of the country.

The Baltimore Bargain House was established in 1881 and got along well enough with horses in the handling of its incoming and outgoing goods until 1906, when the volume of business had in-



One of the loaded bodies awaiting the arrival of a truck. The method of supporting by four chains from the two overhead Triplex hoists is also shown clearly, as are the crosswise beams on which the hoist rollers are moved inward and outward

creased to such a degree that severe and costly delays were caused by the slowness of the animal transportation. It then decided to purchase motor trucks and by 1914 had disposed of all of its horses and installed in their stead a fleet of twenty-two motor trucks which has since been increased to twenty-four trucks, of which twenty are electrics and four are gasoline vehicles.

Truck Loading Expensive

Along in 1912 the company found that while the motor trucks were giving a much superior service to that previously secured from horse wagons, the operation of the trucks was not as economical as it should be because it took 1½ hours to load each of the 5-ton trucks and almost as long to unload them. The trucks would back up to the platform at the main store or at the warehouse and stand idle while loads were being put on or removed from the bodies. The loading operation took such a long length of time because of the fact that the loads were so diversified. Some of the packages might be clothing shipped in small bundles and other packages, huge crates or boxes of chairs or other similar furniture. Practically each load was made up of small packages and other large ones, since all classes of goods were shipped to different parts of the country. The fact that both large and small crates or bundles would be shipped to certain cities at the same time added to the difficulties of arranging the goods on the platforms preparatory to their being loaded in one truck body to be carried to one railroad terminal or in another truck body going to another terminal or boat wharf.

The Germ of the Idea

It soon became evident that some new means would have to be employed for reducing the time of loading and unloading at the main store and at the company's warehouse, since nothing could be done to reduce the similar time spent at the railroad terminals and docks because the facilities at those locations were without the jurisdiction of the Baltimore Bargain House. Accordingly, the demountable body scheme illustrated herewith was worked out by Superintendent Neilson of the Baltimore concern.

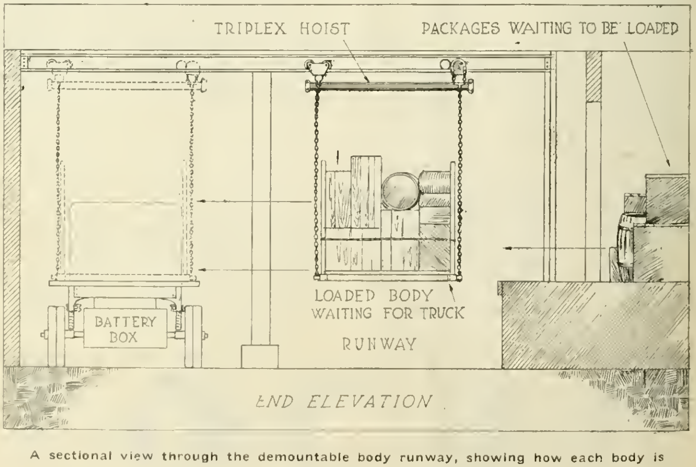
By the use of the demountable bodies the average number of loads hauled per truck per day has been increased from four and one-half to eight and one-quarter. In other words, the same number of trucks with the demountable bodies handle twice the amount of goods as the trucks without them. For instance, the average number of loads carried per truck per day during the 7-month period of 1916 from March to September was as follows:

March	8.63
April	8.67
May	7.73
June	7.17
July	8.38
August	9.33
September	7.19

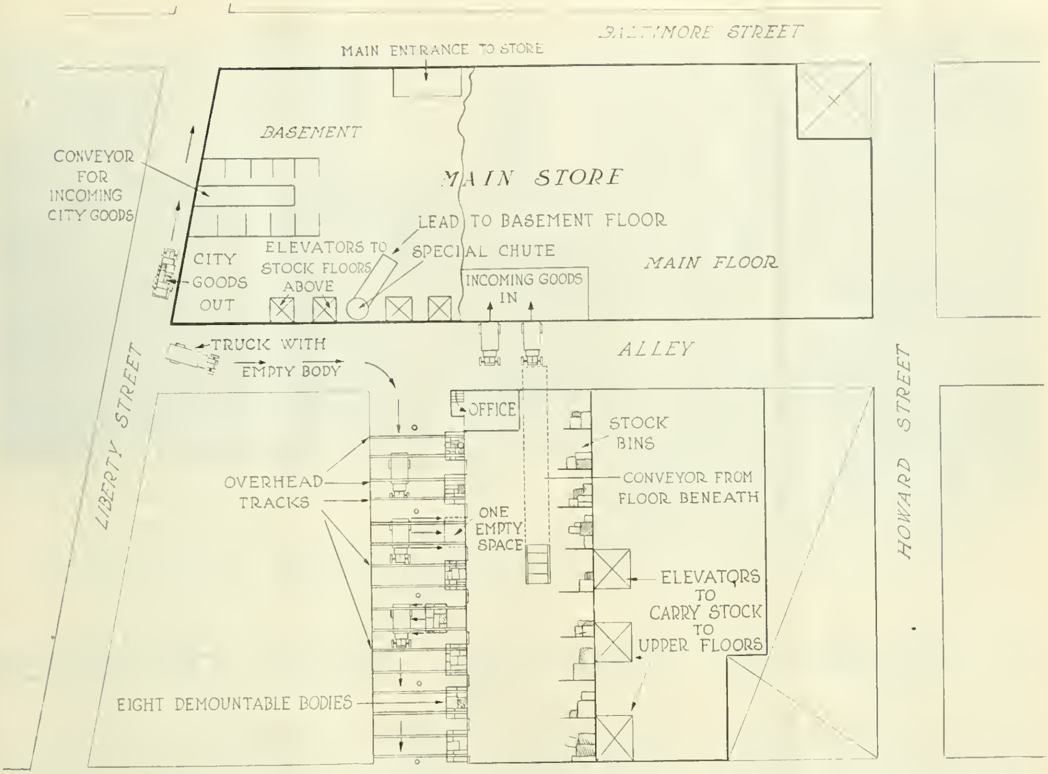
Truck Capacity Doubled

This doubling of the work capacity of the trucks has meant a saving in the cost of operation of approximately $22,000 a year and has enabled the company to handle the growth of its business from a total sales of about $14,000,000 in 1912 to over $26,500,000 in 1918 without any increase in its truck equiment.

During 1918 the fact that the company had its demountable bodies in use



A sectional view through the demountable body runway, showing how each body is moved onto the truck chassis sideways instead of from the end. It is also to be noticed that the body is moved to the truck and not the truck to the body



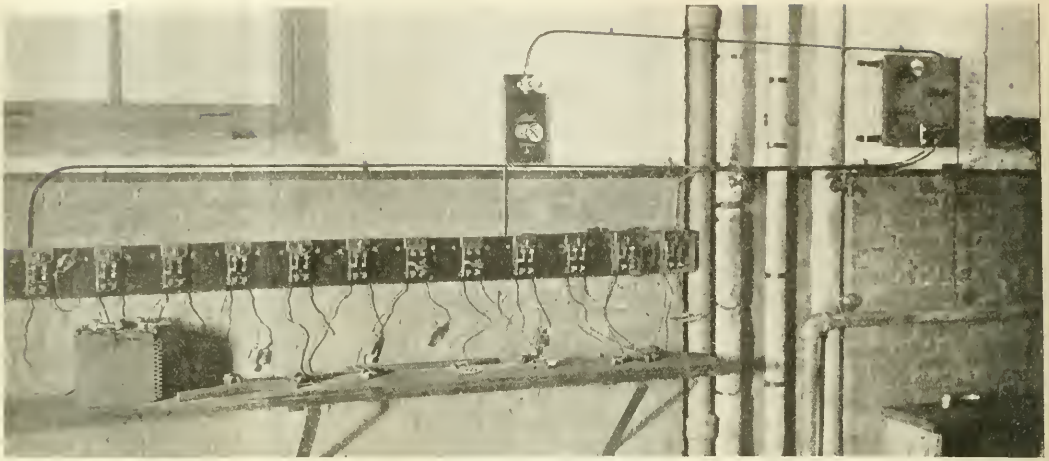
General plan of the demountable body layout at the main store of the Baltimore Bargain house. The city deliveries are separated from the movement of goods between the store, warehouse and railway terminals to prevent vehicular congestion. The location of the demountable bodies in the alley is shown. The arrows indicate the route of the trucks during the transference of the empty and loaded bodies on and off the electric truck chassis

saved it an expenditure of anywhere between $100,000 and $200,000, since a new warehouse would have had to be built provided the goods were to be moved over the company's platforms. These conditions were set up by the great railroad congestion caused by the preference shown to the movement of troops and war material of all kinds. For days at a time the company could ship no goods at all. Then all of a sudden the embargo would be lifted and there would be a rush of all kinds of vehicles to deliver their loads at the various railroad terminals. If the demountable bodies had not been available, only one-half the amount of goods could have been moved across the company's present platforms and this would have meant a shrinkage of a corresponding amount in the volume of business done. As it was, the use of the demountable bodies enabled the company to get its goods to the various terminals while the embargoes were lifted and this eliminated the necessity for constructing a new warehouse to provide additional loading facilities.

The $15,000 investment in the demountable body equipment is made up of thirty demountable bodies, each costing $200 or $6,000 in all; of fourteen hoists costing $500 apiece or $7,000, with about $2,000 for the cost of installation and changes made necessary by the installation of the equipment at the main store and at the Scott Street warehouse. The bodies are each 17 feet long and have a carrying capacity of 5 tons. The thirty bodies are used in conjunction with eighteen 5-ton G. V. electric trucks which are

(*Continued on page* 32)

Some of the trucks fitted with regulation bodies and used for city deliveries. The electrics shown are used for the close-in deliveries and the gasoline trucks on the longer runs. The goods carried by these trucks are loaded across the sidewalk

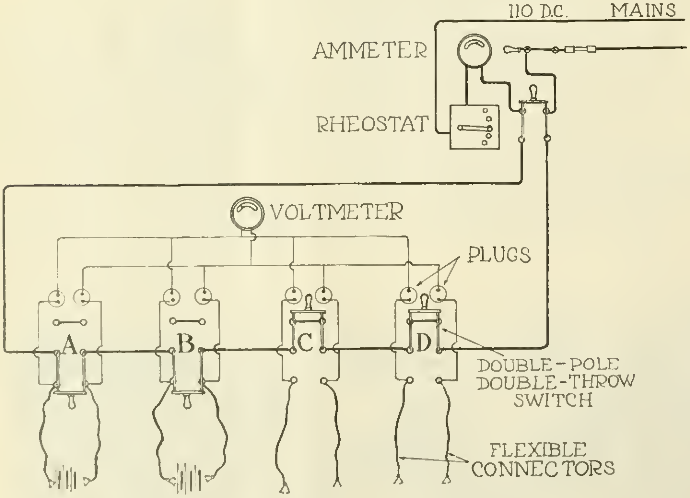


A Simple Device for Charging Small Batteries With D-C Current at Hand

This shows a charging apparatus made by an employee of the Otto Stahl Co., New York City. That company generates its own electricity and as a result the apparatus was simple in its construction. All that was needed was the resistance board with its rheostat, knife switch, ammeter, and connections to the main line and to the battery, twelve double-pole, double-throw switches on the charging stand and the flexible connectors to the batteries. A voltmeter and the necessary plugs for reading the batteries were also connected

A Device for Charging Small Batteries

A SIMPLE device for charging small batteries is shown in the accompanying illustration. This shows a charging apparatus made by an employee of the Otto Stahl Co., New York City, an owner of a large fleet of trucks. This company generates its own electricity, and as a result the apparatus was simple in its construction. However, fleet owners not possessing direct current facilities may use the same apparatus in conjunction with some form of rectifier, which will change the alternating current to a unidirectional flow.



Wiring Diagram of the Stahl Charging System

This shows the position of the switches when two batteries are being charged at one time. The switches at C and D must be thrown into an opposite position in order to close the circuit for the batteries being charged at A and B, as the switches are arranged in series

A double-pole double-throw switch is used. At A and B, the switches are in a charging position and at C and D they are in the opposite position to close the circuit. The circuit comes from the generator, which is a 110-volt D.C., and passes through a rheostat and ammeter into the main knife switch and then through to the charging switches, A, B, C, and D. Flexible wire connectors with snap ends are used to connect the batteries to the switches. A voltmeter is used to determine the voltage of each individual battery and this is accomplished by having two plugs, one on the positive and the other on the negative poles of the connectors which go to the batteries. When the plugs are connected and the switches are thrown in an opposite position as at C or D, the voltage is recorded at the voltmeter. This does not interfere with other batteries that are being charged. The ammeter gives the total amperage going through all of the batteries at one time.

The construction of the rheostat is very simple, as it consists only of a group of high resistance coils of wire mounted in insulating material and having suitable connections with segments on the base plate upon which is mounted the operating arm that makes the contact. Rheostats should only be purchased after consulting a capable electrician as the required resistance must be figured out from the voltage of the circuit to be used, the maximum battery current, the charging rate in amperes and the number of cells to be charged at one time.

It Pays to Take Off Tires When Worn Down to 1 Inch of Rim

THE THREE QUESTIONS ASKED

1—How do you determine when to remove a worn tire?

2—If a tire is kept in place until it is worn down almost to the top of the edge of the steel base, have you found that greater vibration has resulted and consequently greater repairs?

3—What experience have you had with tire companies in adjusting mileage on solid tires which they claim still have more mileage in them?

C. M. Geiger, truck superintendent for the Peter Doelger Brewing Co., New York City, which operates a fleet of fifty-six gasoline and electric trucks. He has found that mechanical defects or mis-adjustments in the steering mechanism result in unsatisfactory truck tire mileage on many occasions

THE mechanical condition of a motor truck often determines the mileage which can be obtained from its tires, according to Charles M. Geiger, Superintendent of Delivery for the Peter Doelger Brewing Co., New York City. That company operates a large fleet of fifty-six gasoline and electric motor trucks. Mr. Geiger is seen in the above illustration looking at the engine of one of the eleven Benz-Gaggenau trucks which he has maintained since 1914 without being able to procure any ready-made spare parts.

Steering Defects Affect Mileage

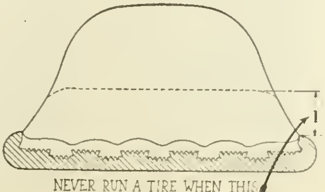
During his long experience as superintendent of the motor delivery equipment of the Doelger company, Mr. Geiger has found that mechanical defects in the steering mechanism and wheel bearings have a great deal to do with unsatisfactory tire mileage. Wheels running out of true decrease tire mileage very perceptibly. While Mr. Geiger does not claim that all tires will give satisfaction by showing more than the guaranteed mileage, he believes that the fleet owner who is getting less than the guaranteed mileage should carefully check up the condition of the front wheels and steering mechanism before condemning the tires.

In determining when to remove a worn tire, Mr. Geiger's attention is usually directed to tires which should be taken off by the general condition of the surface of the tire and the elasticity of the rubber compound remaining. Tires are never run when the profile height of the surface of the tread above the top of the steel base at the side is less than 1 inch, as shown in the accompanying sketch.

The tire mileage records kept by the Doelger company show the mileage which each tire has covered and the length of its time in service. Both of these factors can be determined daily because each day's increment of mileage is added to the mileage previously covered on each daily report. When these two records show that a tire has run in excess of the guaranteed mileage, it is an indication that it should be examined closely to determine exactly when the profile height of 1 inch has been reached.

Mr. Geiger has found that when tires are allowed to remain on the wheels after being worn down to a profile depth of 1 inch, greater vibration results and consequently greater repairs. Such repairs are not localized only in the wheels themselves, but also have to be made on the engine and sometimes on the front springs.

In answering the third question as set down above, Mr. Geiger has found no difficulty in making adjustments with the tire makers when tires have been taken off after being worn down to the line 1 inch above the edge of the steel base. In practically every case, such tires have always given much more than the guaranteed mileage so that requests for adjustments on the mileage basis have been so few as to be almost negligible.



NEVER RUN A TIRE WHEN THIS DISTANCE IS LESS THAN 1 INCH

Driver's Care Important

The care which the driver gives the truck is also a big factor in tire mileage, according to Mr. Geiger. If the driver attempts to swing the front wheels through a wide arc while the truck is standing still, the tires are subjected to a severe side thrust which tends to separate them from their bases. Base separation is the most common symptom in tires which do not give their guaranteed mileage.

Throwing in the clutch suddenly and applying the brakes abruptly are two other causes which result in rapid tire wear. When the brakes are thrown on suddenly, the rear wheels are generally locked so that the tires slide along the pavement. This action sometimes results in forming flats on the tire surface which have the same effect and produce the same vibration on the truck chassis as is the case with a flat steel wheel on the trolley car or railway coach.

Between the front and rear tires, more attention is paid to the former because they support the entire front end of the vehicle including the engine with its many parts which are liable to get out of order or break when subjected to too severe vibration.

Fleet Owners Must Train Mechanics

What the Fleet Owner Must Do to Obtain Competent Men for Making Truck Repairs

1—Select Young and Ambitious Men from Available Local Labor Supply

2—Team Apprentice with Good Mechanic Who Is Willing to Pass On His Experience

3—Provide Good Shop Working Conditions

DUE to the shortage of men capable of making general repairs, the fleet owner must train young men who desire to learn the maintenance end of the truck business. Fleet owners who do all of their own repair work and who, in conjunction therewith have machine shop facilities, are on the constant lookout for men capable of making general repairs. At present there is a serious scarcity of this type of mechanic. People commonly think of the motor truck mechanic as a person capable of handling all sorts of repair jobs. This is not true. Factory training has produced many specialists. One may be an expert on aligning pistons, another an expert gear adjuster, but it is seldom that a man is found who combines all of these qualities in one. This latter type of mechanic is the kind most needed by fleet owners with trucks in daily operation.

However, shops employing a limited number of men cannot afford to hire specialists, as the repair work is too general in nature, and neither can they afford to train specialists in the general work as such men command too high a salary.

Opportunity in Truck Repairing

The maintenance phase of the truck owners' field affords considerable opportunity to the young man, as the pay compares well with other mechanical trades. If he is a hard worker and an earnest student of conditions concerning repair work, he becomes good foremanship material in the course of a few years. The ins and outs of repair work are many. They cannot be mastered in a day or a year. It requires 4 or 5 years to become proficient in most mechanical trades, and this applies equally well to motor truck repair work. A real truck mechanic combines a machinist, an assembler and fit-up man and an engine tuner in one.

The first impression of a young man who is mechanically inclined upon entering a repairshop is a lasting one. If it is a clean, orderly place he is interested. On the other hand, if he finds a shop with men clad in filthy overalls and parts of trucks scattered all over a dirty floor in puddles of grease, with some on a tool-cluttered bench, it is anything but encouraging. The thought of having to work in a place like this is repelling and, consequently, his interest wanes. Fleet owners are directly responsible for such conditions, and they can never expect to secure a good personnel or have it do the best work unless conditions like these are altered.

It is highly important that a shop have good light, proper ventilation, clean floors and benches, careful supervision, and that the men keep their working garments clean. Other industries offer similar working conditions and get a fine class of apprentices. So can the truck operator if he will improve conditions.

The mental attitude of an employee is affected by shop conditions. His output is proportional to this attitude. A bright, clean shop keeps him mentally alert and increases productiveness. These are things to be considered by the fleet owner. He must not overlook the human element in business if he is to be a success and always keep himself surrounded with proper personnel. No business organization can make a better impression on its customers than it makes on its individual members. Thus a high standard is necessary.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

What the Owner Can Do

The primary training given the young men is equally as important as improving the shop conditions. He should be teamed with a good mechanic who is willing and capable of passing on his own experience. This actual shop practice should be supplemented with a few hours' lecture each week. These lectures should not exceed an hour in length and should be given about twice each week. Each organization has someone who is more or less familiar with repair work and capable of giving such instruction. The few fundamentals involved in engine operation and the electrical system should not be neglected. A good start is a time saver, as it makes possible more rapid advancement. The more rapid advancement, the less the cost of training.

While an educational plan of this nature has its drawbacks, it is a means toward an end—better mechanics. It is needless waste of time and money unless a close check is kept on all apprentices. Those who lack initiative to take advantage of the opportunity should not be tolerated. Apprentices will be nonproducers for a certain length of time, and as they improve and become a real asset to the fleet owner, it is the employer's duty to keep satisfaction among them.

Labor always tends to gravitate to the source of highest pay. This means that there is always a chance of losing the mechanics that have been developed. Of course, there is always a certain percentage that will shift regardless of conditions. If the apprentice material is secured from the local labor available, the possibility of shifting is considerably reduced. Yet it is almost certain that if an employer will keep abreast of the times, he will have little difficulty in retaining the major portion of his good men.

A part of M. E. Elliott's fleet of eleven trucks shown lined up in front of his 50,000 square-foot warehouse in Macon. The trucks are employed to handle merchandise, move household goods and deliver and collect baggage

Transferman Replaces 26 Mules by 11 Trucks and Increases Business by 40 Per Cent

Delivery Radius Doubled and Extended to Points 50 Miles Away—All Trucks Sold as Soon as They Become Two Years Old

WITHIN one year after M. E. Elliott, a transfer and storage man of Macon, Ga., replaced his mules by a motor truck equipment, he increased the volume of business done by 40 per cent. He gives credit to the motor trucks for this business expansion, since the trucks have enabled him to accept work within a 50-mile radius of Macon. This includes all of Bibb and Houston Counties and extends to Crawford and Monroe Counties.

Mr. Elliott operates a warehouse with 50,000 square feet of floor space, in which he stores merchandise, household goods and furniture. In conjunction with his warehouse business, he also has contracts with all of the railroads entering Macon to deliver and collect baggage from and to the Macon terminals.

Three Kinds of Truck Work

It is thus seen that his truck work may be divided into three main classifications, including (1) General transfer work, such as hauling cotton and other manufactured products from plant to plant or from plant to railroad or *vice versa.* (2) The moving of household goods from homes in Macon to other points within a 50-mile radius of the city or from homes in Macon into his storage warehouse, and (3) The handling of baggage within the city of Macon itself.

During 1918 he did more than $100,000 worth of business, of which approximately half was what might be called suburban business, since it included the moving of goods outside of the city proper but within a 50-mile radius of Macon.

For this amount of business done, Mr. Elliott maintains a fleet of eleven trucks and no mules. Previously he maintained twenty-five head of mules, but these were done away with about two years ago, or just before the beginning of the great business boom which the South enjoyed as a result of the many war activities carried on in that territory. Because of the different nature of the three classes of business engaged in, the Elliott trucks vary in capacity from ¾-tonners up to 3-ton vehicles, which are the largest practicable size at the present time when goods have to be moved off of the few well-improved main highways of the state.

The Fleet Make-Up

The fleet is made up of four Packards, one of 2-ton capacity and three 3-tonners; one 3-ton White; one 2-ton Kelly-Springfield and five Republics, three of ¾-ton capacity and two 2-tonners. The ¾ and 2-ton trucks are mostly used in the baggage collection and delivery work, since only a few pieces are handled on any one order. The 2 and 3-tonners are used principally in the contract and delivery work and for the moving of household goods into and out of Macon. The household goods delivery business is only a small percentage of the volume of business done during the year, so that none of the trucks are equipped with van bodies. Instead they are fitted with ordinary platform bodies and provided with removable side stakes of both the single post and panel type. When bulk goods are hauled, the panel type of sides are used, while for ordinary transfer work, including the handling of cases and crates, the single post type with chains between the posts is preferable since it permits of either side or end loading or unloading.

Trailer for Cotton Haulage

Mr. Elliott also owns a 3-ton trailer which he employs when bulky goods are to be hauled over routes within the city or those in the suburban territory where there are no severe grades. The trailer was used largely during 1918 in the hauling of cotton between the Macon market and a new mill just outside the city limits. In that work, one of the 3-ton trucks was used to haul the trailer. Each vehicle carried ten bales, or a total load of twenty bales, each weighing approximately 500 pounds, so that the weight of the total load carried was 5 tons. The price secured per bale handled was 40 cents, so that the truck and trailer earned $8 on every trip.

Besides this character of work, Mr. Elliott also handles automobiles and similar

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
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7—Interest	August 1
8—Garage	August 15

equipment in trans-shipment, reshipping the goods as required. His standing is so good in the territory for satisfactory work that loans are negotiable on his receipts.

Repairs Done Outside

While all of the trucks are maintained in one special section of his warehouse set aside as a garage, all of the major repair work is done at the service stations of the respective truck makers in Macon. He has found that he can secure a better ultimate service by having the major repair work done outside than if he attempted to do it himself. It costs more to have the repair work done at the Macon service stations than to do it in his own garage, but the latter course would necessitate the installation of suitable equipment for doing the work and of hiring one or more mechanics to actually make the repairs.

At one time Mr. Elliott attempted to do his own repair work, but, due to the scarcity of reliable mechanics, decided that he would rather pay the service station a little more money for the same work and be relieved of the responsibility and worries of hiring and directing his own mechanics and of installing the tool equipment which would enable him to do the work economically.

He has also found little difficulty in getting his trucks back when they were put into the different service stations for repairs. This has no doubt been due to a somewhat unusual plan of truck operation by which he does not keep any of his trucks for more than 18 months to 2 years. As soon as one of his trucks gets to the age of 1½ or 2 years, Mr. Elliott either trades it in to the dealer or distributor from whom he bought it or sells it outright to some other truck operator.

Trucks Sold After Two Years

He decided upon this course because he found that the truck repairs during the first 2 years of a truck's life were comparatively slight, but increased materially after the 2-year age had been reached. He found by experience that on the average each of his 2- and 3-ton trucks cost about $850 a year for overhauling, painting and new tire equipment after they had reached the 2-year age. In his calculation, a new set of tires was figured at $300, an annual overhaul at $500 and painting at $50. At the end of the 2-year period he sold his 2 and 3-ton trucks on an average of about $1,500 apiece, or about half of the average initial cost of $3,000. If he kept each truck for 2 years after it had reached the 2-year limit, he estimated that he would have to spend $850 a year for upkeep, or $1,700 in all. This $1,700 is $200 more than the $1,500 which he would have to add to the sale price of the truck at the end of the 2-year period in order to buy a new one, so that he considered he was saving $200 by turning back or selling the old truck and getting a brand new one in its place. There is also an additional advantage in having new trucks every 2 years, since they are much less liable to have to be taken out of service for repair work or overhauling than after the 2-year age.

The same policy is followed on the ¾-ton trucks, only, of course, the maintenance costs are less. Mr. Elliott figures that a ¾-ton truck costs just about half as much to operate and maintain as a 2- or 3-tonner, even though the load carried on the larger vehicles is more than double that carried on the smaller vehicle. This disproportionate cost of operation as compared with the tonnage capacity is of course due to the fact that such cost items as the driver, gasoline, oil and overhead expense are the same or almost as much on the smaller unit as on the larger truck.

Tires Cost 2½ Cents a Mile

Tires on the 2- and 3-ton trucks cost on an average 2½ cents a mile. The trucks of those capacities average between 25 and 30 miles a day, although on some of the longer trips routes as long as 85 miles one way are covered. The ¾-ton trucks, due to their greater speed, average between 40 and 50 miles a day. The 2-ton trucks average about $13 a day to operate and maintain and the 3-tonners about $15 a day. The drivers, who are all colored men, are paid at the rate of $2½ a day. From one to three helpers are used on each truck, depending upon the class and weight of the goods handled. The trucks average about 5 to 6 miles to a gallon of gasoline, which at 27 cents a gallon gives a daily gasoline cost of approximately $1.35. Oil costs about 25 cents a day and the proportionate garage charge is set at $1 a day, so that with one helper per truck, the operating cost of a 2-tonner is about $7.10 a day. Interest on the investment is figured at 50 cents a day and $3 set aside for a depreciation and tire cost. An overhead charge of $2 a day to cover superintendence, clerks and office force, together with advertising, etc., is made on each 2-ton truck, so that the total cost per day varies between $12.60 and $13.

One of M. E. Elliott's three 2-ton Republics, seen being unloaded of merchandise which is distributed through his warehouse, shown in the background. The rear body side panels are removable when desired

IOWA TRANSPORT COMMITTEE WORKING WELL

DES MOINES, IOWA, July 11—The Iowa Highway Transport Committee which was formed under the direction of the Council of National Defense in Washington late in 1917, has distributed in the State of Iowa 87,000 booklets; 44,000 bulletins; 112,000 circulars, and answered 6812 letters of inquiry. It has also made a number of practical demonstrations with trucks in different localities over the state; sent speakers out to talk before eighty-three different clubs, besides getting out sample forms of bills of lading, bookkeeping systems, sight drafts, C. O. D. package blanks and inspection reports, rate sheets and other printed matter.

M. E. Elliott's 3-ton White unloading merchandise to be stored in his Macon warehouse. Both the driver and helpers are colored men, the former paid at the rate of $2.50 a day. Note the type of body fitted

Use of Trucks for Garbage Collection in Peoria Proves Successful

COLLECTION of garbage by motor trucks and trailers has been inaugurated by the city of Peoria, Ill., with great success, and, after a thorough trial, the system is being commended to other municipalities which have learned of the experiment and are desirous of learning more of the results and of the saving in cost and other advantages.

The city has done away with all charges for the removal of garbage and only requires the householder or business institution to separate the wet from the dry garbage. Two cans must be provided by each resident or business institution. One is reserved for waste from the table which may be consumed by hogs, while the other is utilized for ashes, tin cans, etc., which cannot be burned in stoves or furnaces.

The trucks haul specially-constructed trailers. These trailers carry a number of rectangular tin receptacles into which the various kinds of refuse are dumped as the truck and trailer moves from house to house or store to store. As soon as the trailer is fully loaded, it is left at a designated corner, and an empty trailer picked up by the truck and carried away for a fresh load.

In the meantime, attachés of the city garbage department empty the cans of the ashes or other refuse, while a company which pays the city $2 per ton for the edible garbage empties the receptacles and hauls the refuse to the feed yards in the rural districts.

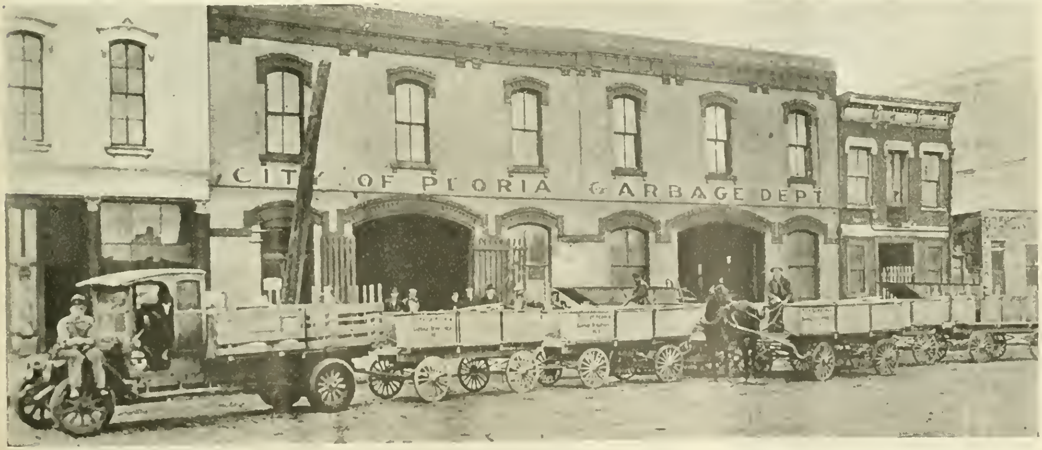
In 1918, the city realized $5,912 from the sale of this garbage, and this year it is believed that the sum will be increased to $10,000, going a long ways toward payment of the vehicles and wages of the men engaged. The separation of the ashes gives the city desirable material for filling in mudholes in the dirt streets and low places.

Formerly, when the garbage was mixed with the ashes, residents naturally objected to dumping such refuse in front of their homes and it became a problem how to dispose of it. Ashes furnish an ideal fill for low places in unpaved thoroughfares and, under the new system, the street department has greatly improved the streets in the suburban districts.

Empty Trailers at Pick-up Points

The trucks keep up a continuous movement over designated routes, while the trailers, when loaded, are left at convenient corners at some central point in each district, an empty trailer being picked up as soon as one that is full is uncoupled.

The system has now reached a point where it is being operated without friction and the city refuse is picked up promptly and there is avoidance of the delay that was formerly so exasperating to all households, business institutions and factories. The utilization of the waste in feeding hogs thus increases the food supply and correspondingly decreases the cost of collection for the city. The improvement of the dirt roads by the separation of the ashes is also a feature that is regarded as one of great importance. The new system promises to be permanent and soon self-supporting.



One of the Peoria garbage trucks with two of the can trailers which it hauls. Cans of garbage are carried in the truck itself, which is fitted with a conventional stake-sided body. Since the truck and trailer equipment was installed, the city of Peoria has discontinued the charge which it formerly made for garbage and ash removal

One of the Big 8 in Truck Operation

6—INSURANCE

POINTS THE TRUCK OWNER SHOULD KNOW

1—Stock Companies are safer than Mutuals
2—Liability insurance protects your business
3—Fire, theft and collision policies protect trucks

INSURANCE is the world's greatest shock absorber and as such should be carried by every motor truck fleet owner, no matter whether he operates his trucks merely as an incident to his business or depends upon them for his entire livelihood. If insurance is imperative for the first class of truck owner mentioned, it is doubly so for the public motor truck haulage man because his entire livelihood depends upon them.

Insurance has become such a highly technical subject since legislatures have concerned themselves with it and commissions have appointed to regulate it, that the average truckman cannot keep informed of the various laws and restrictions which frequently affect his policies. There are, however, a number of conditions which the average policy holder can understand and it is the purpose of this article to point out these conditions to the end of preventing many losses which would have to otherwise be assumed by the assured.

Stock *vs.* Mutual Companies

One of the first questions which naturally arises in the mind of the fleet owner who is desirous of insuring his trucks is whether he should insure in a stock company or in a mutual company. At the very outset, the truck owner should know that the stock company is safer than the mutual company. The difference between the two companies may be explained briefly by stating that the stock company agrees *to pay* for any loss sustained by the assured, while the mutual company agrees *to assess* other members for the loss sustained by the assured. It is evident that there may be a vast difference between agreeing *to pay* on the one hand, and agreeing *to assess* on the other. The stock insurance company has a large capital invested. The mutual company on the other hand has no capital invested except in the form of premiums paid in and which are distributed at the end of the year in the form of dividends, provided the claims paid out have not been in excess of the premiums paid in.

Provided a truck owner insures with a reputable stock company and lives up to the conditions of his policy, the only cost of his insurance is that of his yearly premium. On the other hand, when he insures in a mutual company he is liable to have to pay several times the amount of his yearly premium through assessments if the claims paid out are in excess of the premiums paid in during any one year.

When it is realized that one accident often costs the savings of a lifetime, it becomes apparent that no good insurance is cheap and no cheap insurance is good. You may be able to save a few dollars on the amount of premiums paid by going into a cut-rate company, but if you have a loss, the basis of settlement may prove that your saving was extremely expensive. When a truck owner buys cheap insurance he gets what he pays for and cheap insurance is sometimes not worth having.

Then again, insurance rates have become much more nearly standardized than previously on account of the supervision of rates which has been taken over by insurance departments in many of the states. It is for this reason that the wise motor truck owner should thoroughly investigate the claims of any company which offers to sell insurance at greatly reduced rates.

Cut rates and insurance disasters went hand in hand 15 or 20 years ago when many insurance companies had none-too-good reputations which were not entirely undeserved. But during the last 10 years, the insurance companies have realized that good will is an all-valuable asset and because of that fact, most companies are now anxious that the assured should understand all the conditions of his policy contract in order to be able to live up to them.

With a clear understanding of the advantages of both the stock insurance company and the mutual insurance company, the next important item which the truck owner should consider is what kind of insurance he should carry. In general there are five separate and distinct forms of policies including: 1—Liability, 2—Collision, 3—Fire, 4—Theft, and 5—Insurance on the goods carried.

Liability Most Important

The most important of these forms of insurance to the motor truck owner is that of liability. Liability insurance is of two classes. The first is that which covers injuries to persons and the second, described as property damage. While the first form of liability insurance covers claims brought against an owner as a result of bodily injuries or death. Contrary to the general impression, this form of policy covers not only the owner of the truck but protects anyone who may be driving it. The earlier forms of liability policies provided for an extra premium if coverage was desired for a person or persons other than the one to whom the policy was issued. Liability policies to-day generally protect the assured from paying any damages up to the limits mentioned in the policy which are usually $5000 for one person injured or $10,000 for all the persons injured in any one accident.

It is well for the truck owner to know that in view of the recent tendency of juries to award large verdicts, policies with higher limits of from $10,000 to $20,000, which can be had at an additional premium of approximately 10 per cent, are very advisable.

The second form of liabiltiy insurance known as property damage covers the damage done by the truck to another's property, and includes damage to a passenger car, motor truck, or even a house, but does not include injuries to human beings. The average truck owner often confuses property damage with collision damage, but there is no connection between them. Collision damage covers only damages *sustained* and not damages *inflicted.* In connection with liability for property damage, the courts have recently held that where a business vehicle is put out of service, the owner can collect damages for the loss of the use of the vehicle for the time it is being repaired. In view of these decisions, some of the companies writing libility insurance have provided a clause which protects the assured in claims of this nature. The additional premium for protection of this kind is comparatively small, so that the prudent truck owner will carry the extra coverage.

A $47,000 Judgment

Both forms of liability insurance should be carried by every motor truck owner in order to protect his business. One serious accident may wipe out the entire savings of a lifetime if the truck is owned individually or eat up the surplus of a concern if the truck is owned by an incorporated company. Public transfer and haulage men should carry such insurance by all means, since their very livelihood depends upon the uninterrupted operation of their vehicles. Recently one motor truck owner in Yonkers, N. Y., had a judgment sustained against him for $47,000 for killing a boy who darted out from off the sidewalk directly under the front wheels of the truck. If the company owning that truck were not insured by liability insurance covering injuries to persons, its surplus would certainly have been wiped out or it would have taken many years of business to earn sufficient profits to pay off the judgment.

Collision insurance covers damage sustained and is never issued except in connection with liability or fire policies. It covers damage to the assured's truck resulting from an accidental collision with any other motor truck, passenger car or other vehicle or other object. There are three classes of collision insurance as follows: 1—Full Coverage, 2—One Hundred Dollar Deductible, and 3—Fifty Dollar Deductible. The first policy insures for the full amount of the loss up to the amount of the policy. The second does not pay for a loss which is less than $100. If the loss is over $100 the company pays the difference between the amount of the loss and the $100. For example, a collision which resulted in damage that cost $95 to repair would have to be paid for by the policyholder; if the damage cost $125, the insurance company would pay only $25. For policies in the Fifty Dollar Deductible class, the principle is the same except that the unit of the judgment is $50 instead of $100.

The next two types of insurance which should be carried by the truck owner are fire and theft. These policies cover losses due to fire or theft, as their names signify. One important point for the truck owner to remember is that he should take out theft and collision policies in the same company. The reason for such action may best be explained by assuming a typical case in which a truck owner who is insured against theft and collision in two different companies reports that his truck has been stolen. A few days later he recovers his truck and finds that it has been almost completely wrecked due to a collision. He then applies to the company carrying his theft insurance and is told that the damage to his truck was caused by a collision and that he should collect from the company carrying his collision insurance. He then applies to the latter company and is told that his truck was stolen before anything happened to it and that its present condition is due solely to the fact that it was stolen. He is then advised to collect from the concern which carries his theft insurance.

In this quandry he sometimes gets nowhere with the result that he has to stand the expense of putting his truck into shape from his own pocket until such time as the case may be cleared up. On the other hand, if both theft and collision policies are carried in the same company, the assured is protected, leaving it to the theft and collision departments of the company to fight it out as to whose books the loss should be entered upon.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

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How Rates Are Determined

As to rates, no attempt is made in this article to give any concrete figures because what might be a high rate in one case might be exceedingly low in another. It may be well to state, however, that motor truck insurance rates are determined under four main headings as follows: 1—The class of business; 2—The cost of the truck and its age; 3—The particular business in which the truck is engaged, and 4—The particular locality in which the truck works. In the first class, all businesses are divided into seven general classifications under which almost any given business can be placed. In the second instance, it is evident that the rate of insurance should be more on a high-priced truck than on a low-priced one. It is also evident that the question of the age of the truck when insured should be taken into account. The business in which the truck is engaged also affects the rate, since the risk in some businesses is far greater than in others. In regard to the factor of location, it is evident that in some sections of the country where there are a large number of trucks in use, with consequent vehicular congestion, there is a greater liability of damage due to collision than in other sparsely-settled sections where there are comparatively few trucks in operation.

Blanket Insurance on Loads

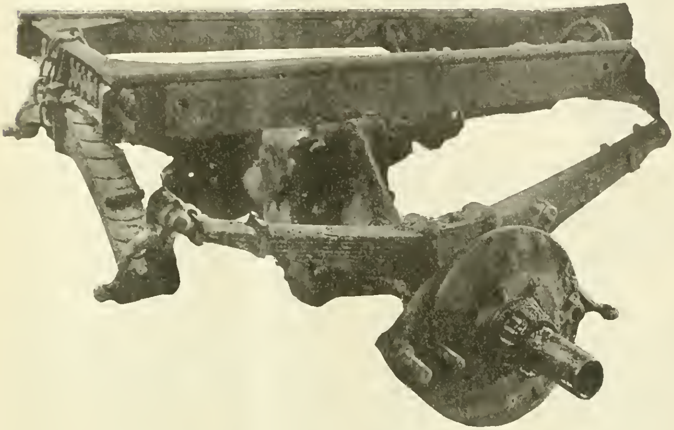
Then there is the question of insurance on the loads carried by means of blanket insurance to cover all loads handled during any given period, or policies covering a particular load moved between any two particular points on a particular day. The first form of policy is highly desirable for public truck haulers whose sole business is the movement of other peoples' goods. All such owners should carry blanket insurance, provided it can be obtained. It is much more difficult to get such insurance than to insure a particular load to be carried between any two given points on a stated day. However, the former type of insurance can be obtained, one company writing such policies being the A. A. Cervantes Co., located in the La Salle Building, St. Louis, Mo. That company writes a blanket $3000 insurance policy on the goods carried on the trucks of the Progressive Transfer Co. for $75 premium, as told in greater detail in THE COMMERCIAL VEHICLE for July 1, 1919. In writing policies covering various goods carried on trucks, the moral risk is the most important item so that the general reputation of the concern applying for the insurance often determines the rate to be given.

Another factor in insurance which the average truck man does not understand is that when a company pays a loss, the amount paid is deducted from the amount of the policy. For instance, if a person carrying a $5000 policy was paid for a $4000 loss he assumes that during the balance of the term of the policy he is insured for only $1000. This is not the case. His insurance is for the full limits of the policy for each separate loss after the preceding loss has been settled unless there is a clause in the policy which specifically states that only one loss shall be settled. The average policy is worded as follows: "The liability shall be reduced by the amount of such loss or damage until repairs have been completed, but shall then attach for the full amount, as originally written, without addition premium."

Under the latter wording, it is conceivable that a $5000 liability policy might cost the insurance company $200,000 or $300,000, but it never would, because after a few accidents the policy would be canceled and a pro-rata amount of the premium returned to the assured.

In closing, one very essential precaution which should be taken in buying insurance is that the policy should be taken in a company financially strong. Court cases frequently drag out for several years before any verdict is rendered and if the company issuing the policy goes out of business before that time, the policyholder is liable for the costs and the payment of the verdict if the case should be decided against him.

Overloading and Corrosion Problems of Ice Cream Truck Maintenance



The Effect of Salt Corrosion

This is what the ice cream manufacturers have to guard against during the delivery of their product. The salt water drippings from the ice packed around the cans is most detrimental to the rear truck parts, such as the rear axle members, springs and brakes

The Two Problems and How They Were Solved

1—Grease and plenty of it, helped solve the corrosion problem. One greaser, paid $26 a week, is responsible for every truck part being properly greased. A new non-leak type of body also helped to prevent the salt water spray from getting on the rear truck members.

2—A rigid inspection of every truck part helped solve the problem caused by the necessity for overloading the trucks during the rush season from May to October each year.

OVERLOADING and the corrosion of the truck parts are the two serious problems which must be solved in the successful maintenance of a fleet of trucks in the retail ice cream business, as determined by the J. M. Horton Ice Cream Co., which operates a fleet of seventy-nine trucks for deliveries in the metropolitan area of New York City.

The problem of overloading comes up because there are two distinct seasons in the retail ice cream business, one a rush period from May to October each year during which the trucks must be run continuously every day of the week, including Sunday, and a subsequent dull period from December to April, when the business done is less than half that of the busy season. These two seasons set up conditions perhaps peculiar to the ice cream business and result in methods of truck maintenance which differ from those which may be applied in other lines of transportation activities.

Why Overloading Is Permitted

Because of the great volume of business in the rush season, the number of trucks required to handle the deliveries in the dull season is not sufficient to make the deliveries in the busy period, and rather than put on more trucks to handle the maximum business and have them idle over the dull period, overloading of the trucks to handle the minimum business has been resorted to. This known overloading has made it necessary that the trucks be very carefully inspected daily during the rush period and overhauled during the slack business period of the year, so that they will be fit to run without interruption during the summer months.

On account of these conditions, the trucks undergo a rigid inspection once a month. The smaller trucks, including the 1- and 2-tonners, are under perpetual inspection. They are looked over daily for possible defects. The larger trucks are inspected every month.

The Problem of the Salt Spray

The second problem of the corrosion of the truck parts is caused by the salt water drippings from the ice packed around the cans to keep the ice cream cold and hard until the final delivery to the customer is made. Salt must be used with this ice to prevent its premature melting, but even so, there is a certain amount of melting, and the dripping of this salt water on the truck parts, especially the rear axle members, springs and brakes is most detrimental.

The solution of the problem has been effected partially by a new non-leak type of body, which will be treated of more fully in a subsequent issue of THE COMMERCIAL VEHICLE, and by an adequate inspection of the parts and a thorough greasing. The experience of the Horton company has shown that the entire rear axle travels in a salt spray. The action of such a spray on the axle parts, springs and brakes is shown clearly in the illustration on this page.

The successful results secured by this rigid inspection and adequate greasing is shown by the enviable maintenance record set up by the Horton company, which ran its fleet of seventy-nine trucks at full capacity without a let-up during a period of six months. From May until October, 1918, not one of the trucks was taken off its route, and only a few minor roadside repairs were made.

As told by word and picture in the July 1, 1919, issue of THE COMMERCIAL VEHICLE, all major repair work is concentrated in one garage. This garage is located at 131st Street, New York. All light repairs are taken care of in the other two Horton garages, one of which is located at Twenty-third Street, New York City, and the other in Brooklyn. These two garages take care of the inspection of the trucks garaged at each location. Should there be need of any heavy repairs, the trucks are sent up to the main repair station at 131st Street, New York City.

The Greaser Pays

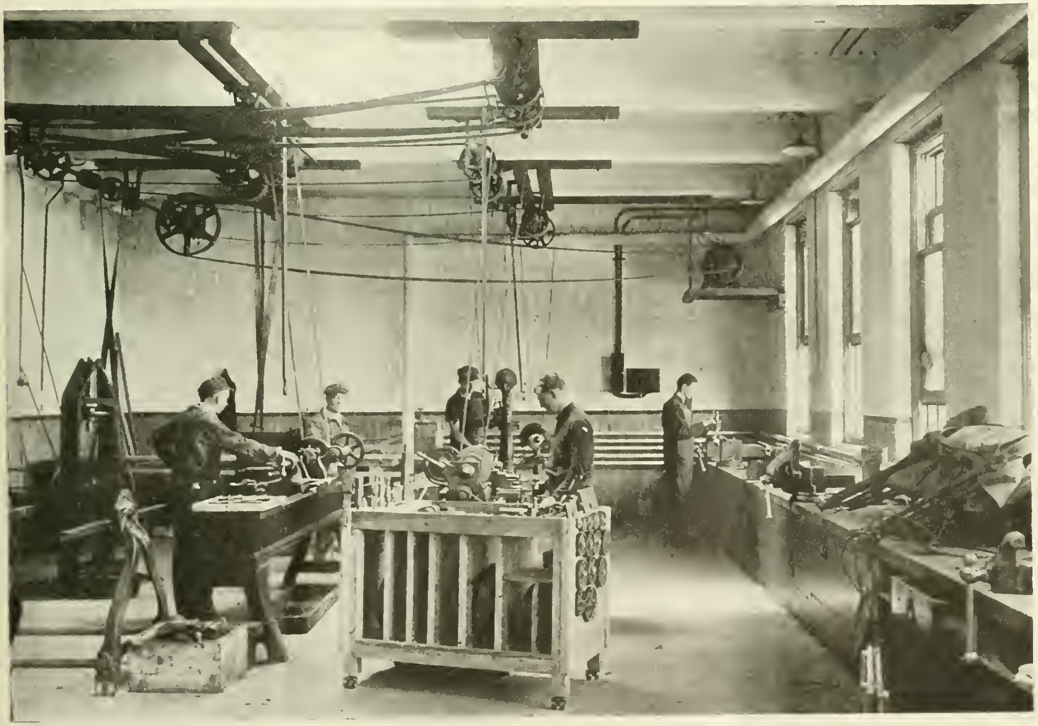
The inspection consists of a careful scrutiny of the parts that do not rotate to discover any possible corrosion and of those parts that are most affected by overloading. The Horton company has practically solved the corrosion problem by hiring a man to take entire charge of the greasing of the trucks. He is paid $26 a week and is considered one of the most essential men in the truck maintenance crew. His particular work is to see that every grease cup is properly lubricating the parts and that the springs, both on the outside and inside, are thoroughly greased. He must turn every grease cup until the grease oozes out on the other side, thus insuring complete lubrication. Much trouble has heretofore been experienced by the breaking of springs due to their corrosion. The spring clips have also caused trouble by being "frozen," thus rendering it practically impossible to take off broken springs without first cutting the clips.

Particular attention is paid to the brakes. The drivers are expected to immediately report any trouble from this source. As a result, the Horton company has experienced little trouble from smash-ups or other accidents directly due to bad brakes. When it is considered that each truck makes on an average forty stops on its route, it is apparent that particular attention must be paid to the condition of the brakes and the brake-operating parts. These stops do not include those made on the road between each customer's place of business.

The six electric trucks also come under the monthly inspection. These vehicles are stored in the public Exide garage, treated of in great detail on pages 28 to 30 of THE COMMERCIAL VEHICLE for May 15, 1919, where their batteries are charged. The running condition of the electrics, however, is taken care of by the crew of the 131st Street garage.

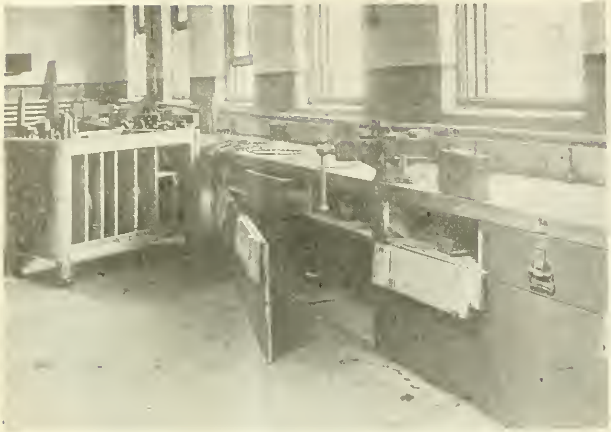
The Overhauling Period

The overhauling period begins in October and lasts until May. As stated in the previous issue of THE COMMERCIAL VEHICLE, most of the trucks are taken off of their routes during that period. The trucks are taken in



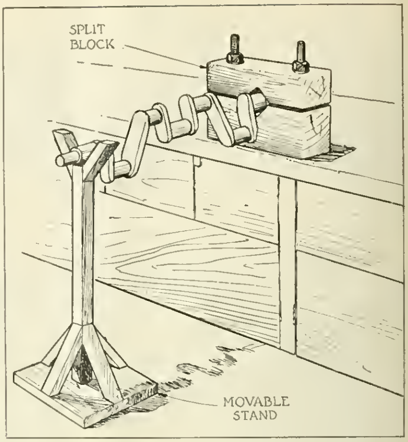
A Machine Shop That Is Modern in Every Respect

It has the best of lighting facilities. Advantage is taken of the window space and in addition, the walls are whitewashed, greatly improving these facilities. The equipment is complete, including two lathes, an arbor press, an anvil, a hack saw, shaper, emery wheel, and two engine stands. The four-wheel swivel-castor stand in the foreground is a handy device for keeping all parts not being used in the machine shop off the floor, thus preventing their loss. It also enables the mechanics to find the parts readily



A Real Motor Truck Garage Toolbench

The space underneath the bench has been divided into 6-foot sections, each of which is given to a mechanic to keep his tools in. There is one large drawer with a shelf to either side and an open space beneath. The method of hanging the doors is quite novel and permits the entire front to be opened or any portion, at will. Parts and tools are kept in the compartments where they may be found readily and free from dust and dirt caused by sweeping. It also prevents tool loss



Truing Crankshaft Bearings

This split-block and the Y-topped portable stand are employed to true up the crankpin bearings. The bearings are first marked with Prussian blue and the connecting rods then put in place and turned about the crankpins to determine wear or uneven machining during grinding

one at a time and are completely torn down and practically rebuilt, ready for the next rush season's work.

Most of the heavy lifting work during the overhauling period is taken care of by a portable 3-ton crane shown on page 34. All welding is accomplished by means of a forge and an oxy-acetylene welding outfit, the latter mounted on a portable two-wheeled carrier.

A handy device for truing up the piston rod bearings has been installed by the Horton company. This device consists of a portable stand upon which one end of the crankshaft is mounted and a stationary holder bolted to the repair bench which holds the other end of the crankshaft. The crankshaft is held rigid in the latter holder by means of two bolts which tighten a wooden block over it. The connecting-rod bearings are then painted with Prussian blue and rotated on the crankshaft bearings to ascertain the wear, if any.

Straightening of shafts, etc., when cold, is accomplished by means of an anvil and an arbor press, located in the machine shop. This method obviates the need of using the repair bench, thus eliminating the consequent wear and tear caused thereby on the top of the bench.

Much time is saved by using a portable, electrically-driven air pump. This is mounted on four swivel-castor wheels and is rolled around to each truck when needed. A wire attached to the pump is led to electric plugs, conveniently placed around the garage wall and columns.

How to Prevent Tool Loss

One big feature of the Horton garage is that all parts are kept off the floor when not being used. In order to accomplish this, a portable four-wheeled swivel-castor bench was built. This is used exclusively in the machine shop and was designed so that everything needed in the machine shop equipment could be kept in one convenient place. This bench or stand consists of a table with a 3-in. flareboard all around, mounted on two 3-ft. end boards, which are 2½ ft. wide. The space between the upper and lower tables is partitioned off by uprights. The end boards are used to mount the thread-cutting

One End of the Light Stockroom

This picture shows the stockroom from the opposite end from that at which the photograph reproduced directly opposite on the next page was taken. It is separated from the garage proper by a firebrick wall and is entered through a metal fireproof door gears, while the upper table and the partitions are used for the base plates, chuck, rests, etc.

In order to keep all of the parts used on one repair job together, the Horton company has designed a repair bench that will be of interest to fleet owners. Though the bench is integral, the space underneath has been divided into 6-ft. sections, each of which belongs to a mechanic. This space is set aside for one large drawer, two shelves, one on each side of the drawer, and a large open space beneath these. Each shelf is equipped with a hinged door, swinging downward. These doors in turn are mounted on one large door extending the width and height of the whole section. This large door is also equipped with a hinged door leading to the space below the drawer and shelves. The whole section may be exposed by simply lifting out one of the hinge pins and swinging the whole door outward.

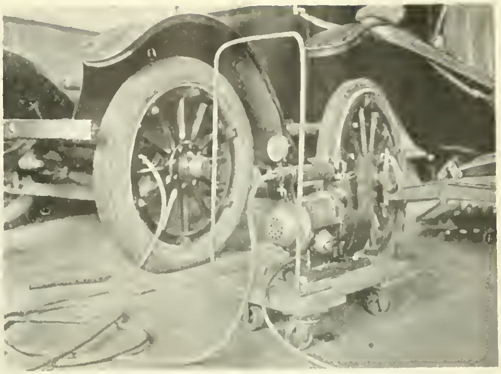
Facing Engine Pistons

The big feature of this device is that the company has overcome the usual trouble in overhauling work—the loss of parts. When left in different places, parts are misplaced, causing trouble and delay. With the Horton method, there is no chance of this occurring, as everything is placed in one particular section under the repair bench. The parts are also protected from dust and injury. The repair bench is made of heavy planking for lasting qualities and to avoid vibration when hammering and doing heavy work.

In order to facilitate quicker facing of pistons on the lathe, the company has designed a device which obviates the need of using a dead center to hold the piston in place. This device consists of a hollow spindle with a flanged and tapering center which fits into the lathe.

A Complete Set of Parts Always On Hand

This shows one side of the Horton stockroom where parts and supplies are kept on hand for the three garages. Each garage, however, has what is called a running stockroom where parts and supplies needed each day are kept for emergency use



No Time Wasted Pumping Tires

This electrically-driven pump is mounted on a four-wheeled stand which is pushed around to the trucks. It is equipped with an electric socket which connects to switches conveniently placed around the garage

A fiber disk fits onto the flanged center and is held tight by means of a bolt. The pistons fit snugly on these fiber disks without the need of a dead center, and, as a result, only one motion is needed in placing the piston on the lathe instead of two.

The lubrication of the engines is supervised under the same rigid rules as those followed out in greasing the springs, etc. Each driver is given complete charge of oiling his own engine. Consequently, there is no valid excuse for burned-out bearings, etc. As an added precaution, each truck is equipped with a 1-gallon can of oil for emergencies. This is carried in the tool chest on the runningboard. Before this system was installed, the drivers would buy any needed oil at other garages, making it hard to keep the books in good condition. Then again, occasional dishonesty in the matter of purchases would crop up. Now, there is no chance for outside purchases. As each operator is also a salesman, it is of advantage to him to see that his truck is kept in good condition so that he can visit his routes as often as possible. As a result, he is always alert to any possible troubles to his truck.

As stated in the previous issue of THE COMMERCIAL VEHICLE, each driver is expected to note all troubles that may have occurred to his particular truck during the day. This is accomplished by means of a daily report card and a blackboard. The latter is stationed at the entrance to the garage in plain view of the foreman, who notes in turn what work has to be done so as to arrange for the immediate repair of the truck. The report card is also used to note the amount of gasoline used, as well as the oil and grease taken, the total mileage, and all stops not included in the regular route.

The foreman goes carefully over the drivers' report cards each day and notes the oil and gasoline taken by each truck. These are compared with former records, and if any marked changes in oil or gasoline consumption occur, the matter is looked into at once to determine the reasons.

(*Continued on page* 34)

Principles of Loading and Unloading Gears to Save Truck Time

Different Forms of Mechanical Devices to Reduce Labor and Increase the Truck's Income

By J. Edward Schipper

WHEREVER quantities of loose materials, or materials of large bulkiness, have to be loaded into trucks, the problem arises of how this can be done so that the loading time and the expense of loading will be reduced to a minimum.

Every time an analysis is made of truck transportation cost, the length of time required for loading is found to be an important factor. Therefore, truck manufacturers, contractors and fleet owners are constantly endeavoring to cut down the time required to load or unload the vehicle and are giving every encouragement to the design and invention of devices which make this possible.

Loose material, such as dirt, gravel, coal, ashes, etc., is most difficult to deal with. Solids, such as stone, bales of hay, bales of cotton, furniture, crates, etc., do not present as hard a problem, because they can be lifted on the loading platform and generally packed very easily by the driver and helper into the desired position. Where the articles handled are of miscellaneous size and shape, as in moving van service, manual labor has to be depended upon entirely, and for this reason a different basis of charge is generally used in this class of work. For handling the loose materials mentioned, however, a variety of devices are in use, and many of these are of exceptional value.

Dumping is the most common method of unloading loose material. Dumping bodies were employed to a considerable extent on horse-drawn vehicles before the motor truck came into common use. These early dumping bodies generally were manipulated by the driver, who inserted a crank on the squared end of the shaft and cranked the wagon body up to a dumping position. A train of gears gave the reduction necessary to enable one man to readily lift a loaded 2- or 3-ton wagon. That type of body was extensively employed for retail delivery of coal and is still in common use.

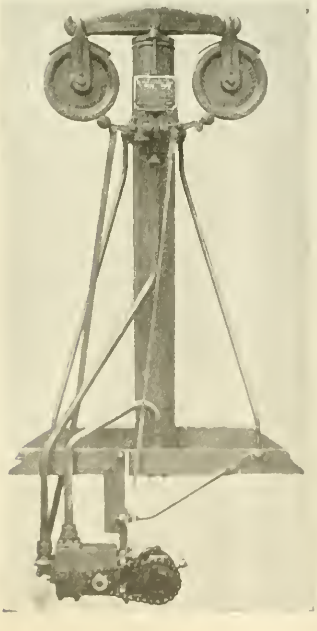
Hydraulic Hoists on Motor Trucks

On the larger motor trucks the dump body is generally hoisted hydraulically. Owing to the presence of a gasoline engine on the truck, mechanical power is available for the hoist, and generally a take-off from the gearbox permits of the engine power to be used in operating the pump for a hydraulic hoist or in running any other unloading device which can be mounted upon the truck itself.

Hydraulic hoists are made in either vertical or slanting installations. With an hydraulic hoist it is important that the load be properly distributed so that when the outfit is installed on the chassis, the chassis is not called upon to take care of any undue strain; there must also be no undue strain on the hoist.

With a recent type of hydraulic hoist it is possible to dump a capacity load in about 15 seconds. After the commodity is dumped it is not necessary to keep the truck at rest. The driver can start on his return trip and the body will of itself come back into position. This may appear on the surface to be a small item, but when figuring cost on a job, it is a saving of time such as this that makes the job profitable.

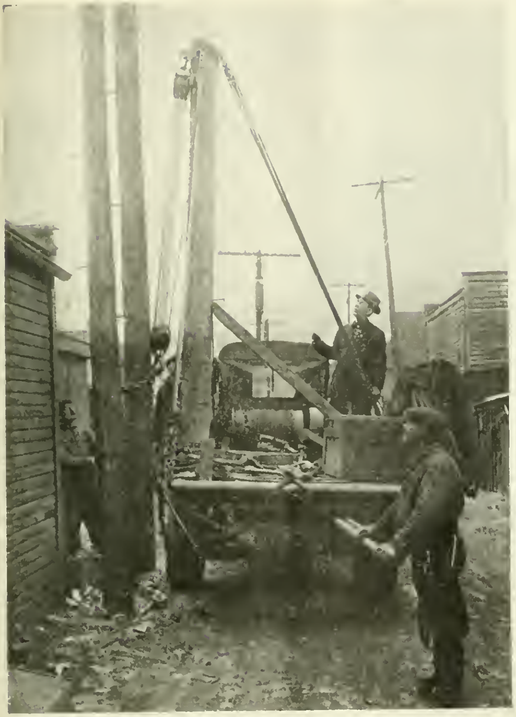
As compared with manual unloading or hand-operated gear trains for raising the dumping body, the hydraulic hoist is so far superior that it requires only a relatively



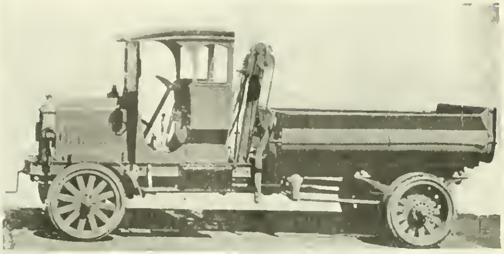
Left — Wood hydraulic hoist. Weight, 325 lb.; capacity, 3 tons

Below — All-steel dumping body with driver-operated tail gate latch

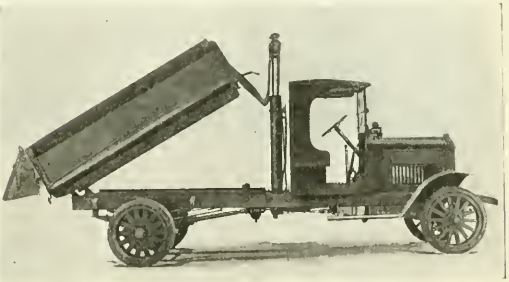
Forms of Hoists and Loaders for Conserving Truck Time



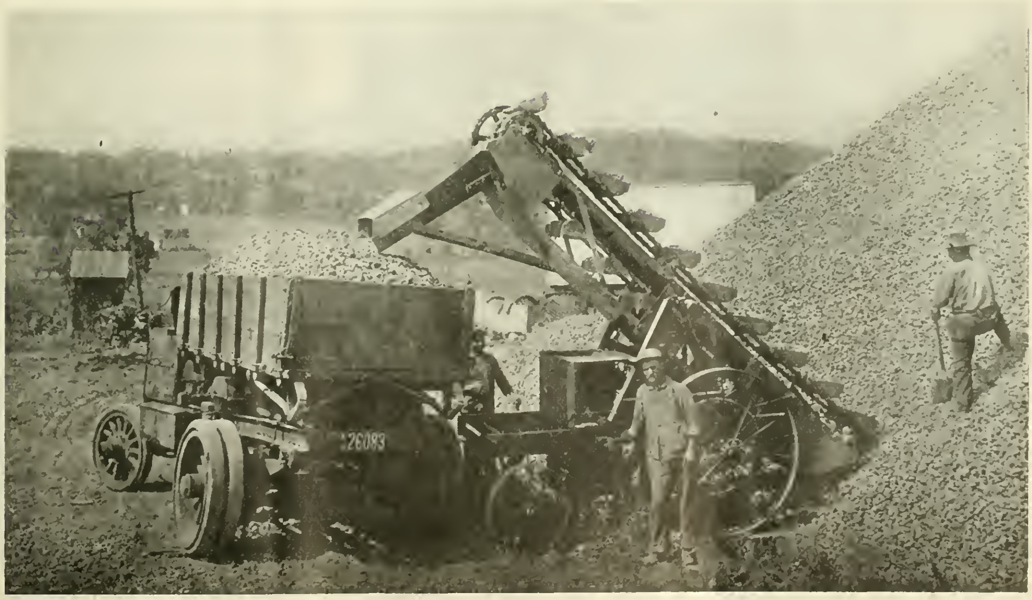
Winch-equipped truck for telegraph pole installation



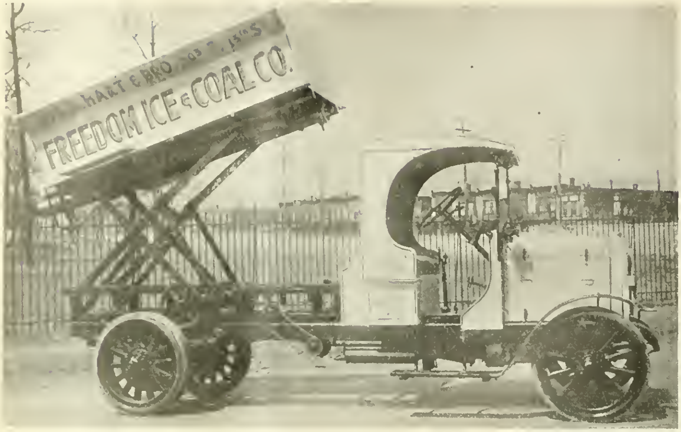
Slanting type of hydraulic hoist installation



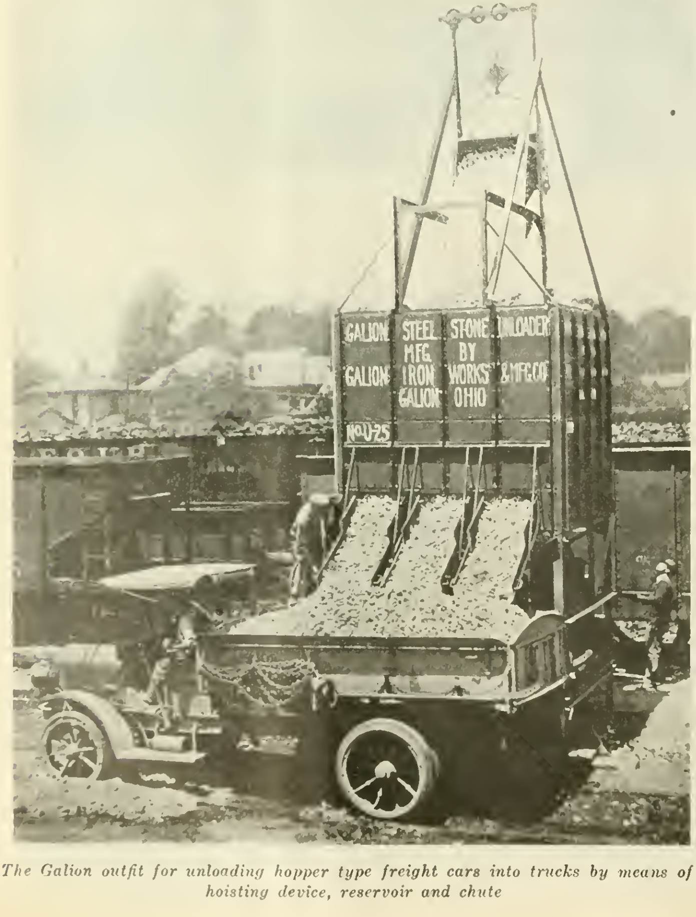
Vertical type of hydraulic hoist installation



A mechanical truck loader which does quick and satisfactory work and eliminates hand shoveling



Dump body raised by power take-off on transmission system



The Galion outfit for unloading hopper type freight cars into trucks by means of hoisting device, reservoir and chute

short time to pay for itself. This is realized by motor truck fleet owners who are indorsing the installation of the hydraulic hoist in combination with dump bodies.

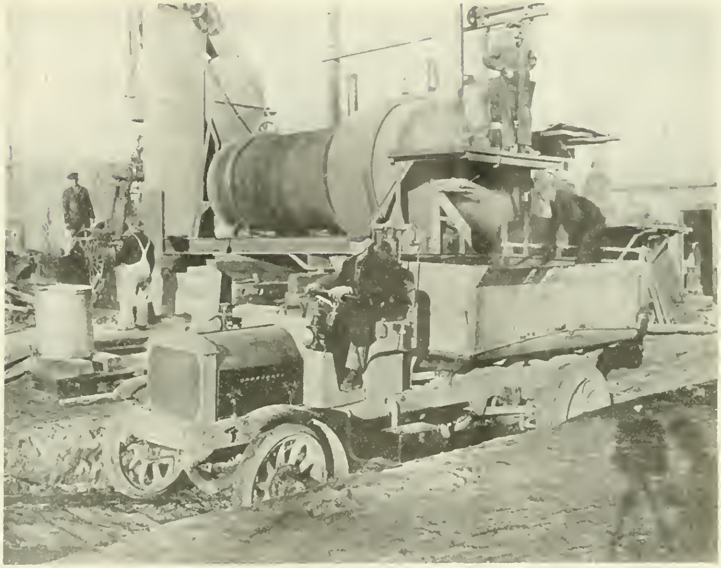
An important factor in the success of a dumping body is the design of the tail gate. For instance, in road building, by the use of a restricted type of tail gate, sand or gravel can be spread along the road in any desired thickness while the truck is in motion. It is almost impossible to calculate in money, labor and time saved the value of this method. On the other hand, if the commodity is to be dumped all in one spot, it can be placed just where it is needed, and by the use of the vertical hoist the body can be quickly raised to the proper height. The angle to which the body must be raised has been worked out for various materials.

The hydraulic hoist for a 5-ton truck weighs approximately 500 lb. in the heavy-duty type; that is, a 500-lb. hydraulic hoist will have a capacity up to 7 tons. Such a hoist requires a space of about 15 in. between the body and the seat, if installed vertically, or from 18 to 20 in. if slanting. The lightest type of hydraulic hoist, designed for trucks up to 2-ton capacity, but capable of lifting up to 3 tons, weighs approximately 325 lb., and requires a space of 13½ in. between the body and seat. On this type the body arms are outside the chassis frame.

A Truck Crane

A very ingenious loading installation, which is used by Massachusetts municipalities for sewer cleaning, employs a truck crane with a fixed boom and a single drum for raising and lowering the clam bucket. This is operated by a direct take-off from the transmission gearset, and is mounted on an extension on the side of the truck frame, as illustrated. The clam bucket itself is opened and closed by compressed air, the air compressor which the installation comprises being driven from the transmission shaft. This arrangement can be made either automatic so that the clam bucket opens after it has been lowered, and closes when the hoist starts, or it can be made manually operated so that the opening and closing can be timed at the will of the operator. The crane swings the loaded bucket over the body of the truck, and it is dumped by the compressed-air system, which opens the clam bucket. Formerly the weighted tails were simply lowered and the cleaning operation performed by manual labor entirely.

In all loading of loose materials, particularly those which are delivered



Feeding from concrete mixer directly into truck, with ground dug away to give sufficient clearance above the top of the truck body

to the loading point by freight car, it is highly desirable that gravity loading be used. Wherever it is feasible, the freight car should be brought up to an elevated track and dumped into overhead bins, from which the material can be withdrawn through some form of chute into the truck.

This method can be employed to advantage even in small-scale operations, because it not only eliminates manual labor, but after the material has been once delivered to the highest point by means of the rolling stock it, requires no further power expenditure in handling it, except that required for opening and closing the chute doors.

The use of winches mounted on trucks for heavy work is practically a necessity. For instance, in telegraph and telephone pole installations, where the heavy pole has to be hauled into position and then lifted and lowered, the use of a winch effects a very material saving as compared with the old pike-pole method. Furthermore, the use of winches tends to obviate physical injury. Statistics show that truckmen compelled to lift heavy crates or other unwieldy bulks are more subject to hernia than any other class of men. For this reason alone the extensive use of lifting devices should be urged. A winch mounted on the truck platform will be found to give a wider range of utility to the truck body, particularly for contractors, who are apt to handle practically any class of work. Telephone and telegraph companies have found it necessary to maintain several trucks so equipped.

Sewer cleaning installation with power take-off from transmission and clam bucket, operated by compressed air

For handling such materials as coal, coke, stone, sand, fertilizer, and similar loose materials, from storage or cars, various types of portable loaders external to the truck itself can be employed to advantage. For instance, the continuous chain type, with closely spaced buckets, is very useful. The buckets pick up the load as the loader is pushed into the material, and are kept full by manual shoveling, if this is necessary. The buckets then deposit the load into a chute or hopper, from which it is fed into the truck. By the use of mechanical loaders of this type it is possible to cut the loading time from 15 to 20 min. down to 2 min. These figures are reported by the manufacturers of a device for unloading stone, sand, gravel, or other similar material, from a hopper-bottom car, carrying it to a bin, and loading it into a truck or wagon without the employment of any shovelers. It is figured that the cost for labor alone, loading stone out of a car into a wagon or truck, comes to about 15 cents per cubic yard when the work is done manually. With this type of loader it is claimed it will do this same work for 2½ cents a cubic yard.

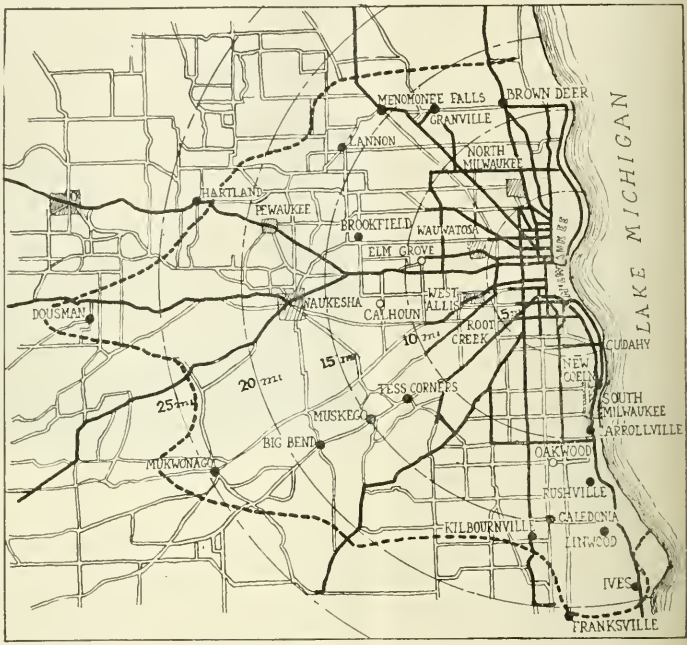
Machines of this kind are operated by one man, and as many as ten cars of a total weight of 500 tons can be moved in one day. The chief units in the construction of the loader are: frame, hoisting apparatus, bin, chute and pit, and the powerplant. The unloader is first located at a siding, and the cars are so moved that the hoppers or slides are over a chute placed

(*Continued on page* 35)

Trucks Have Advantages of Speed and Low Cost in Farm-to-Market Milk Haulage

Milwaukee Territory Now Offers Opportunity for Doing Work on Big Scale With Large Truck Fleets

Over 65 Per Cent of Milk Now Received Is Hauled by Trucks



Map of the Milwaukee territory, showing the area inclosed within the dotted line from which milk is hauled into the city by means of motor trucks. The heavy lines indicate the principal highways which the trucks traverse. The principal towns from which milk is collected are also shown

THE employment of motor trucks in the haulage of milk from the farms within a radius of 25 miles of Milwaukee, Wis., into that city has proved so successful during the past year that there is to-day an opportunity for the formation of a company to operate a large fleet of trucks exclusively in that work.

The use of trucks in milk haulage has many irrefutable advantages as compared with shipping the lactic fluid by steam lines or electric trolleys. Both the farmer and the city distributer have found it more economical to ship by truck than by any other method and it is because of this dual saving at each end of the line that a concern to haul milk on a large scale has more than a reasonable chance of success.

Of course the prime gainer in the matter of truck delivery of milk to the city is the dairy farmer, and unless a company is soon formed to carry the milk they will gradually acquire trucks themselves. Each farmer will try one or more trucks if that many is necessary to carry his milk, or will pool with a neighboring farmer, if their output is not sufficient to warrant the private ownership of a truck. The farmer is the prime gainer because he it is who pays the freight charge, and a reduction of the charge is money in his pocket.

The cost of bringing in milk on trucks has been found to be 2 cents a can less as compared to the cost of bringing it to the city on trains or trolleys.

Trucks Saving $17,812 Yearly

What a saving of 2 cents a can means in the aggregate becomes apparent when it is known that there are 8 gallons of milk to a can, and that sixty-five per cent of the 30,000 gallons of milk that come into Milwaukee every day come in on motor trucks. And every day in this case means Sundays and holidays.

In other words, 65 per cent of 30,000 gallons means that 19,500 gallons of milk are daily hauled into the city by trucks and 19,500 gallons is equivalent to approximately 2440 cans of 8 gallons each. A saving of 2 cents a can when shipped by truck therefore means a total saving of $48.80 a day or $17,812 a year.

Time Saved for the Farmer

The saving in time and labor to the farmer is even more striking. Where the farmer had to hitch his horse and take the time to drive slowly and laboriously to the nearest train sheds to a train which sometimes came late, and which he sometimes missed, he might not have stopped to figure the cost of the upkeep of the horse, the wear and tear on the wagon and other expenses, but the matter of time was very real to him. In that the truck becomes a boon.

There is no need of hauling the milk anywhere, when the farmer is on a truck delivery line. The truck passes his farm, and his labor after the milk is once in the cans is to help put the cans on the truck. Where the truck does not exactly pass by the farm, all the farmer has to do is to haul the milk to the road where the truck runs. Although this it not so convenient as in the former case, it is still frequently many miles less than the trip to the railroad station, and carries with it the invaluable advantage that there is little likelihood that he will miss the truck. The truck will wait if the farmer has not yet arrived. And places where neither trains nor trolleys reached are now valuable dairy farms.

And of course the milk distributer in the city benefits by the truck idea. With him it is an absolutely cash benefit, and one which may lead him to go deeply into the related business of hauling the milk from the farms into his bottling plant in the city. Before he had to send his trucks or wagons to the depot to take the milk from the trains to his plant, and he estimates that by the direct truck service he saves 5 cents a can.

Railroad and trolley officials advance the argument that trucks cannot bring the milk into the city in nearly the same time that their lines can. But farmers reply that the officials do not count in the time it takes to haul the milk to their stations, and then rehaul it to the distributers. The farmers contend that when that is considered, an actual saving in delivery time which they estimate at 15 per cent of the whole delivery time by train or car is effected. The farmers further show their faith in their con-

A line of trucks arriving at one of the main milk depots in Milwaukee with 8-gallon cans of milk picked up from farms within a radius of 25 miles. Most of the trucks used in the work are provided with cabs for the protection of the drivers in winter weather, for the trucks run every day of the year, Sundays and holidays included

tention by increasing their use of the truck delivery. The trucks in use are of all makes and all sizes, though the 3½-ton variety seems to be becoming the most desired.

New Territory Tapped

What hauling milk on trucks has done in particular is to tap new sources of milk supply. Farms that are situated far from railroad stations, and that hitherto had been regarded as poor locations for dairying, because of the daily necessity of making the trip to the station, have suddenly taken on new value because the trucks often pass the farm, or at worst travel a road that is only half as far from the farm as are the railroad tracks. The truck is thus encouraging dairy farming in sections where it was not expected before the advent of the truck in the milk business. And the effect on the price of the milk to the city consumer is commensurate.

While the amount of milk shipped by truck to Milwaukee the past year was approximately 500,000 gallons more than the previous year, milk dealers estimate that within 5 years, 85 per cent of the city's daily supply of milk will be shipped on trucks.

Although about fifty trucks are engaged in gathering the milk from the farms and bringing it to the city, the trucks are all privately owned. One Milwaukee milk concern does operate five trucks of its own, but has twenty-six trucks delivering milk to its three branches in three different parts of the city. The remainder of the trucks are owned either by the farmers who have the milk to haul, or by one farmer who carries his own milk and then gathers as much additional milk as he can carry while on the way in, or by persons who are beginning to make a business of hauling milk for the farmers into the city.

Milk Hauled 25 Miles

Milk is brought to Milwaukee on trucks from a radius of 25 miles. From as far as Menomonee Falls, which is somewhat more than 25 miles away, trucks loaded with milk cans arrive daily at the bottling plants in Milwaukee. The trucks come in over every road leading into the city. From the south, the trucks travel over the Chicago road; the Janesville plank road; the Kilbourn road; Loomis road and Howell road, tapping the extreme southern and southwestern part of the 25-mile radius. From the west, they run over the Blue Mound road, the Watertown road and the Lisbon road, while from the north, the Granville, Silver Spring, Cedarburg, North Fond du Lac, Green Bay and Port Washington roads, see their burden of trucks carrying milk daily.

These roads are all first class highways and this makes it possible for the trucks to return on the same day they deliver their milk, even to the farthermost points, except on rare occasions, where the reloading of the trucks takes too much time.

Trucks Return Loaded

For the trucks do return loaded. Of course many of them carry the empty cans back. But many others carry on an ordinary delivery service back. It is a service of which both farmers and merchants are taking increasing advantage. Merchants in Milwaukee knowing the roads on which their farm customers live, quickly acquaint themselves with the trucks that take those roads, and the delivery arrangements follow.

Milwaukee county and the adjoining counties realizing how important these roads are for the welfare of their communities, have made it a point to keep these roads in good condition all the year round. The roads are oiled in summer, and kept free of snow in winter. The county operates plows through the snows where the drift is of such size as is likely to impede motor traffic, and it would require a good sized drift to keep the trucks off the roads. Where the county does not operate its own snow plow, it is usually arranged so that one truck is selected, and a snow plow attached to it, and this run through the road cutting the way for the other trucks to follow. One farmer on the Janesville plank road has such a snow plow which he built himself.

A Packard 3½-tonner taking on a load of empty milk cans to be carried back to the various farms within a radius of 25 miles of Milwaukee from which milk is picked up

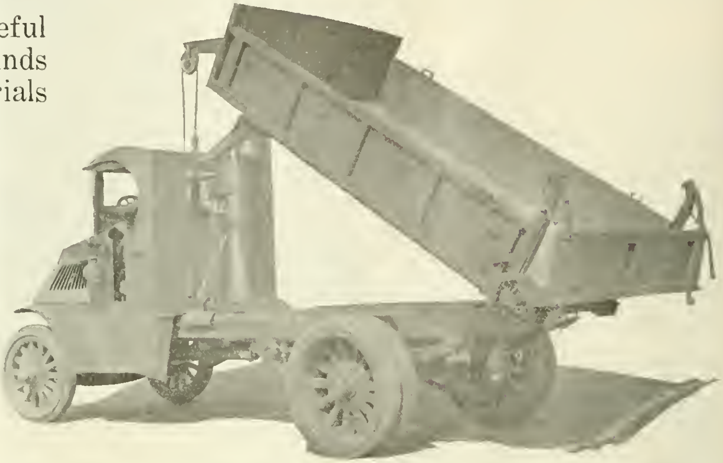
CANADIAN TRUCK COMPANY

VICTORIA, B. C., July 9—A 2-ton Giant truck operates on regular daily schedule between Victoria, B. C., and Sidney, B. C., carrying freight between the two points. The route was inaugurated by Roy Brethour and H. H. Shade.

New Convertible Dump Body for 3- and 5-Tonners

Special Dump Body Useful for Hauling Various Kinds of Construction Materials

Tailgate Opened and Closed Automatically



The Metropolitan convertible combination truck body used for dumping work, showing automatic tailgate

FLEET owners whose trucks are not operated with full capacity loads on account of the diversity of the loads carried in bodies of fixed cubical capacity will be interested in a convertible combination dump body which is being built by the Metropolitan Body Co., Bridgeport, Conn. Contractors, manufacturers of paper products, wooden boxes and other bulky goods will find that such conditions can be improved by the use of a combination dump body such as is produced by the Metropolitan company. That type of body is built in two sizes: One is for 5-ton truck and retails at $495; the other is for trucks of from 2- to 3-ton capacity and retails at $400. These prices do not include extension sides or racks. The 6-in. extension sides retail at $17 in each case, while the 12-in. size costs $26. The 2½-ft. extension racks cost $45 extra. The hydraulic hoist or any other type is supplied at extra cost.

In designing and building this special type of body, the Metropolitan company has taken into consideration the severe usage customary in contractors' work, as well as the various uses that certain fleet owners may make of their trucks. The body throughout is ironed so as to carry not only its rated capacity, but to stand up under extraordinary strains and rough handling.

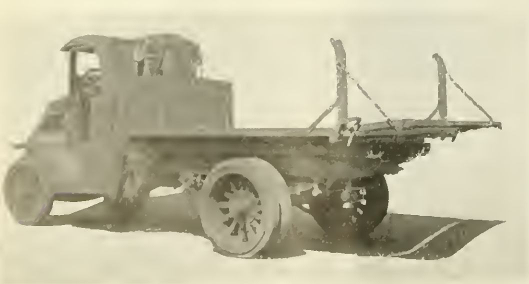
The Convertible Features

The combination feature is worked out so that one body can be used for hauling all the different kinds of construction materials. If bulky material is carried, the body can be equipped with additional 6- or 12-in. flareboards and can also be equipped with a 4-ft. rack making a general trucking outfit. Should the truck owner desire to carry such material as boards or logs, the sides can be removed and the tailgate lowered so as to form a platform, as illustrated. When used for dumping, the body is raised at the front end by means of an hydraulic hoist or any other type of hoist. The rear end of the body is equipped with an automatic, double-acting tailgate. It is automatically released when the body is raised. Lowering the body automatically locks the tailgate again without any attention on the part of the driver.

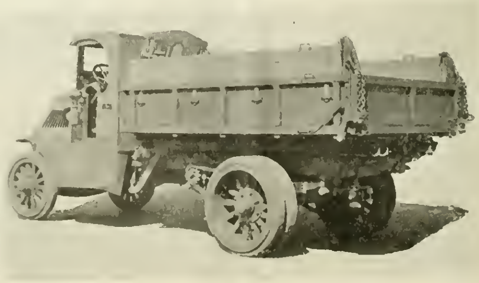
The tailgate may be hinged at its upper end to two upright arms projecting above the floor, as well as to the floor. When the body is used for dumping, the tailgate swings on the two upper hinges. It is swung open by means of a release arm, located at the center of the rear frame member and connecting the rear end of the body with a cross arm which turns two angular pieces at both ends. These two pieces release or lock the tailgate.

Special Automatic Tailgate

When the truck body is being raised, they are lifted up off the retaining bolts in the tailgate, thus releasing it. When the body is being lowered, the gate falls into place by gravity and the angular pieces are turned back so as to again fit over the retaining bolts, thus locking the gate. The release arm is adjustable by means of a turn screw and may be fixed to open the gate at any determined angle of the body. By placing the two hinge bolts in the lower hinges, thus securing and pivoting the gate at its lower end, the body may be used for loading



The Metropolitan combination body used as a platform type for carrying lumber, etc. The sides are removed and the tailgate lowered so as to form part of the platform



The carrying space of the Metropolitan convertible combination truck body can be increased by adding 6- or 12-inch flareboards, which are sold as extras packages, etc. The gate, when lowered this way, may also be used as an extension for carrying long pieces of lumber.

The Metropolitan dump bodies are built of hardwood throughout. The floor, sides, front end and tailgate are lined with 14-gage sheet steel. The ironing is all hand-forged and the whole construction is designed to stand up under the most severe usage. The cross members underneath the body are of oak, 2¾ x 6 in. The sub sills are of 4-in. steel I-beam.

The inside dimensions of the 5-ton body are 10 ft. 6 in. long and 6 ft. 6 in. wide. The sides and tailgate are 18 in high. The front is 30 in. high. The capacity is 4 cu. yd.

The size of the 2- to 3-ton body is as follows: 10 ft. long; 5 ft. 6 in. wide; sides and tailgate 15 in. high; front 21 in. high. The capacity is 2½ cu. yd.

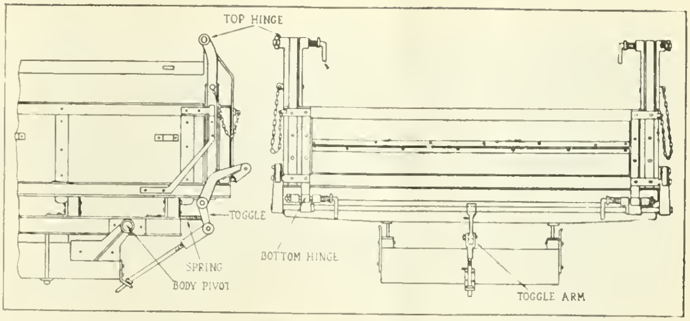
A New Book for Fleet Owners

FLEET owners maintaining their own trucks will be interested in a new book, entitled "The Auto Electrician's Guide," which is being put on the market by the Michigan State Auto School, Detroit. It is of particular interest to the garage man as it quickly answers many of the everyday questions concerning motor truck electrical troubles. The book sells for $7.50.

It contains more than 850 wiring diagrams covering every system of wiring in use. There are 286 internal wiring circuits which give complete information on wiring of generators, controllers, coils, starters, switches and other electrical parts.

One of the most important features of this guide is that these diagrams cover all the wiring systems from 1912 to 1919, some of them dating back to 1906. The book is made up in loose leaf form, making it easy to insert additional diagrams as issued. All diagrams are printed in black on plain white paper.

In addition to the wiring diagrams for gasoline trucks, "The Auto Electrician's Guide" shows wiring diagrams for various electrics.



Side and rear view of automatic tailgate arrangement of Metropolitan body

New Low Trucking Rates from New York to Boston and Philadelphia

NEW YORK CITY, July 10—S. Sipser, a large motor truck haulage contractor in this city who owns and operates a fleet of ten trucks and controls over 100 more trucks has just brought out a new schedule of motor truck rates between New York City and such centers toward the south and southeast as Philadelphia, Pa., Trenton, N. J., Baltimore, Md. and Washington D. C., and northeast to Stamford, Bridgeport, New Haven and Hartford, Conn., and to Springfield and Boston, Mass.

The schedule of rates per 100 lb. to the various cities mentioned above are given in the following table according to whether a full or a partial truck load is carried.

For instance, in the rates from New York to Philadelphia the rate for carrying loads of 1 ton is 85 cents per 100 lb. On the other hand, the rate for carrying loads of from 2 to 4 tons is 80 cents. A full load of 5 tons costs 70 cents per 100 lb. The charge for carrying 1-ton loads from New York City to Boston is $2.50 per 100 lb. A 2- to 4-ton load costs $2.25 and a full 5-ton load, $2 per 100 lb.

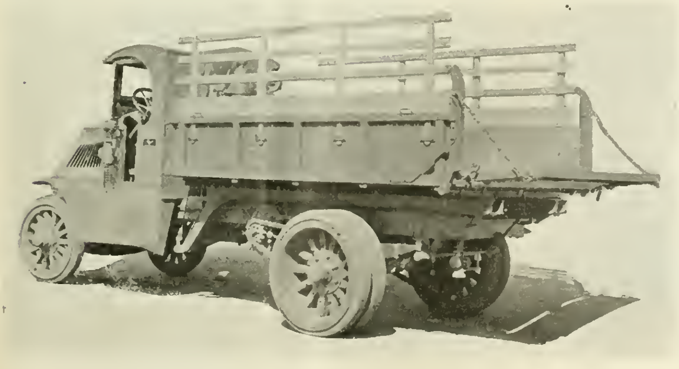
SCHEDULE OF RATES FROM NEW YORK CITY

Place	Rate per 100 Pounds	
Philadelphia	Full load of 5 tons	$0.70
	2 to 4 tons	.80
	1 ton only	.85
Trenton	Full load of 5 tons	.60
	2 to 4 tons	.65
	1 ton only	.70
Baltimore	Full load of 5 tons	1.75
	2 tn 4 tons	2.00
	1 ton only	2.25
Washington, D. C.	Full load of 5 tons	2.25
	2 to 4 tons	2.40
	1 ton only	2.60
Stamford, Conn.	Full load of 5 tons	.37½
	2 to 4 tons	.40
	1 ton only	.45
Bridgeport, Conn.	Full load of 5 tons	.40
	2 to 4 tons	.47½
	1 ton only	.52½
New Haven, Conn.	Full load of 5 tons	.65
	2 to 4 tons	.70
	1 ton only	.75
Hartford, Conn.	Full load of 5 tons	.80
	2 to 4 tons	.90
	1 ton only	1.00
Springfield, Mass.	Full load of 5 tons	1.00
	2 to 4 tons	1.15
	1 ton only	1.25
Boston, Mass.	Full load of 5 tons	2.00
	2 to 4 tons	2.25
	1 ton only	2.50

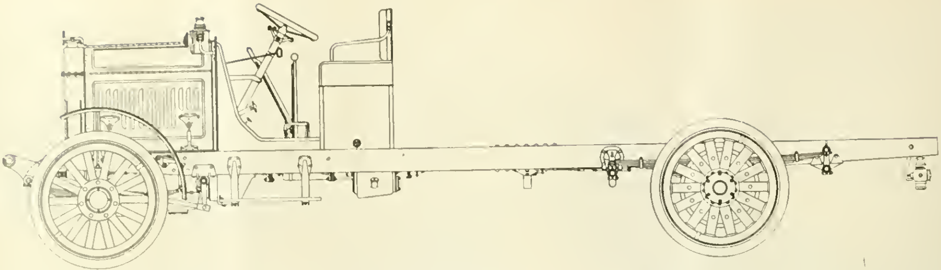
The trucks owned by Mr. Sipser consist of Masters, Sanfords and Packards. These are used to do contract work of all kinds within the city, such as unloading cars and delivering miscellaneous freight and merchandise of all kinds. The other trucks controlled by Mr. Sipser are owned by drivers and other concerns for which he supplies the work.

Rural Express Service Planned

Mr. Sipser is also co-operating with the New York City Department of Markets to organize a rural express line in Suffolk county, Long Island. As now proposed the line will serve such points as Huntington, St. James, Comack, Northport, Smithtown, Riverhead and others. Fuller information on this line will be published in a subsequent issue of THE COMMERCIAL VEHICLE.



The Metropolitan body equipped with a 4-foot rack, converting it into a general trucking outfit suitable for the great majority of work



New Koehler 2½-ton worm-driven model with four-speed gearset

New 2½-Ton Koehler Is Worm-Driven—Has Radical Changes in Design

KOEHLER SPECIFICATIONS

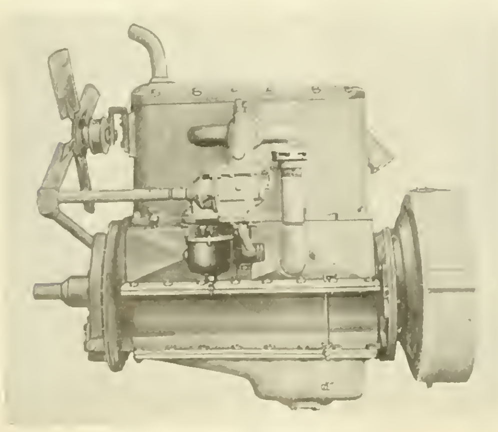
Capacity, tons	2½
Price	$2,965
Wheelbase, in.	162
Tires, front	36 x 4
Tires, rear	36 x 7
Bore, in.	4
Stroke, in.	5⅛
N. A. C. C. hp	25.60
Speed, r.p.m.	1225
Speed, m.p.h.	14
Gear ratio in high gear	9.25 to 1
Final drive	Worm

A NEW 2½-ton worm-driven truck, known as Model M, is being manufactured by the H. J. Koehler Motors Corp., Newark, N. J. The new model is radically different in design from its predecessors. A larger engine has been installed and a number of other important changes have been made to make this model more sturdy and serviceable. The new model replaces the Model L of the Koehler line, which now includes Models X, 1¼-tonner; KT, 3-ton road-tractor; and MT, 5-ton road-tractor.

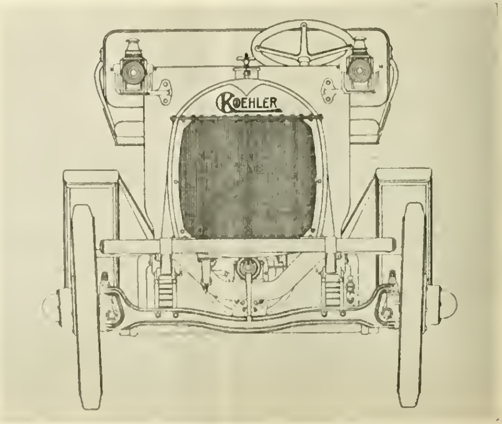
Like its predecessors, the new 2½-tonner is an assembled product. It differs, however, radically from the previous model. Timken worm drive has supplanted internal-gear drive; a pressed steel frame is used instead of a rolled channel; the tire sizes have been enlarged; Wayne wheels are used instead of the company's own make; a gear pump has taken the place of a thermo-syphon system; the radiator is of the cellular type instead of vertical finned tube; a centrifugal governor is used instead of a suction type; a Zenith carbureter has taken the place of a Stromberg; and Spicer universal joints are used instead of K-B. Other changes include a four-speed gearset instead of a three-speed, located amidships instead of being a unit with the engine and a Lavine steering gear instead of the one formerly made by the Koehler company itself.

The four-cylinder L-head engine is of Koehler-Hercules design, featured with a five-bearing crankshaft. The cylinders are cast in block with the tungsten steel valves at the right. Suspension is three-point, mounted above supports, with forward support trunnioned above the cross member. The cylinder head is detachable. The oil reservoir, hand plates on side, timing gear cover, oil pump cover, are all accessible and easily removed. The valve tappets are held, in pairs, by quick-detachable crow-foot clamps. The piston pin bearings are Non-Gran and the piston rings are American Hammered. Lubrication of the engine is by means of a pressure oiling system is which the oil is forced by a gear pump through the hollow crankshaft to the main bearings, the connecting rod bearings and through the oil leads to the piston pin bearings. Separate leads furnish oil under pressure to the camshaft bearings, also a constant bath of oil for the timing gears, pistons, cylinder walls, etc.

The drive is through from the engine through fabric disk joints forward of the gearset to oil-tight metal joints and a two-piece driveshaft, supported midway by an S.K.F. annular ball bearing, to the worm-driven axle. From there the drive is taken through the springs to the wheels. The gearset is suspended at three points. Provision is made for a power takeoff at the gearset for a body hoist, etc., and for driving a speedometer from the gearset shaft. The two heavy, flexible connections between the clutch and gearset are designed to take a twist, either way, of five degrees from normal. The propeller shaft is of steel, drawn tubular type, equipped with three universal joints. The clutch is of the Brown-Lipe, ten plate, dry-disk type, fully enclosed. The clutch facing is wire woven asbestos.



Engine used in new Koehler 2½-tonner



Front view showing new radiator cap of new Koehler

Driving torque and propulsion are through the half-elliptic springs. The spring suspension is sturdy. All of the leaves are of chrome vanadium steel heat-treated and ground. Both the front and rear springs are practically flat and measure, front, 40 in. long, 2½ in. wide, ten leaves; rear, 56 in. long, 3 in. wide, twelve leaves. All of the springs are fitted with reamed bushings. The spring eye pins and spring shackle pins are secured with pinch-bolts so that neither shackles nor brackets have to be replaced through wear. The pressure blocks are of the arched type, and the spring clips are of 3½ per cent nickel steel, heat-treated.

The engine is cooled by water, which is circulated by a gear pump through an armored cellular radiator, of the built-up type with heavy copper core and a cast iron case. The radiator filler cap has a cork-gasketed cap which is pivoted at its center on a hinged arc. Tension is provided by a hinged member carrying a coil spring.

The service and emergency brakes are of the Duplex internal-expanding type, operating in 18-in. flanged drums and lined with Thermoid. The brake and clutch pedal pads are drop-forged, 5½ in. wide.

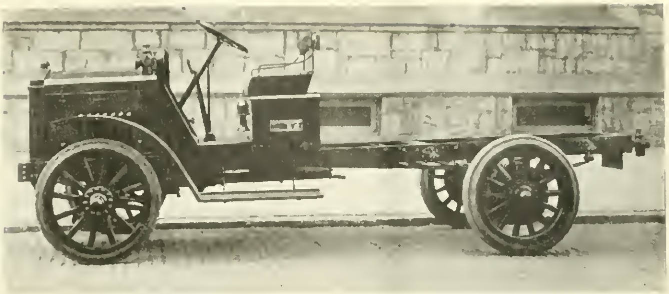
The wheels are wood with square spokes. The felloes of both front and rear wheels are formed from two sections with metal connectors, into which the wedge-shaped ends of the felloes are forced under high pressure. The tires are of the solid pressed-on type, and single all-around.

The steering gear is of the irreversible, split nut, equalized-thrust type. The ball arm is straight. The housing is grease tight and easily filled. Steering is on the left and brake and gearshift control in the center.

Fuel is fed by gravity from a 20-gal. tank under the seat. The tank is of sheet steel, welded at all joints. It is securely supported in cradles carried on the main frame cross members. These cradles absorb shocks. The gasoline tank outlet valve handle is carried outside of the seat box just above the frame. A dial indicates the on and off positions of the lever. Control of the fuel supply is by a ratchet-type of lever on the steering wheel and by an accelerator.

The frame is of pressed steel, ¼-in. thick and heat treated. It is 6 1/6 in. deep with flanges varying from 2 in. at points of least stress to 3⅜ in. at points of greatest stress. The forward half of the frame is rigid, protecting the engine from stresses under the frame weave, while the rear half is flexible.

Absence of the conventional grease cup is noticeable. Wick-feed is used for the most part. Large specially designed oil reservoirs furnish lubricant for such parts as the spring eye pins, clutch and brake pedal rocker shaft, etc., while tubular members are also utilized wherever practical. The wick-feed oiling system is designed so that it cannot feed a surplus of oil, as it operates only when the working parts are in motion.



New Conestoga 1-ton worm-driven model

New Conestoga 1- and 2-Ton Models Are Both Similar in Design

CONESTOGA SPECIFICATIONS

Capacity, tons	1	2
Price	$1,850	$2,550
Wheelbase, in.	118	136
Tires, front	34 x 3½	36 x 4
Tires, rear	34 x 5	36 x 4
Bore, in.	3½	3¾
Stroke, in.	5	5
N. A. C. C., hp.	19.6	22.5
Speed, r.p.m.	1350	1350
Speed, m.p.h.	16.5	14
Gear ratio in high gear	7¾ to 1	9⅔ to 1
Final drive	Worm	Worm

TWO new worm-driven models, 1- and 2-tonners, are being produced by the Conestoga Motor Truck Co., Lancaster, Pa. With the exception of the engine, frame, wheel and gear ratio sizes, and front axle makes, the two models are similar. Both are assembled of well-known parts, including a Continental engine, Bimel wheels, English & Mersick radiator, Bosch magneto, Zenith carbureter, Fuller & Sons clutch and gearset, Columbia and Salisbury front axles, Wisconsin rear axle, Rowland springs, Ross gear, and Sterling universal joints.

Both L-head four-cylinder engines are units with the gearsets. The cylinders are cast in block and the valves are placed at the right. The engines are water-cooled, the circulation being taken care of by thermo-syphon system and a vertical finned tube radiator with a demountable cast iron case. Fuel is fed to the carbureter by gravity from a 16½-gallon tank under the seat. The engines are oiled by splash-pressure, in which the oil is fed through a pump to pipes through to the gears and the main bearings. It then drains back to the pan. A single high tension magneto is used for ignition. Spark control is by hand.

The clutch is of the multiple dry-disk type, and requires no adjustment, this being automatically taken care of. The three-speed, selective gearset is of the heavy duty type. All of the gears are 3½ per cent nickel steel and heat treated. The shafts are of chrome nickel steel, carried on large size ball bearings.

The drive is taken from the engine through the gearset and clutch to the one-piece tubular driveshaft and from there through the worm-driven axle to the springs and wheels. Strom ball bearings are used in the rear axle throughout, and the main housing is a one-piece casting. The front axle is a heavy drop forge I-beam section with Bower roller bearings in the hubs. Driving torque and propulsion are taken through the half-elliptic springs.

The service and emergency brakes are both internal expanding. They are 2½ inches wide. The frame is of 6-inch rolled channel steel, rigidly reinforced with five cross members, large gusset plates and angle sections. All of the parts and castings are hot riveted in place. The Conestoga company makes its own frames.

The wheels are wood of artillery type, with square spokes and mounted with single solids on the 1-tonner and with singles on the front and dual solids on the rear on the 2-tonner.

The steering gear is of the heavy truck type, with double controls and an 18-inch steering wheel. Steering is on the left and gearshift and brake levers in the center.

Equipment includes a box seat, dash and rear oil lamps, mechanical horn, oil can, necessary wrenches, front fenders and short running boards.

New Conestoga 1-tonner

New Russel Axle Designed for 5-Ton Capacities

Guthard Wrench—Million Oil Filter—O'Brien Engine Block Support—New Boyce Moto-Meter—King Hand Hoist—Continental Axle Stand

THE Russel Motor Axle Co. of Detroit is now marketing a new internal-gear-drive axle for heavy duty trucks of 5-ton capacity. The axle follows along the lines of previous Russel axles except that it is altered where necessary to meet the requirements of heavy duty work. The load-carrying member is a one-piece, heat treated, alloy-steel bar with integral spindles. The bar section varies to prevent localization of stresses and fatigue of steel.

The jackshaft is placed in front of the load-carrying member, the reason assigned for this practice being that the wheel bearing loads and stresses are neutralized and consequently very much lessened. One of the claims for the new axle is that the means provided for supporting the jackshaft housing on an extension to the spring seat inside the springs obviates many difficulties that are met with in the usual internal-gear-axle construction. It is general practice to take the support and torque on the brake spider flange. With the support used on the new Russel axle it is possible to make the jackshaft housing in a one-piece casting, thus considerably lightening the weight.

The differential and driving gear and also the driving pinion are supported as a unit in the differential carrier in the new Russel axle. This permits ready removal from the jackshaft housing, permitting accessibility and possibility of adjusting the alignment of the gears. Another feature of the design of the new Russel axle is the fact that the housing is arranged so that the internal gear and the driving pinion work within a bath of lubricant, while the wind and dirt are excluded from the gear casing.

Million Oil Filter

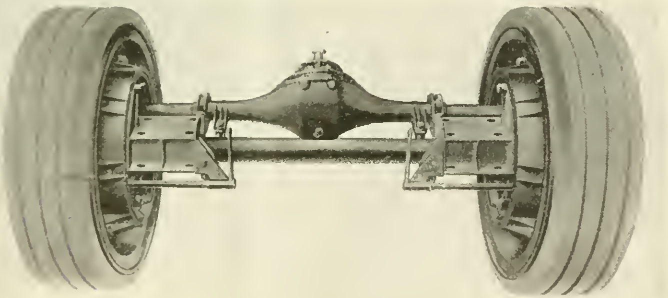
AN oil filter for removing particles of dirt and sediment from dirty oil so that the oil can afterwards be used for machinery, etc., is being produced by the Million Motor Co., Adrian, Michigan.

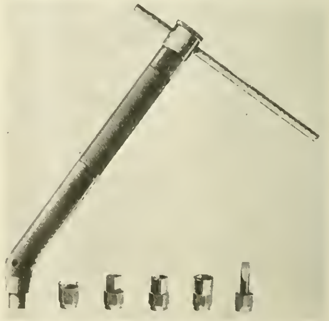
In operation the oil passes through a series of fine mesh brass wire filter cloth and is then filtered by going over a series of wicks by capillary attraction. It is made in two sizes, 30 gallons for garage use, the price being $35. The 10-gallon size sells at $20.

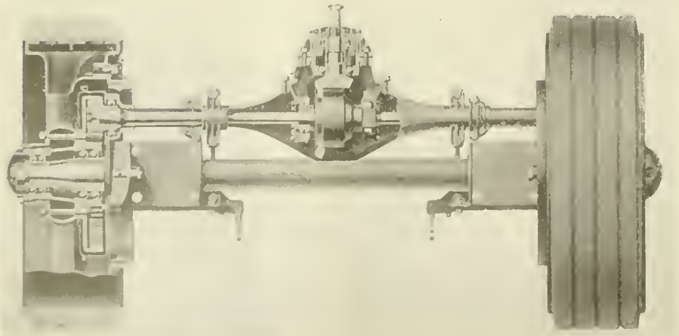
Guthard Wrench

A WRENCH that spins off nuts or bolts is being manufactured by the Edgar C. Guthard Co., Chicago. This is styled the Billmont master wrench. It is essentially a universal socket wrench and is designed to do the work of a dozen or more wrenches. It will reach the fourth connecting rod nut on a Ford car with ease and spin it off. The wrench and one adapter, so any size socket can be used, one Ford valve grinder, one screwdriver and three nut sockets retail as a set for $10.

The Billmont master wrench is so con-


New Russel heavy-duty axle


Guthard Wrench


Cross section view of new Russel axle

Million oil filter

structed that it can be held in place with one hand and operated with the other, thus overcoming the difficulty of the ordinary wrench in keeping the jaws squarely on the nut and spinning the nut instead of getting only a quarter turn with each fitting of the wrench jaws. A knurled handle keeps it from slipping.

O'Brien Engine Block Support

THE O'Brien device is an adjustable support for engine blocks, the stationary part of the support being bolted to the bench and the movable part of the support being bolted to the cylinder block. The price is $18.50 and the maker is the Economy Auto Supply Co., Denver, Col.

The movable part or support arm is bolted to the engine with the engine-head bolt when removed from the truck and the spindle end of the arm then slipped into a box bolted to the bench. No lifting out of the engine is necessary after mounting on the support. The arm with the engine attached revolves on the spindle and can be turned in any position convenient for the work being done and rigidly held there by tightening one screw. The part of the arm that bolts to the engine is offset from the center of its spindle, bringing the center of the engine in line with the spindle to balance the engine. The support is rigid enough to allow an engine to be run in with a belt.

New Boyce Moto-Meter

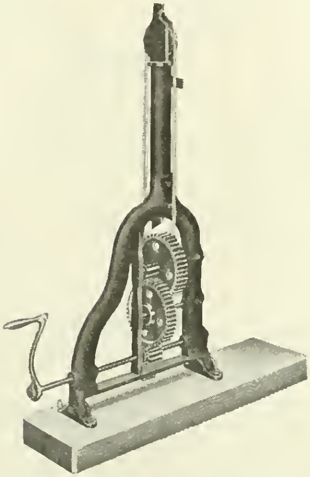
A NEW Boyce Moto-Meter, specially designed for truck and tractor use, has been brought out by the Moto-Meter Co., Long Island City, N. Y. This model has been designed for severe service conditions, such as are met with on trucks and tractors. The retail price is $10.

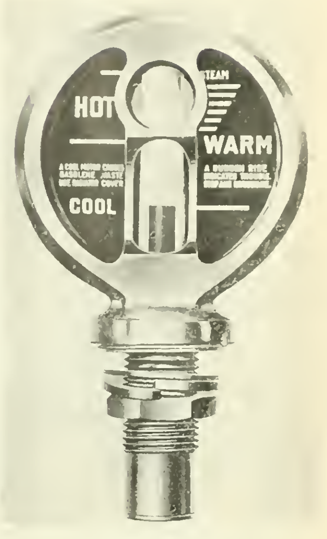
The diameter of the thermometer tube is ½ in., which makes breakage practically impossible. The frame of the instrument is sturdy, and the thermometer tube is thoroughly protected. The casing is nickel plated, and the tube has a broad red column of indicating liquid easily seen, regardless of dust conditions so often met with in truck and tractor service.

King Hand Hoist

A HAND hoist for dumping bodies, which has a capacity of 4000 lb., is being manufactured by the Hebb Motors Co., Lincoln, Neb. This hoist, styled the King, sells at $50.

The power is transmitted from the hand crank through a train of gears to a cable which runs over a pulley and lifts up the body. As the load is lifted, the hoist gradually tilts back toward the body, making the pull always straight. The hoist is shipped complete with baseboard for attaching to any chassis. The holes are bored where required, and the board is bolted to the frame. A space of 11 inches is required back of the seat for the installation of the hoist.


King hand hoist

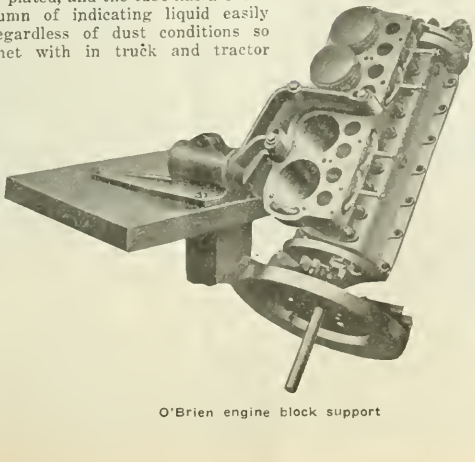


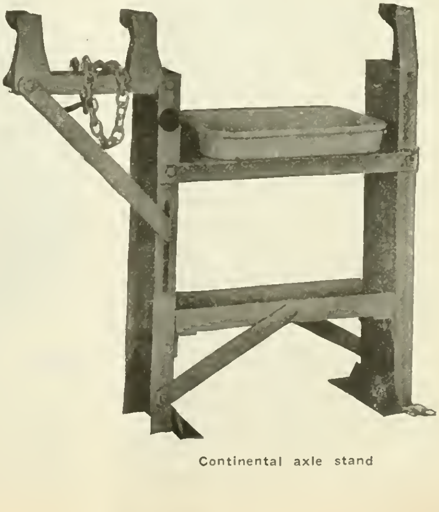
New Boyce Moto-Meter

Continental Axle Stand

A STAND for holding front or rear axles after they have been removed from the truck is being manufactured by the Continental Auto Parts Co., Knightstown, Ind. The price is $36.

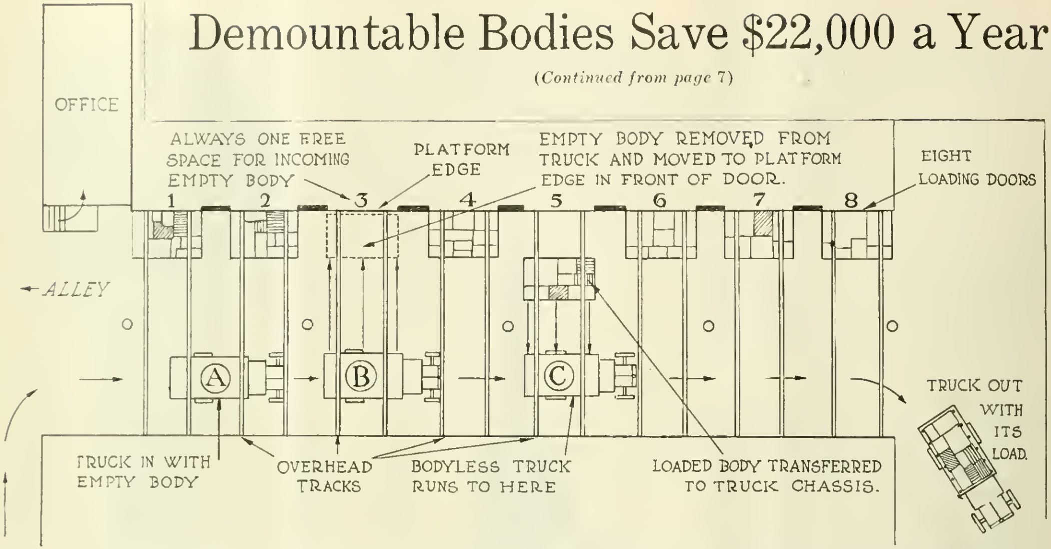
The axle is clamped firmly in position on the adjustable vise and the taper of the housing is taken care of by the adjustment. The axle is at a convenient height to work on and may be torn down regardless of type. The stand will handle any and all types of axles, both front and rear. A heavy cast iron grease pan takes care of the old grease and oil. The weight is 145 lb.


O'Brien engine block support


Continental axle stand

Demountable Bodies Save $22,000 a Year

(*Continued from page* 7)


OFFICE
ALWAYS ONE FREE SPACE FOR INCOMING EMPTY BODY
PLATFORM EDGE
EMPTY BODY REMOVED FROM TRUCK AND MOVED TO PLATFORM EDGE IN FRONT OF DOOR.
EIGHT LOADING DOORS
1
2
3
4
5
6
7
8
ALLEY
A
B
C
TRUCK OUT WITH ITS LOAD.
TRUCK IN WITH EMPTY BODY
OVERHEAD TRACKS
BODYLESS TRUCK RUNS TO HERE
LOADED BODY TRANSFERRED TO TRUCK CHASSIS.

Details of the handling of the demountable bodies. At A, a truck is shown entering the alley with an empty body. At B, the empty body is being moved transversely to the edge of the loading platform by means of two overhead Triplex hoists. The truck then moves ahead to the position at C, where a loaded body is placed onto it. The truck then leaves from the opposite end of the alley from that at which it entered, thereby not interfering with other incoming trucks

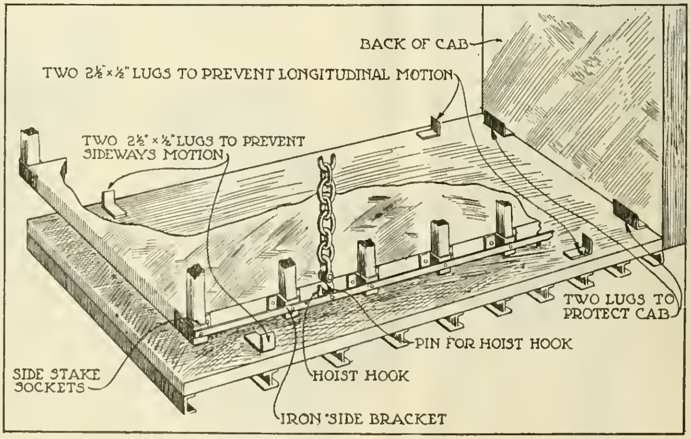
used in the transference of the goods between the company's main store and its warehouse and between the various railway and boat terminals. Other trucks with ordinary bodies are mounted on two electric trucks and four gasoline vehicles employed in the delivery of material to retailers in Baltimore or within the surrounding territory. The electrics are used for the close-in city hauls and the gasolines for the outlying runs.

The Method of Operation

The general layout of the scheme by which the demountable bodies are manipulated is shown in the large view of the main store and annex at the top of page 7 and the cross-sectional view through the platfrom at the bottom of page 6. The actual method of the substitution of a fully loaded body for an empty one is shown by the illustrations at the tops of pages 5 and 6. In a study of the plan view on page 7 it is to be noticed first of all that the incoming and outgoing goods from and to the warehouses and terminals are divided into two streams of traffic, one for the incoming goods and the other for the outgoing goods. Similarly, goods brought from the warehouse or terminals for final delivery within the city or nearby points and goods shipped from the main store to retailers in the same area are segregated and handled at a special location so that the two lines of city and distant shipments do not conflict and cause vehicular congestion. The incoming and outgoing city goods are loaded and unloaded from ordinary type bodies across the sidewalk and will not be discussed here, since this article deals more particularly with the demountable bodies and their use.

As shown in the plan view, the empty bodies are arranged longitudinally along a platform in a runway which extends from an alley in back of the main store through the annex building to the next street. There are nine large doors in a wall parallel with the edge of the loading platform. One of the bodies is placed in front of each door with the floor of the body level with the top edge of the platform. The goods are moved from the rear of the platform through the large doors and over the edge of the platform into the truck bodies where they remain until the trucks with empty bodies enter at one end of the runway and leave at the other with loaded bodies.

Each body is supported by two Triplex hoists made by the Yale & Towne Mfg. Co., New York City. Each hoist consists of a horizontal cylinder supported on wheeled carriages at each end. These cylinders are slightly less in length than the length of the demountable bodies and are supported on the wheeled carriages which move along overhead I-beams extending clear across the runway near the ceiling. At each end of the cylinder is a differential block with a chain and hook so that each body is supported at four points, two on each side, one near the front and the other near the end of the body.



Perspective view of the demountable body platform and the platform on the truck chassis, showing how the former is held in place on the latter by means of four lugs to prevent both sideways and longitudinal motion while the truck is in transit

While there are nine doors on the loading platform and spaces for nine bodies, one in front of each door, only eight bodies are ever in place at the same time. This leaves one open space at which a truck may remove its empty body before taking on a loaded one. Differing from other demountable body installations, that of the Baltimore company moves the loaded body onto the truck chassis from the side rather than from the end. This method of body transference is clearly shown in the cross-section view through the runway given at the bottom of page 6.

When the truck with the empty body enters the loading runway from the alley, it runs forward parallel with the edge of the loading platform to a point opposite the door in front of which there is no body. The four body hooks are then lowered from the Triplex hoists above and the body lifted off the truck chassis. The body is then moved inward to the edge of the loading platform where it is ready to be loaded with goods for the next trip. The truck minus its body is then moved forward to the loaded body which it is to carry and the loaded body is placed on its platform in exactly the reverse manner. The truck then runs out of the other end of the runway so that it does not interfere with other incoming trucks.

How Bodies Are Held to Trucks

Each of the demountable bodies is held in place on the truck chassis by its own weight and by four small lugs bolted directly onto the top of the platform rigidly attached to the truck frame, as shown in the sketch on the bottom of page 32. These small lugs are made of flat ½-in. bars 2½-in. wide. Two of the lugs are placed near the rear end of the truck platform to prevent sideway motion, the upstanding or vertical part of the lug in each case being parallel with the longitudinal edge of the body. This vertical member of the lug contacts with a special metal framework built up along each side of the demountable body platform to carry the body stakes. The two lugs at the front end of the platform, however, have their vertical members perpendicular instead of parallel with the longitudinal edge of the truck platform and these vertical members press against one side of the side stake pockets to prevent any longitudinal motion of the body while the truck is in transit. Additional transverse angle-iron lugs with their bosoms facing toward the front end of the truck are bolted to the truck platform a few inches in back of the driver's cab to prevent the body from damaging the cab. By this simple means of lug attachment and by the use of Triplex hoists, an empty body may be removed and replaced by a loaded one in from 5 to 10 minutes time as compared with the loading time of 1½ hours without the use of demountable bodies.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

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1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
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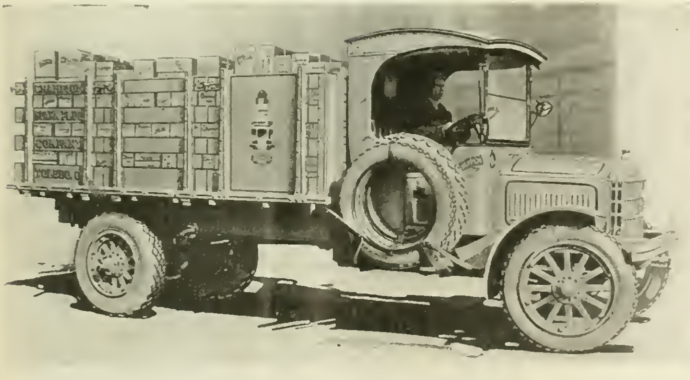


The 2-ton Garford truck shown above carries 20,000 spark plugs a day from the plant of the Champion Spark Plug Co., Toledo, Ohio, to a passenger car manufacturer in Detroit. The truck leaves the Toledo factory at 7:30 a. m. every morning on its 68-mile trip to Detroit. After delivering the shipment of spark plugs in Detroit, the truck is loaded with porcelain insulators at the Champion company's porcelain plant in Detroit and returns with them to Toledo. The round trip of 136 miles is accomplished in less than 10 hours, including the loading and unloading at both ends. Records kept by the Champion company indicate that the truck with a capacity load averages 10 miles to a gallon of gasoline and 470 miles per gallon of oil

While the means just described permit a rapid movement of goods across the loading platform, it should also be borne in mind that other changes were necessary inside of the store proper in order to keep the goods moving to the loading platform in a continuous stream and without serious delay. The Baltimore company solved its interior handling problem by providing ample elevators for moving all of the incoming goods from the main floor to the upper floors and of installing large spiral chutes for the movement of all outgoing goods from the upper floors to the basement.

Two different sizes of spiral chutes are provided, one of large diameter for case goods and another of smaller diameter for packages. Approximately 97 per cent of all the outgoing goods are transferred from the upper floors of the main floor stock room to the basement by means of the spiral chutes. This in itself is a considerable economy since it does away with practically all manual handling of the outgoing goods from whatever floors they are stored to the basement.

In the basement the goods are transferred to the level of the loading platform above by means of a large conveyor. When the goods leave the top of the conveyor they are deposited directly on the loading platform floor from where they are sorted into bins according to the railroad or steamship line on which they are to be shipped. From the various route bins the goods are transferred directly through the loading doors near the edge of the platform into the waiting demountable bodies.

One Bus That Made Good

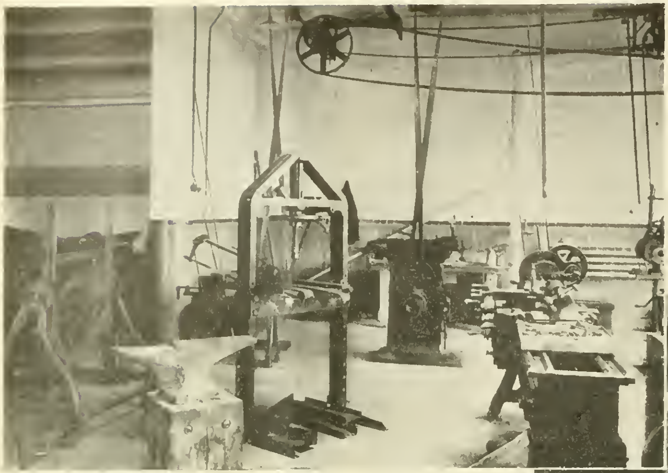
WHEN the Street Railway company of Galesburg, Ill., recently declined to extend its lines to a public park, 1½ miles distant, claiming that the 6 months' business was not sufficient to warrant the expense of construction, the mayor and aldermen ordered a 1½-ton G. M. C. truck, added a bus body with five seats, and a capacity of twenty-five passengers, and now operates it in conjunction with the street cars between the terminus of the railway and the park.

Transfers from the street cars are accepted for the run to the park and the regulation fare is collected for the return trip and transfers given for the cars. All the receipts, however, go to the Street Railway company, while the city pays the salary of the driver and the expense of maintaining the truck.

The run from the terminus of the railway to the park is made in 10 minutes. Patrons greatly enjoy the novelty of the ride and the move has been endorsed by the entire city. But for the action of the council, the park would have been of little benefit to the public. This is a suggestion to other cities where there is a gap of a mile or more, that must be bridged somehow. No more inexpensive method could be devised, and the problem solved so successfully in Galesburg, might be applied to other municipalities.

Overloads and Salt Problems of the Ice Cream Trucks

(*Continued from page* 19)



Two Devices for Bending Shafts Cold

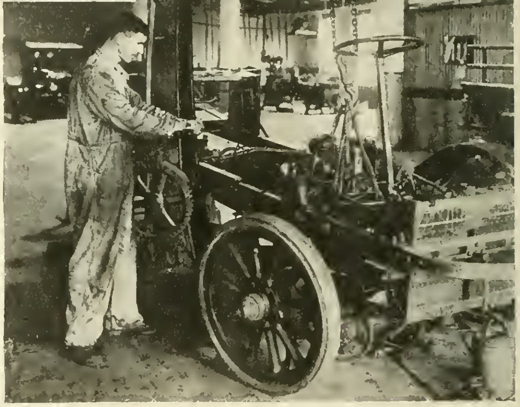
Not only is the arbor press useful for taking out bushings, etc., but it comes in handy for bending work. The anvil is used for the heavy parts where hammering is necessary

There are two mechanics in each of the garages at Twenty-third street, New York, and in Brooklyn. All small adjustments, etc., are taken care of there. The main repair station has four mechanics, four handy men, two washers and a greaser. All repair work is done during the day and washing and greasing at night.

One Main Stock Room for all Garages

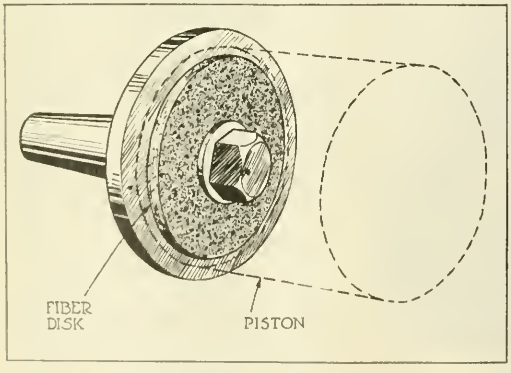
Following out its scheme of concentration in the repairing of its trucks, the Horton company has located what is called its general parts department or main stockroom in one large fireproof room in the 131st Street garage. All parts, hardware, etc., needed by the three garages in New York City and Brooklyn are kept here. This stockroom is 40 feet long and 10 feet wide. It is located on that side of the garage opposite the machine shop and runs from the front to the circular stairway, as illustrated in the previous issue of THE COMMERCIAL VEHICLE. It is separated from the garage by means of a firebrick wall and a fireproof sliding door entrance. Lighting facilities consist of a single window at the front and overhead electric lights.

All tires, parts, nuts and bolts, etc., are kept on shelves which run the length of the room on both walls. This department contains nearly everything that may be needed by the three garages. However, in order to overcome any difficulty in the way of having parts, etc., on hand when needed, that company has arranged to keep a close watch on what parts are called for every day and has therefore opened in each garage what is called a running supply department. This, though smaller than the main stockroom, is well equipped with the necessary parts, etc., that are needed daily in small repairs and replacements.



This Portable Crane Comes in Handy

It takes the place of a traveling crane or any other fixed device and is useful not only for lifting out engines and parts, but for jacking as well. It is easily rolled around from one part of the garage to another and comes in very handy during the overhauling period



A Time Saver for Piston Facing

No need of using a dead center to hold the piston in place on the lathe when using this device. It consists of a hollow spindle with a flanged and tapering center which fits into the lathe. The pistons fit snugly on a fiber disk, which in turn is held tight on the flanged center by a bolt

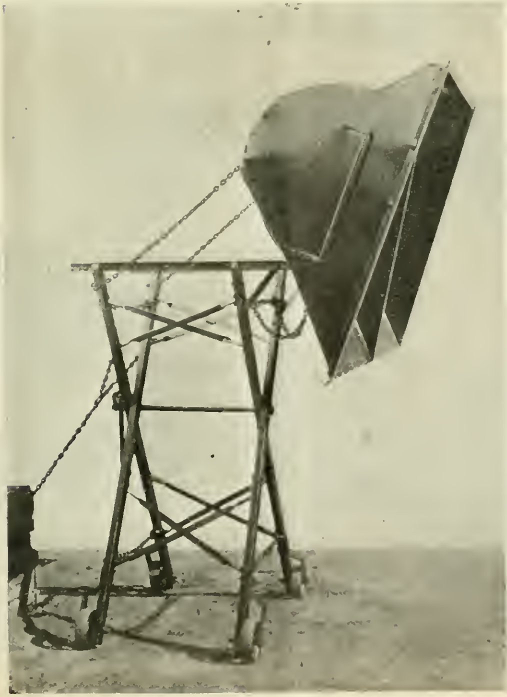
Loading Devices to Conserve Motor Truck Time

(Continued from page 23)

under the railroad track, where the load is discharged into a pit which is between the elevator and the track. The bucket is loaded, and then hoisted on an inclined track and emptied at the top of the track, into a hopper bin, from which it is discharged by gravity truck chutes into wagons, trucks or hauling cars. The drivers operate the chutes and load their wagons without delay or assistance.

Useful type of road body which can be loaded or dumped from the side

The elimination of hand shoveling is of supreme importance in saving time and money on work of this kind. As a matter of fact, it is almost impossible to get hand shovelers, because in summer there is so much other work to be had that men will not do this sort of work, and in winter conditions of frost make it practically impossible.



Lee loader in dumping position

The manufacturer of a type of loader widely used compiled figures for comparison of costs in loading 5 cu. yd. of broken stone, coke, gravel, sand, and similar material, by hand and by a loader. His conclusion, based on cost of labor, time of use of truck, etc., was that the loading of a truck by hand cost $1.94½ and by machine 45½ cents. The use of the loader almost exactly doubled the number of trips that could be made by the truck.

Handling Laborers Cheaply

TRANSPORTATION of laborers and materials by trucks was found to be considerably cheaper than transportation by rail on a large drainage and construction job completed last fall at Macon, Ga. From Jan. 1 to Nov. 15, approximately $3,825 was spent on truck transportation, of which $510 represented the cost of hiring trucks used in addition to those owned and operated by the city of Macon, the county and the government. The balance, $3,315, represented the cost of upkeep and operation of two trucks for 12 months.

Of the total of $3,315 spent on the trucks, wages of the truck drivers represented $1,560; gasoline and oil, $830; and repairs, $925. Of the monthly cost per truck, $138, wages took $65, gasoline $35, and repairs $38.

The average daily run was 25 miles; therefore, the monthly mileage, based on 26 working days, would be 650. From these figures, not allowing for depreciation, the average cost of operation per mile was 21 cents. Dividing this into its component parts, it was found that wages amounted to 10 cents per mile; gasoline and oil, 5.3 cents, and repairs 5.8 cents.

A comparison of truck and rail costs of transporting laborers to and from their work was made. It was found that to carry one laborer to and from his work, an average distance of 5 miles, the cost by rail was 30 cents per day. By motor truck, the cost per man was reduced to 2.65 cents daily.

Produce Wholesaler Finds Mules Are Far Too Slow

Trucks Proved So Successful in Handling War Business Boom That Their Use Is Continued to Enlarge Civilian Delivery Territory

WHEN the war struck Little Rock, Ark., it forced the George E. Shelton Produce Co. to motorize its delivery equipment and to-day, when the war is over, it is still motorized and giving a much better service than was ever possible with mules. While the war struck Little Rock in many ways, including the drafting of several thousand of her citizens for our great overseas army, it caused a rapid business expansion in which the mules formerly employed by the Shelton company could not keep pace. The city's business expansion was due to the location of the large Camp Pike cantonment, 8 miles out of the city, and to a large increase in the army personnel stationed at Fort Roots, 7 miles outside of the city.

Had to Buy Trucks

In 1917 Little Rock had a population of between 80,000 and 83,000, so that when between 20,000 and 30,000 men were concentrated at Camp Pike the problem of feeding the city's regular population and the draft army men as well became a most serious one. The Shelton company, which deals in produce of all kinds including potatoes, grapes, bananas, celery, etc., was doing a good business and delivering its goods at wholesale to retail grocery stores and hotels by means of six mules.

When the capacity for housing the drafted men at Camp Pike had been nearly reached, the railroad facilities at the camp were not sufficient to bring in all of the required food, so that a large percentage had to be bought in Little Rock. The Shelton company got its share of this new business and attempted to make deliveries from Little Rock to the camp 8 miles away by its mule teams. These could make only one trip a day and as a result the Shelton company was forced to purchase motor trucks in order to compete with other produce houses in the same city which were getting more than their share of the business because they put on motor trucks instead of mules and made two trips a day to the camp instead of only one trip, the maximum of the mule ability.

Accordingly the Shelton company disposed of its mules and replaced the six animals with four motor trucks. One of these is a Ford used for special delivery work, and the others, three Republics, one of 1½-ton capacity and two 2-tonners. With this equipment the Shelton company was able to practically double its business and still serve its former city customers.

Each of the Republics made on an average of two trips a day to the camp, carrying all sorts of vegetables and fruit. Besides making deliveries to the camp and to the fort, the trucks are used to haul the produce, which is shipped into Little Rock by railroad, from the various terminals in the city to the company's place of business where buyers from the army and from the individual grocers in the city come to look over the stock in hand and purchase such amounts as they require.

The truck equipment costs more to operate than the mules and wagons which it replaced. Yet it is cheaper in the final analysis because it has accomplished more than double the work and thereby increased the volume of business formerly done by the Shelton company over 100 per cent.

Drivers First Problem

The first problem of the Shelton company was to purchase trucks in order to take advantage of the big business boom and to get its share of the government orders. This done, its next problem was to keep the trucks in motion and the greatest trouble it experienced in this respect was in securing proper drivers. The shortage of men due to the large

One of the two 2-ton Republics and the Ford 1-tonner used for special delivery work being loaded with produce in front of the Shelton store. Each truck has a driver's cab and the Republic is fitted with a removable side-stake body for side loading or unloading

Another view of the loading operations at the Shelton store. Colored drivers are employed on each of the company's four trucks and are paid from $15 to $18 a week. Helpers, also colored, are paid at the rate of $10 a week

drafts made for the army aggravated the condition and made it necessary for the company to hire colored drivers who are paid from $15 to $18 a week. It found that as a rule a colored driver was very prone to overspeeding and if not carefully watched would operate his truck at much greater speeds than were conducive to a low upkeep cost. By close supervision, however, several of the old drivers of the mule wagons were taught to operate the trucks with a reasonable degree of success.

Helpers' Pay

The company also soon found that in order to make two trips a day to the camp and back without fail, some means must be employed for loading the trucks rapidly at the company's store and of unloading them at the other end of the route. Because sidewalk loading had to be resorted to, helpers were found most economical in increasing the truck mileage by reducing the idle standing time during loading and unloading operation. Sometimes even two or three helpers are employed at the Shelton store to load the trucks as soon as they come in from their previous trips. These helpers are also colored men or boys who are paid at the rate of $10 a week. One of the helpers is shown loading one of the 2-ton Republic trucks illustrated on this and the opposite page.

To further decrease the loading and unloading time, the Republic trucks were each equipped with a removable side stake body in which several of the stakes were formed into panels that could be lifted bodily away from the truck body platform to permit of side loading or unloading.

Due to the fact that deliveries had to be made on time, especially to the camp in order to retain the government business, all four trucks were equipped with driver's cabs to protect the men during the cold weather. The cab fitted on the Ford special delivery truck is of the built-in type, as illustrated in the view at the top of this page. It has a built-in windshield and is provided with side curtains to completely inclose the cab. The Republic trucks were furnished with a cab with a celluloid windshield which could be rolled up to the front edge of the cab top when not in use. Side curtains with celluloid windows were also provided so that the cab could be completely inclosed, as in the case of the Ford.

Now that the war is over, the Shelton company has not gone back to its mule equipment because it has received proof of the many advantages of trucks in delivery service and their ability to meet peak load conditions. Without trucks the company has realized that it could not handle large orders placed during a rush period and that if it could not make deliveries the business would be lost and would be given to some other concern which could deliver promptly. Of course, the abandonment of the Camp Pike cantonment has resulted in a falling off in the volume of business done, but this has merely served as an opportunity to overhaul the trucks and give them the attention to which they were entitled but which was sometimes denied them during the period when the camp was filled to its maximum capacity.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

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8—Garage	August 15

Sales Territory Increased

The fact that the company maintains a motor delivery service has enabled it to reach out and obtain business in sections previously inaccessible because of the inability to make deliveries in those territories by means of mules. Eventually it is hoped that the additional business secured in this manner will equal that done with Camp Pike during the war period so that the total volume of business will have been doubled solely through the use of the more modern motor truck delivery equipment.

The location of Camp Pike resulted in the construction of a fine piece of highway between Little Rock and the camp itself. This made it possible for the Shelton company to deliver goods to the camp without running off onto the poor roads. The advantages of the good roads to Camp Pike has also been reflected in other localities so that good roads have been provided through many of the outlying suburban territories. This has helped the Shelton company to obtain business in such areas and to deliver economically by means of motor trucks, whereas before considerable trouble and delays would have been experienced due to the trucks becoming mired during the rainy season.

The company has attempted to safeguard the operation of the trucks by training the most intelligent of the helpers to become drivers so that they may take charge of the trucks if any of the drivers are sick or leave the employ of the company.

The Editor's Viewpoint

A Place for Every Tool

HAVE a place for everything and have everything in its place is a truism which may be applied very appropriately to the tools in the garage or machine shop of the motor truck fleet owner. Having a place for every garage tool which is not bolted down to the floor indicates in the first place a desire for orderliness, which if carried through by putting every tool in the place provided for it, means a reduced cost of truck maintenance by making it possible for the mechanics to do more work in any given time. When tools are kept in their places, the machinists do not have to spend half of their time getting the tools or trying to find them and the other half of their time actually doing the work. Perhaps nine-tenths of the time may be put to actual work, with one-tenth or less in getting ready for the job.

Out in Chicago, the truck superintendent for one large department store operating over sixty trucks, has solved the tool-keeping problem by providing a board about six by ten feet hung up on the wall of the shop so that the top may be reached by a man standing on the floor. All of the special tools such as wrenches for taking off axle nuts; special engine wrenches; socket wrenches for spark plugs, etc., etc., are hung on this board on hooks so placed that every tool may be removed from it without interfering with the others. When there are empty hooks on the board, it indicates that the tools which will be hung up at the end of the day's work are in use by some other mechanic in the shop or are out in the service truck making roadside repairs.

Such a board is easy to make and costs very little. Yet it has proved so worth-while in saving the time of the garage mechanics that the same superintendent is having a second board made in order to hang up other tools which were formerly kept in tool boxes or in drawers under the workbench from which it was sometimes necessary to take out all the tools before the particular ones desired could be found.

Do not think that such a board is only desirable in garages where fleets of sixty trucks are maintained, for the same type of board has just as many advantages in the smaller shops where tools are kept for small fleets of from five to ten vehicles. The idea of the board is a good one, and many a fleet owner who now has trouble keeping his shop neat and clean or in getting the maximum work out of his machinists will find that he can turn the idea into real money by the savings which may be effected through its use.

Buying Transportation

EVERY fleet owner is to-day buying transportation, not motor trucks, even though he may be delivering his own goods instead of selling haulage by carrying other people's goods. The motor truck is merely the means to the end and not the end itself. When the purchase of trucks is looked at in this light, the owner may view the case from an entirely different perspective and one which may result in him obtaining more satisfaction from his motor equipment.

In the first place, such an attitude on the part of the prospective purchaser convinces him that it is continuous service which he must have in his delivery system, irrespective of the make or size of the truck selected. When he realizes that this continuous service means transportation, he does not haggle over the initial cost so long as he is assured that he will obtain the service desired.

In this connection, the truck buyer may often learn much from the truck dealer, for most truck dealers try to keep their trucks sold in order to cash in on repeat orders which have a low sales cost. The progressive truck dealer of to-day is just as much interested in the problems of his prospective customer as the customer himself. The story is told of a wide-awake western dealer who sold a fleet of ten trucks and who insisted that the purchaser buy 4 per cent of the total cost of the trucks in spare parts at the outset, together with the services of a capable inspector considered essential to the proper maintenance of the vehicles. That dealer sold transportation, not merely his own trucks, notwithstanding that the purchaser intended originally to buy trucks only. Nevertheless the truck owner is more than satisfied and is glad that he bought transportation instead of merely trucks. **Moral:** *Buy transportation first and trucks second.*

The Readers' Forum

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

FAIR CHARGE FOR HIRING TRUCK

Must Consider Operating, Maintenance and Fixed Charges

To the Editor, COMMERCIAL VEHICLE:

For us to make a reasonable profit, how much should we charge a day for the hire of a 1½-ton truck worth $2,000? We have a customer in the paper business who is willing to put on one of our 1½-ton trucks provided we can give him a satisfactory contract. The trucks will be used every day except Sundays and holidays, and will be used for short hauls on paved streets. The material hauled will be baled paper and the mileage covered would not be over 30 miles per day. Some days the mileage would be even less than 30 miles. We want to determine a contract rate which will give up a reasonable profit and still be low enough to meet competition.—C. F. E., Atlanta, Ga.

Regarding an approximate charge to make for a 1½-ton truck to be used in hauling paper over city streets, we give you below an estimated cost of operation based on an average daily mileage of 25 miles. All of the items included in the estimate are the same as those which are given on the monthly cost sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. Of course, if the mileage covered daily is increased, the approximate figures given below will also have to be increased proportionately. The figures are of course only estimates which may be changed to suit your particular conditions provided the various unit items of the cost of gasoline, grease, the wages of the driver, the garage charge of $1 a day and the license fees are changed from those given in the tabulation.

As may be seen, the items are divided under the three general heads of Operating Charges, Maintenance Charges, and Fixed Charges. The individual items would probably be somewhat as follows:

OPERATING CHARGES	Estimated Daily Cost
Gasoline, 7 miles to the gallon, 3.6 gal. at 27 cents	$ .94
Grease, kerosene and waste at 1 cent a mile for 25 miles	.25
Driver at $3 a day	3.00
Total operating charges	$4.19
MAINTENANCE CHARGES	
Tires at 3 cents a mile for 25 miles	.75
Repairs at 2 cents a mile for 25 miles	.50
Spare vehicle rental at 50 cents a day	.50
Garage at $30 a month	1.00
Total maintenance charges	$2.75
FIXED CHARGES	
Insurance, fire, liability and collision at $200 a year	.66
Interest at 6% on cost of truck minus tires, or $2.000 minus $250 equals $1.750	.35
Depreciation at 33⅓% on $1.750	1.94
Total licenses and taxes at $5 a year	.02
Total fixed charges	$2.97
Grand total of operating, maintenance and fixed charges	$9.91

The figure below of $9.91 includes only the actual cost of the truck operation with a small charge of 50 cents a day for a spare vehicles rental to cover any day when you may have to supply another truck to replace one laid up.

It is usual for companies doing public haulage to approximately double the actual cost of truck operation in order to insure themselves of a profit of from 10 to 15 per cent after all charges for overhead, maintenance, such as office rent, office help, telephone, advertising, cost of getting business, etc., have been considered. In your case this would give a total of $19.82 as the maximum charge, provided you furnish a truck driver and pay all the bills for supplies and repairs. If you secure the contract for hauling the work, you could undoubtedly get this figure down to about $15 a day and still made a profit on the work.

HOW TO FIGURE TON-MILE COST

Commercial Ton-Mile Used Rather Than Absolute Ton-Mile for Figuring

To the Editor, COMMERCIAL VEHICLE:

Will you please give me a formula for determining the cost per ton-mile with the following information known:

Total number of miles run	1,118
Total tons delivered	317
Total operating cost per mile	$0.423

—M. S. CONVERSE CO., Springfield, Mass.

It is impossible to figure the cost per ton-mile from the figures you have given without knowing the number of trips made in the delivery of the 317 tons of coal and in covering the 1118 miles run.

The reason for this is that the number of ton-miles must be determined for each truck trip and the total number of ton-miles in any given period determined by multiplying the number of ton-miles made on one trip by the total number of trips in the period under consideration. In other words, the trip is the basis of figuring all ton-mileage. You cannot obtain the total ton-mileage for any truck over any given period by multiplying the number of miles run by the number of tons delivered. The reason for this is that the ton-mile is a unit of work done.

Perhaps you will understand this most readily by permitting us first of all to define the two kinds of ton-miles. The first kind of a ton-mile is the absolute ton-mile which is analogous to the work unit of the foot-pound. The foot-pound is the work done in moving a mass of one pound through a height of one foot. Similarly, the absolute ton-mile is the moving of a mass of one ton over a distance of one mile.

The absolute ton-mile is not used in motor truck cost calculations because it does not take into account the empty mileage of the vehicle. For instance, if a vehicle started from some certain point with a load of 5 tons and traveled 2 miles, it would have accomplished $5 \times 2 = 10$ absolute ton-miles of work. If at the 2-mile point, the vehicle had delivered 1 ton leaving 4 tons of load which had to be delivered 3 miles further on along the route, the absolute ton-mileage would have been $3 \times 4 = 12$. If it then returned empty over the 5 miles to the starting point the absolute ton-mileage of this portion of the trip would have been $5 \times 0 = 0$. The total mileage of the trip is the sum of the number of work units accomplished on each portion of the trip, or $10 + 12 + 0 = 22$ absolute ton-miles. This total of 22 ton-miles does not take into account the empty running miles from the point of the last delivery to the starting point of the next load. This empty running mileage is very important because it costs as much, if not more, to run the motor truck empty as it does loaded.

Then again, the absolute ton-mile is very difficult to obtain, since when loads are dropped off piecemeal or picked up piecemeal, the calculation of the ton-mileage for the entire trip entails so much work that it is liable to result in the driver taking more time in figuring the ton-mileage than in actually driving the truck.

Is is for these two reasons that a new arbitrary unit called the commercial ton-mile has been adopted for use in figuring motor truck costs. It is this commercial ton-mile which is meant when ton-mileage figures are mentioned in THE COMMERCIAL VEHICLE. The commercial ton-mile may be defined as obtained by multiplying the total tonnage of any one trip by the total mileage of that trip. This requires only one operation and takes into account the empty truck haulage. For instance, a truck starts out with a load of 5 tons, drives 15 miles, delivers all of its load and then returns empty to the starting point. The commercial ton-mileage is equal to 30 × 5 = 150. If the same truck picked up a second 5 tons after it had delivered its initial load of 5 tons at the 15-mile mark and carried the second 5 tons back to the starting point, the total load moved would be 5 + 5 or 10 tons × 30 miles = 300 commercial ton-miles. It is seen that by this method, the carrying of the second 5 tons shows up in the total commercial ton-mileage which is just double that of the first case. This is true because the truck did actually twice as much work on that particular trip.

Greater details regarding absolute and commercial ton-miles were given, together with simple charts and illustrations, in an article entitled **"What the Ton-Mile Is and How to Figure It,"** as published on pages 20 and 21 of THE COMMERCIAL VEHICLE for April 15, 1915. That article shows by means of a track and rectangles representing the absolute and commercial ton-miles, the exact difference in the two forms of ton-mileage, so that problems such as yours may be worked out without difficulty. As that particular issue is out of print, you will have to visit your local public library or call at this office to study the article.

You may figure the cost per ton-mile from the data you have given if you assume that you used a 5-ton truck and carried 5 tons on each trip. Details of the working out of the problem under that assumption are as follows: If you divide the 317 tons by 5 tons to the load, you will find that the truck must have made 63.4 trips to deliver 317 tons if it carried 5 tons on each trip. Then if you divide the total mileage of 1,118 by 63.4, the number of trips, you will obtain the average mileage per trip of 17.6. The ton-mileage per trip will then be 17.6 miles × 5 tons = 88 ton-miles. For a total of 63.4 trips, the commercial ton-mileage would then be 5,579.2. To determine the cost per ton-mile you must divide the total cost of operation by the number of commercial ton-miles of work done during the same period for which the cost figures are given. This would work out in a fraction whose nominator would be 1,118 miles, the total miles, × $0.423, the cost per mile, = the total cost of operation, and whose denominator would be the commercial ton-mileage of 5,579.2. This division gives a cost per commercial ton-mile of 8 cents.

USE OF CHAIN DRIVE ON TRUCKS

43 Models Built by 16 Companies Use This Form of Drive

To the Editor, COMMERCIAL VEHICLE:

Will you give us a list of truck companies which build chain-driven trucks. Kindly also indicate the capacities of the trucks on which this form of drive is used.—J. H. LARKIN, R. L. Polk & Co., Inc., Seattle, Wash.

Below is a list of the names of sixteen trucks companies which build forty-three models of trucks on which chain drive is employed:

Name	Manufacturer	Address	Capacity in Tons
Doane	Doane Motor Truck Co.	San Francisco, Cal.	6
Garford	Garford Motor Truck Co.	Lima, Ohio	5 6 tractor
Geneva	Geneva Wagon Co.	Geneva, N. Y.	¾
Hall	Lewis-Hall Iron Works	Detroit, Mich.	7
Kelly-Springfield	Kelly-Springfield Motor Truck Co.	Springfield, Ohio	1½ 2½ 3½ 4 5 6
Knox	Knox Motors Co.	Springfield, Mass.	2 tractors
Lange	Lange Motor Truck Co.	Pittsburgh, Pa.	2
Mack	International Motor Co.	New York City	1 1½ 2½ 3½ 5½ 7½ 4 tractors
Old Reliable	Old Reliable Motor Truck Co.	Chicago, Ill.	5 7
Peerless	Peerless Motor Car Co.	Cleveland, Ohio	3 4 5
Schleicher	Schleicher Motor Vehicle Co.	New York City	3 5
Steele	W. M. Steele	Worcester, Mass.	2 3 4 5
Sterling	Sterling Motor Truck Co.	Milwaukee, Wis.	7
Universal	Universal Motor Co.	Detroit, Mich.	7 3½
United States	United States Motor Truck Co.	Cincinnati, Ohio	2½ 3½
Wichita	Wichita Falls Motor Co.	Detroit, Mich.	2 2

WAR TRUCKS BOUGHT BY THE U. S.

Original Orders Called for 204,760 Trucks—About 1/3 Cancelled

To the Editor, COMMERCIAL VEHICLE:

Will you kindly tell us as nearly as possible the number of trucks sold to the United States Government during the war period. This has been published in your magazine from time to time but as there is so much difference of opinion of what trucks were represented and what were not, we would like the complete data.—L. B. BROCKETT, Packard-Cleveland Motor Co., Cleveland, Ohio.

Complete figures regarding the purchase of war trucks by the United States Government were published on pages 18 and 19 of THE COMMERCIAL VEHICLE for July 1, 1919.

The total number of trucks ordered, the number cancelled and the number still on order at the periods mentioned below are as follows:

Total war trucks ordered	204,760
Total orders cancelled	77,806
Total trucks left on order	126,954
Total trucks accepted to December 1, 1918	90,727
Total trucks to be delivered on January 9, 1919	28,629
Total trucks overseas to December 1, 1918	46,275

The above figures give the totals in the various cases mentioned. If you desire greater details, including the number of trucks of each make and capacity as ordered by the Government, you will find a complete tabulation of this nature on pages 3613, 3614, and 3615 of the *Congressional Record* for February 15, 1919.

MAKERS OF TRUCK FIRE PUMPS

Twenty-three Manufacturers of Such Equipment for Fire Apparatus

To the Editor, COMMERCIAL VEHICLE:

Can you furnish us with a list of companies which manufacture fire pumps to be used on fire trucks, in order to give greater water pressure.—MARTIN KIRTNER, Northumberland Fire Co., Northumberland, Pa.

Below is a list of companies which manufacture fire pumps. By writing them direct you would be able to ascertain whether or not these are especially applicable for use on fire trucks:

Jackson Iron Works, San Francisco, Cal.
W. & B. Douglas, Middletown, Conn.
Pratt Engineering & Machine Co., Atlanta, Ga.
American Well Works, Aurora, Ill.
Chicago Pump Co., Chicago, Ill.
Economy Pump Mfg. Co., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Pump Co., Anderson, Ind.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
J. Andrew Morse & Son, Boston, Mass.
Lawrence Machine Co., Lawrence, Mass.
Rodney Hunt Machine Co., Orange, Mass.
American Steam Pump Co., Battle Creek, Mass.
Morris Machine Works, Baldwinsville, N. Y.
Buffalo Steam Pump Co., Buffalo, N. Y.
American La-France Fire Engine Co., Elmira, N. Y.
Cameron Steam Pump Works, New York City.
Worthington Pump & Machinery Corp., New York City.
Goulds Mfg. Co., Seneca Falls, N. Y.
F. K. Myers & Bros., Ashland, Ohio.
Platt Iron Works Co., Dayton, Ohio
National Transit Pump & Machine Co., Oil City, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Whole Nation Back of Road Building

Senators from Many States Introducing Road Bills

WASHINGTON, July 2—More than two score bills have been introduced in the Sixty-sixth Congress that evidence a nation-wide demand for national highways and call for more complete control of federal expenditures on roads. These bills and the public interest in good roads are the result of the efforts of the Highway Industries Assn., the war-time activities of the Highway Transport Committee of the Council of National Defense, the Road Committee of the National Automobile Chamber of Commerce, and other bodies.

Among the many bills that have been introduced, the chief interest centers around that brought to the attention of Congress by Senator Charles F. Townsend of Michigan, which provides for a national system of highways, a federal highway commission and a thorough study of all principles governing transportation. This measure, which was first introduced in the last session of Congress, has been reintroduced with some little amendments, including provision for a commission of three members to be appointed for 6-year terms; for compensation to states which have already established main trunk-line systems; authorization to purchase road machinery and motor vehicles as may be necessary for securing the recognition of states by making it necessary to secure consent before construction and maintenance of a national system can be undertaken within its boundaries.

Among the many other bills introduced are those from Congressman Osborne, creating a Department of Federal Highways; that of Senator Sheppard of Texas, asking for a military highway for the southwestern border; that of Representative Hayden, Arizona, who would have the War Department undertake to survey and investigate the need for a boundary road; that of Representative Hudspeth, Texas, who has about the same idea, and of Senator Jones, Washington, who would have a survey of the entire Pacific Coast for the purpose of constructing a military road, and who would also survey and locate military roads from St. Louis, Mo., to Olympia, Wash. Representative Lea, California, proposes a highway for military coast defense to be known as the Roosevelt Highway, along the northern Pacific coast of his state. Congressman Hawley of Oregon asks for the extension of such a highway to his commonwealth. Senator Shields of Tennessee has proposed a bill that would authorize the Secretary of War to prepare a preliminary plan for a system of improved national highways, based on military requirements. Other bills ask for increases of from $400,000,000 to $1,000,000,000 to the present Federal Aid Road Act appropriations. There are, in addition, a number of other bills calling for special appropriations for construction of national park thoroughfares, memorial roads and military highways. The delegate from Hawaii has asked that his territory be allowed to participate in the distribution of money under the Federal Aid Road Act.

CANADIAN NATIONAL HIGHWAY

NEW WESTMINSTER, B. C., July 3—A national highway that would reach from the shores of the Atlantic in the Maritime Provinces to the waters of the Pacific in British Columbia has been proposed in Canada. The road proposed would follow the National Trans-continental railway from the Atlantic to Winnipeg, and the Canadian National Railway from the Manitoba metropolis to Vancouver.

NEBRASKA ROAD WORK

OMAHA, NEB., July 5—With the slogan in mind to "Pull Nebraska out of the mud," the state has been divided into five districts, with a resident state engineer at the head of road projects in each. Main trunk lines over the state have been charted, and voting on bond issues is in progress. The most notable of the local campaigns has just culminated at Omaha with the approval of a $3,000,000 bond issue for hard-surfaced roads in Douglas County. Iowa counties also are approving similar bond issues, failure having been recorded in but one instance.

KANSAS CITY GOOD ROADS WORK

KANSAS CITY, MO., July 5—The Good Roads Assn. of Greater Kansas City conducted a campaign to raise funds for promoting roads within a 100-mile radius of Kansas City. Enough subscriptions at $10 each were secured to guarantee the work for several months. J. Frank Smith, manager of the association, spends most of his time helping communities around Kansas City get road petitions started, and plans working to secure hard surfaced roads. The association points out that 2000 miles of roads can be built in this territory by 1926—and figures are given to show that the great increase in freight movement and business generally will require these 2000 miles to get stuff moved promptly. Throughout the campaign, and in all the work of the association, stress is laid on the movement of freight by highway, and the products that must come to Kansas City by truck.

NEW VESTA SERVICE STATION

CHICAGO, July 2—The Vesta Accumulator Co. will erect a service station on the site of the old home of the Chicago Motor Club. The work of tearing down the old building will be started as soon as the club moves out.

Dept. of Agriculture Gets More Trucks

11,751 Trucks Transferred by War Department

WASHINGTON, July 7—Eleven thousand seven hundred and fifty-one army trucks, valued by the War Department at $33,432,395, have been turned over by the War Department to the Department of Agriculture and in turn distributed to the various state highway departments for use in the construction and maintenance of highways throughout the United States. The fourth allotment of several thousand trucks will be made shortly. The trucks are of twenty-four different types and sizes, including 1½-ton Kelly-Springfields, light aviation models; 2-ton Federals, I. H. Cs., Nash Quads, Denbys, Kelly-Springfields, Morelands, Seldens and Wilsons; 2½-ton Macks; 3-ton heavy aviation models; Denbys, Federals, Gramm-Bernsteins, Peerlesses, Republics, Standards, Velies, and Whites.

Texas received the greatest number of trucks, taking 699; Illinois received 523 trucks; Iowa received 345 trucks, and California received 361 trucks.

These trucks are being distributed by authority of legislation passed last spring by Congress, authorizing the War Department to turn over road building and other equipment, including trucks to the Departments of the Treasury, the Postoffice and of Agriculture. The Department of Agriculture allocates the equipment to the various states according to demands and requirements, allowing the states to use the equipment directly or to loan it to contractors at reasonable rates.

TRUCK-STEAMBOAT DELIVERY

ST. LOUIS, MO., July 3—The projected motor truck-steamboat freight traffic service between St. Louis and Alton, Ill., as recently announced in THE COMMERCIAL VEHICLE, has progressed to a stage at which definite schedules of rates are being compiled. Harry Newman, of Harry Newman Co., Inc., St. Louis, who is representing the motor truck and trailer department of the system, has been given the task of drawing up a table of freight rates for the unique service.

The system includes the joint operation of trucks, trailers, and steamboats. Motor trucks and trailers will be loaded at the commercial plants on either side of the Mississippi and will be driven onto the ferryboats which will carry the trucks loaded with goods across the river. Trucks and trailers will run thence to their destinations. This system will cut down considerably the mileage for Alton-St. Louis shipments by eliminating the detours necessary to reach the bridge approaches and will also eliminate the expense of bridge tolls.

Intercity Hauling by Truck Is Taxable

Decision of November 18, 1918, Now Reversed

NEW YORK, July 2—The Internal Revenue Commissioner has reversed his decision of November 18, 1918, in reference to the 3 per cent tax on the transportation of household goods by a motor truck. The new ruling makes warehousemen or van owners liable for tax on all intercity hauling from April 1, 1919. The following are quotations from regulations of the Internal Revenue Commissioner that are applicable to the trucking industry pertaining to the imposition of tax—section 500—regulations No. 49:

Carrier—The word "carrier" as used in Title V of the revenue act 1918 was held to mean any person, corporation, partnership, or association who or which, for hire, furnishes any of the transportation services or facilities described or referred to in subdivisions (a), (b), (c), (d), and (e) of section 500 of the act.

Transportation—The word "transportation" as used in Title V of the act means the movement of persons and property by a carrier, including all services and facilities rendered, furnished, or used in connection with such movement by or on behalf of a carrier. It includes receipt, delivery, elevation, transfer in transit, ventilation, refrigeration, icing, storage, demurrage, towage, lighterage, trimming of cargo in vessels, wharfage, handling of property transported, feeding and watering live stock and all other incidental services and facilities. It does not include cartage or passengers' meals or hotel accommodations.

CHARGES TAXABLE

General Rule—The charges in respect of which the taxes under subdivisions (a), (b), (c), (d), and (e) of section 500 must be assessed are, all charges for transportation, as above defined, collected under tariffs filed or concurred in by the carrier making the charges with a Federal or State regulating authority, provided, however, that if a carrier has not filed or concurred in such tariffs all charges collected by such carrier for transportation, as above defined, are taxable.

Tax Less Than Half Cent Disregarded—In computing the amount of tax to be paid under the provisions of section 500, a fractional part of a cent shall be disregarded, unless it amounts to ½ cent or more, in which case it shall be increased to 1 cent. No tax shall apply to any payment for freight transportation in the sum of 16 cents or less.

PART II — TRANSPORTATION OF PROPERTY BY FREIGHT, EFFECTIVE DATE OF THE LAW

Tax Under Revenue Act of 1918—The tax under the revenue act of 1918 is in lieu of the tax under section 500 of the revenue act of 1917, and in the case of the 5501, transportation of property by freight the rate of taxation is the same under both acts. The provisions of the revenue act of 1917 are effective as to all taxable services or facilities furnished between midnight of Oct. 31, 1917, and midnight of March 31, 1919; the provisions of the revenue act of 1918 do not apply to services or facilities furnished prior to midnight of March 31, 1919, but do apply to such services or facilities furnished subsequent to midnight of March 31, 1919.

Transportation by Mechanical Motor Power When in Competition with Carriers by Rail or Water of Property by Freight—Transportation of property by freight by mechanical motor power is taxable only when in competition with carriers by rail or water. When property is transported between two points by mechanical motor power and rail or water transportation is furnished between the same points, competition is deemed to exist in the absence of unusual conditions.

Transportation of household goods, by mechanical motor power is transportation of property by freight. If such transportation is conducted in competition with transportation by rail or water, it is subject to the transportation tax.

When the amounts charged for transportation by motor truck vans include services of packing and unpacking furniture, carrying goods up and down stairs, moving pianos, safes, etc., out of windows, the tax will apply to the entire charge made for the service unless the amounts can be apportioned between the actual transportation charges and the other charges.

TRUCKS SHIPPED BY BOAT

DETROIT, July 7—Plans for a fast steamboat to carry trucks, passenger cars, tractors and automotive supplies and implements are being made by the Detroit & Cleveland Navigation Co. The vessel will be built at once. It will be 300 feet long with 75 feet beam. It will have two decks with two sets of elevators and will accommodate 275 vehicles. The plans are unique in the history of shipbuilding. The ship will run on no definite schedule. Its movements will be governed chiefly by the trend of the automotive traffic. Shipments will be carried to any point on the lakes. Other freight besides automotive products will be accepted whenever possible.

TAYLOR ON SEVENTH AVENUE

NEW YORK CITY, July 5—R. E. Taylor Corp. has opened a service station in conjunction with its show rooms for Signal trucks at Seventh Avenue and Thirty-seventh Street. This is a entral location at which Signal truck owners may secure parts, etc., for their trucks. There is a garage in connection with the station for temporary storage of trucks and where oil and gasoline may be obtained at all times.

Service Station Men May Organize

Metropolitan District Men First to Get Together

NEW YORK CITY, July 6—Truck owners maintaining large fleets of trucks will be interested to know that the heads of thirty motor truck makers' service stations in the Metropolitan territory met at the Automobile Club of America to discuss the advisability of forming an organization of service men to better conditions in service stations. It is hoped that service station managers of large fleet owners will be admitted to the tentative association in order that they may be able to benefit by the experiences of the large service station managers.

Several managers of large service stations foresaw great advantages in an organization of this kind where service men could get together after business hours once in a while and discuss their craft. A committee was appointed to arrange another meeting to which service men will be invited. The committee will arrange a program, and the date, although not settled yet, will be in about 2 weeks.

The members of the committee are: Roy C. Rognan, Vim, chairman; Ernest V. Derks, Buick; F. W. Fenn, National Automobile Chamber of Commerce; W. M. Wahrenberger, Bronx County Auto Co., Ford; J. F. Gfrorer, Hudson; R. J. Oakes, Haynes. The call for the initial meeting was made by Rognan, who has been studying the situation for some time.

DITHRICH BILL NOW LAW

HARRISBURG, PA., July 3—The Dithrich Bill which passed the Senate, as told on page 13 of the June 15, 1919, issue of THE COMMERCIAL VEHICLE, has now been signed by Governor Sproul, thus making it a law. The provisions of the bill make it necessary that motor trucks be licensed by classes, according to weight, from $20 to $150, the latter being for 10,000-pound classes. Truck lengths are limited to 28 feet and widths to 90 inches; weight to 28,000 pounds, including both chassis and load. Trucks are limited to speed by classes ranging from 10 miles per hour for heavy vehicles to 20 miles for lighter trucks. Sworn statements that applicants for licenses are physically able to operate are required when applications are made. Certain qualifications as to vision, hearing and use of hands are necessary. Authority to have special examination is given.

The code contains penalties for destruction of identifying marks and requires that records be kept by garage owners, of trucks left for storage or repair, while provisions are made for the use of lights. Trucks with licenses of other States may run in Pennsylvania once a week.

One State to License Truck Mechanics

Oregon Chooses Board of Three to Examine Mechanics

PORTLAND, ORE., July 8—Governor Olcott of Oregon has appointed Professor M. L. Granning, of Oregon Agricultural College, E. E. Boggess of Portland, and Hal R. Fancher of The Dalles, as members of the new State Board of Automotive Mechanics Examiners, which is to examine all persons working for hire in Oregon as truck mechanics, and license those found qualified. Under the law creating the board, which so far as known is the first of its kind in the United States, mechanics not licensed by the board will be subject to $100 penalty if they work for hire as truck mechanics.

The board is required to visit various parts of the state at specified intervals to conduct examinations.

The board has organized with Boggess as president, Fancher as vice-president, and Professor Granning as secretary-treasurer. All three are men of many years' practical experience as mechanics. Boggess is a garage operator and repairman of Portland, Fancher operates a garage and repairshop at The Dalles, and Professor Granning is head of the automobile department at Oregon Agricultural College.

One of the first questions arising under the new law is the disposition to be made of men working as mechanics in the smaller communities of the state who, though certainly not skilled mechanics in many instances, are the only ones obtainable and much better than none.

The board has a tentative solution of this problem that is interesting. As explained by Professor Granning, it consists of putting mechanics in four or more classifications according to skill and practical knowledge. For instance, Class A would include first-class all-around mechanics, who must pass a searching examination to obtain that rating; Class B would include men rated as good mechanics; and so on down to apprentices and helpers. The board purposes using considerable discretion in granting licenses to men of the latter classifications to work in the small towns that would otherwise be without mechanics, but will be much more critical in the larger places.

3 PER CENT TAX ON CHASSIS

WASHINGTON, D. C., July 1—To insure that motor truck chassis will only be taxed 3 per cent a bill has been introduced in Congress which amends section 900 of the Revenue Act to specifically place a 3 per cent tax on chassis and motor trucks. The bill includes the original paragraph 1 of section 900 of the Revenue Act, but includes the words "and chassis thereof." Following is the bill which has been referred to the Ways and Means Committee:

"Be it enacted by the Senate and House of Representatitves of the United States of America in Congress assembled, That paragraph 1 of section 900 of an Act entitled 'An Act to provide revenue, and for other purposes,' approved February 24, 1919, be amended to read as follows:

"'Automobile trucks, automobile wagons, and chassis thereof (including tires, inner tubes, parts and accessories therefor, sold on or in connection therewith or with the sale thereof) 3 per centum.'"

WASHINGTON DEMONSTRATION

WASHINGTON, D. C., July 2—A motor truck parade in which 304 trucks took part under the direction of the Washington Automotive Trade Assn. and the Motor Transport Corps, U. S. Army, was held in Washington on June 28. The trucks were of all types and descriptions from light delivery to heavy army vehicles. Brigadier General C. B. Drake, Chief of the Motor Transport Corps, was the Grand Marshal and led the parade which included the complete army truck corps that will journey from Washington to San Francisco, beginning July 7.

SHIP-BY-TRUCK MOVEMENT IN STATE OF OREGON

PORTLAND, ORE., July 7—Oregon truck dealers have opened an active campaign, in co-operation with Julius L. Meier, northwest regional chairman for the Highways Transport Committee, and Fred A. Rasch, utilities engineer of the Oregon Public Service Commission, to arouse interest in the ship-by-truck movement. A ship-by-truck parade is to be followed by operation of a demonstration ship-by-truck line, to prove the low costs, reliability and rapid transit of truck freight and express service. A special committee composed of F. B. Thompson, of the Diamond-T Truck Sales Co., C. W. Cornell of the White Co., and E. D. Van Dersal of the Garford agency, has been named to obtain from other states exact cost data on motor truck transportation lines.

N. Y.-N. J. TUNNEL

NEW YORK CITY, July 8—Clifford M. Holland, chief engineer in charge of the building of the vehicular tunnel between New York and New Jersey has opened an office in the Hall of Records. As stated in THE COMMERCIAL VEHICLE for July 1, 1919, appropriations of $6,000,000 have been made by each of the two states which will be connected by means of this thoroughfare. The actual work on the tunnel is to be started as soon as all the preliminary details have been settled.

Ship-By-Truck Bureaus Now in 65 Cities

Offices Opened in 34 States, 6 in New York and Ohio

NEW YORK, July 10—The ship-by-truck movement which has been supported from the beginning by the Firestone Tire & Rubber Co., Akron, Ohio, the first mention of which was made in the April 15, 1919, issue of THE COMMERCIAL VEHICLE, when the Firestone trucks participated in the 50-mile run, made out of Macon, Ga., has grown to national proportions. The Firestone company has created ship-by-truck bureaus in sixty-five trucking centers to date in the following cities: Akron, Albany, Atlanta, Baltimore, Birmingham, Boston, Brooklyn, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Davenport, Des Moines, Detroit, El Paso, Erie, Fargo, Grand Rapids, Great Falls, Harrisburg, Hartford, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Louisville, Memphis, Minneapolis, Milwaukee, Minot, Nashville, New Orleans, Newark, N. J., New York City, Oakland, Oklahoma City, Omaha, Philadelphia, Pittsburgh, Portland, Providence, Richmond, Rochester, Salt Lake City, San Antonio, San Francisco, Scranton, Seattle, Spokane, Springfield, St. Louis, Syracuse, Toledo, Washington, Wichita and Youngstown.

TRUCK PRICE INCREASES

NEW YORK CITY, July 8—Several companies have advanced the prices of their trucks since July 1, as follows:

Name	Tons Capacity	Old Price	New Price
		Effective Aug. 1	
Autocar	2	2150	2400
		Effective Aug. 1	
Autocar	2	$2050	$2300
Maxwell	1	1125	1225
Rainier	¾	1550	1750
Rainier	1	1790	1875
Rainier	1½	1890	1975
Rainier	2	2250	2400
White	¾	2300	2400
White	2	3300	3300
White	3	4100	4500
White	5	5000	5000

All models of Rainier trucks now have Continental engines, and the ¾-tonner is equipped with 35 by 4½ in. pneumatic tires instead of 34 by 4 in. pneumatics.

The general price increase is due entirely to the cost of materials and labor. The prices of axles, pressed steel frames, steering gears, and other parts have gone up from 15 to 40 per cent.

ONE LESS TOLL ROAD IN PA.

YORK, PA., July 5—The State Highway Dept. and the Lancaster County Commissioners have concluded an agreement with the officials of the Clay and Hinkletown Turnpike Co., whereby the turnpike soon will become the property of the State at a cost of $24,000. This means that the toll road may be free within the next 60 days. There are comparatively few toll roads left in the State.

Camp Holibard Losing 100 Trucks a Day

Largest Number of Trucks Kept at Baltimore Camp

BALTIMORE, MD., July 3—One hundred army trucks are being shipped from Camp Holibard by freight and over the highways daily for transfer from the War Department to other Government bureaus, and this number will soon be increased considerably in accordance with recent approval of the Department of Sales for the transfer of 39,000 motor vehicles.

There are 11,000 army vehicles stationed at Camp Holibard—the greatest number at any one camp in this country. These comprise 6000 assembled, 4000 securely packed in waterproof crates and 1000 which have been shipped to the camp for junk purposes, because they are unserviceable and not in repairable condition.

Six thousand uncrated and assembled trucks stand in the open and are protected against the atmosphere by heavy coatings of grease and oil over all exposed metal parts. None show any sign of deterioration. The 4000 which are crated have been stacked and covered by a wood roof. Congress was asked for appropriations to provide storage for all of these trucks, but failed to approve the bill, and the wood sheds were constructed by the initiative and at the expense of the Motor Transport Corps.

JACKSON TO BUILD TRUCKS

JACKSON, MICH., July 6—The Jackson Automobile Co. will start production on its 3½-ton four-wheel driven truck within 2 weeks. That company, which has been practically idle since the signing of the armistice, has discontinued manufacture of passenger cars and will hereafter devote itself to truck production only. Material for the initial run of trucks has been obtained and assembly work is about to start.

PIERCE-ARROW NOT SOLD

BUFFALO, N. Y., July 5—Persistent reports here and in New York that the Pierce-Arrow Motor Car. Co. has been sold were denied by Charles Clifton and Walter C. Wrye, president and treasurer of the company. The officials declared they knew of no foundation for the report, though they admitted that control of the corporation might be obtained by stock purchases on the market.

MAY HAVE 16,000 EXTRA TRUCKS

WASHINGTON, D. C., July 3—That there may be 16,000 more surplus vehicles above the 39,000 already so classed and distributed to Government Bureaus was indicated by testimony before the Senate Military Affairs Committee when C. W. Hare, Director of Sales, and Colonel Fred Glover and others testified with regard to the disposition of surplus munitions. Testimony showed that there were 64,334 trucks in the Army. Of this number 33,485 trucks are being held, and 30,849 trucks have been declared surplus and are being transferred to other Government bureaus. Colonel Glover stated that the temporary reserve of 16,000 additional vehicles is included in the 39,161 which are still held by the army, and these may be turned over later as surplus, so that the army will retain from 18,000 to 22,000 vehicles. There are also 23,543 trailers which are to be divided into permanent and surplus quantities and disposed of.

KEYSTONE TRUCK SOLD

PHILADELPHIA, PA., July 9—The Keystone Motor Truck Co., Inc., Philadelphia, Pa., which exhibited the Keystone truck at the Philadelphia Show last spring, has been bought by the Commercial Car Unit Co. of the same city. The designer of the truck, H. W. Sofield, has assumed the vice-presidency and general managership of the Commercial company.

KELDON TRUCK PUT ON MARKET

ST. LOUIS, MO., July 5—A 2-ton truck, to be known as Keldon, is being manufactured by the House Cold & Tire Setter Co. The first truck has been completed. Regular production will begin shortly on a basis of 5 to 25 a month.

ANOTHER TRUCK TOUR FOR MO.

ST. LOUIS, MO., July 7—Plans are being formed by the Commercial Car Bureau of the St. Louis Automobile Manufacturers' & Dealers' Assn. for another motor truck expedition through Missouri and Illinois, with a stop of a day or so at Sedalia, when the Missouri State Fair is on.

CANADA PASSES ROAD BILL

OTTAWA, ONT., July 3—After having been under discussion during practically the whole of to-day's sitting, the Government's bill to encourage the construction and improvement of highways was put through committee in the House of Commons to-night and passed without a division. One amendment was inserted in the measure in committee. That change was to the effect that expenditures of money provided under the bill should be made by tender and contract, unless for special reason the Federal Government and the Provisional Government concerned agreed to a different method of procedure. In the event of an agreement to an expenditure for road-building or improvement without the formality of a public call for tenders good reasons must be given.

Coming Events

1919

Sept. 22-24...Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.

1920

Jan. 3-10.....New York City, Motor Truck Show, Twenty-second Regiment Armory. 168th St. and Broadway.

Jan. 24-31....Chicago, Ill., Motor Truck Show, Drexel Pavilion.

6-State Truck Tour to Start in August

Will Show the Usefulness of Trucks to Farmers

CHICAGO, July 2—The National Truck Development Tour, which has been reported in earlier issues, is being planned by the National Assn. of Motor Truck Sales Managers, and is developing into a more important proposition than early reports indicated. The tour has as its main purpose the development of truck use on the farm, but its scope is broader than that, inasmuch as the tour will preach the motorization of the farm, with the truck as the keynote of this motorization. Not only will the value of the truck as a means of transportation for the farmer be taught by special speakers and by example of the trucks themselves, but also its application to other farm uses, particularly those where belt power is needed.

All, or nearly all, of the twenty to twenty-five motor trucks will be equipped with power take-offs and will demonstrate the use of the truck in driving such small power machines as cream separators, ensilage cutters and power saws. Some of this equipment will be carried on the trucks and they will also give demonstrations with equipment already on the farm.

Efforts will be directed toward the education of the farmer in the value of the truck. Also the financing of the farmer in truck purchases by the local banker will be made one of the features of the tour. A special representative of the Illinois State Banking Assn. will accompany the trucks and will make it his point to convince the local banker of the necessity of assisting the financing of truck purchases by the farmer and show him how to do it properly.

The Pan-American Union is taking a direct interest in the demonstration and will have a special representative along with the trucks in order that the lessons may be transmitted to other countries in the union, and who also will take moving pictures for use in Latin-American countries. Special speakers, who will take up various phases of the motor truck in transportation and on the farm, will be on hand at every noon and night stop, and the tour will be accompanied by a Jackie Band from the Naval Training Station.

Final plans for the run were completed today at a meeting of the executive committee of the National Assn. of Motor Truck Sales Managers. One change in the previous plan was made by postponing the time of start one week. The demonstration tour will start from Grant Park, Chicago, Aug. 4, and will take 60 days, reaching 6 states and such cities as Dubuque, Cedar Rapids, Des Moines, Bismarck, Grand Forks, Fargo, Minneapolis, Madison and Milwaukee. It is anticipated that from 20 to 25 trucks will participate, one truck from each factory.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

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Aug. 1, 1919, to Jan. 15, 1920

THE FLEET OWNERS' MAGAZINE

Devoted Solely to the

MOTOR TRUCK

And the problems of motor truck installation, operation and maintenance in all their phases.

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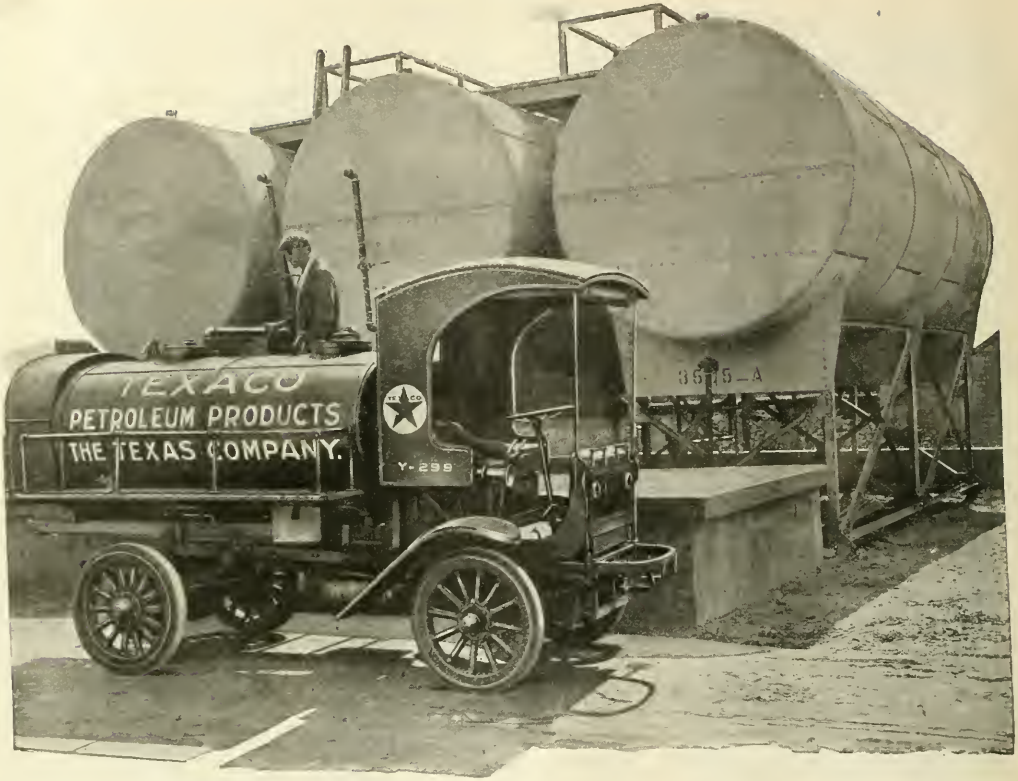

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Buffalo Transferman Builds Business on Good Motor Truck Service

Drivers' Bonus Gives Good Results—No Overloading

By George W. Grupp

THE first time a motor truck was used in Buffalo for general trucking and carting purposes was 10 years ago. From that first truck, Buffalo's fleet of carting and trucking motor vehicles have grown until to-day there are about 150 or more. With a few exceptions, none of these vehicles are run in fleets. Each truckman having either one or two, J. F. Kulp & Sons Co. were the first to operate a fleet of any size to speak of in this kind of work in Buffalo. But last May a new competitor was given birth—first known as the General Service Co., now known as the Erie Service Co., Inc. Horses were given no consideration when it was organized. Instead, it bought two Maxwells. These they used until September, 1917, when they were replaced by Stewart trucks. To-day, from two trucks in May, 1917, the fleet has grown to include six 2-ton Atterburys, these having been converted into two 3-ton trucks and four 2½-ton trucks; two 1000-pound Ford delivery vehicles; three 1-ton Stewarts, and one 1½-ton Day-Elder.

All of the trucks are equipped with stake bodies. If sand or coal is to be hauled, a knocked-down box is slid into the stake body. This fits very snugly inside the stake sides. But on the whole the stake body is most advantageous for the kind of work done—carting, machinery moving and some hoisting work. By carting is meant anything from barrels or boxes of freight to household goods. They haul anything which is asked of them. Distance is of no consequence to them as long as the hirer has the price to pay them. During a recent coal shortage they have often been asked to assist in hauling coal from the coal trestles to factories because of the scarcity of vehicle tonnage, the coal dealer's regular equipment being too busy delivering small lot orders of coal to homes. Factories and commercial establishments had to be served by hiring extra equipment from such concerns as the Erie Service Co.

POINTERS FOR THE TRANSFERMAN

1—Hire good drivers and pay them accordingly. Make each driver responsible for the condition of his truck. Do not switch drivers from one truck to another.

2—A bonus system for keeping the truck out of the shop for serious repairs pays good dividends.

3—Always keep your promises on every job. It pays, even though you may lose money on one job.

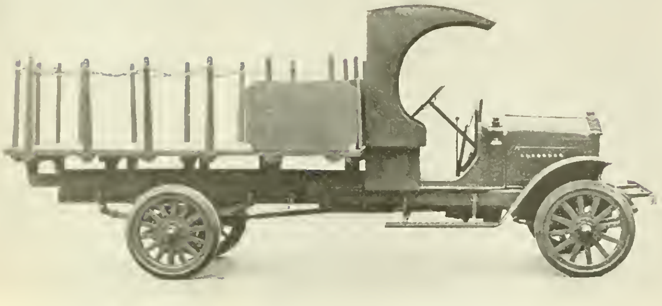
4—Do not countenance truck overloading; it is a slow but sure form of truck suicide.

To show what that concern will attempt to do, one instance will be cited. Recently it contracted to pack, crate and haul the household effects of eighty-five families of aeroplane artisans to the railroad station who were moving to Garden City, Long Island.

Value of Advertising

When one of the trucks is on a one-way loaded trip to a town of some distance from Buffalo, they place on the side of the body a sign which reads something like this: "This truck is going to Rochester. Open for return trip." On its way back they pick up a full or part load. Thus they try to make the truck pay for its operation both ways.

This sign business is one of their special features. When they are hauling for the Curtiss Aeroplane Co., at present they have a contract to do all of their carting in Buffalo, they fasten on a sign reading, "Aeroplane Manufacturers." If they happen to be moving pianos for somebody, they slip on their piano moving sign. For each kind of business in which they do considerable hauling, they have a sign. "And our name is such—Erie Service Co., Inc." said G. C. Illig,



One of the 1-ton Stewarts, showing the type of side stake body found most adaptable for all classes of transfer work

president of the company, "that you cannot tell but what this company is a co-operative carting company owned by, say for example, some piano manufacturers or the like who are having their drayage done by this company. In other words, the people can't tell whether the truck is owned by the firm for whom it is doing the hauling or not. The sign designating the commodity being hauled creates an impression in the customer's mind that their dealer can afford to operate a truck, even though in reality he can't, to give them prompt service. Then again, this sign business is good advertising for the Erie Service Co. Merchants and manufacturers get to know the kind of work we can do and are doing. Thus unsolicited trade is brought to our doors."

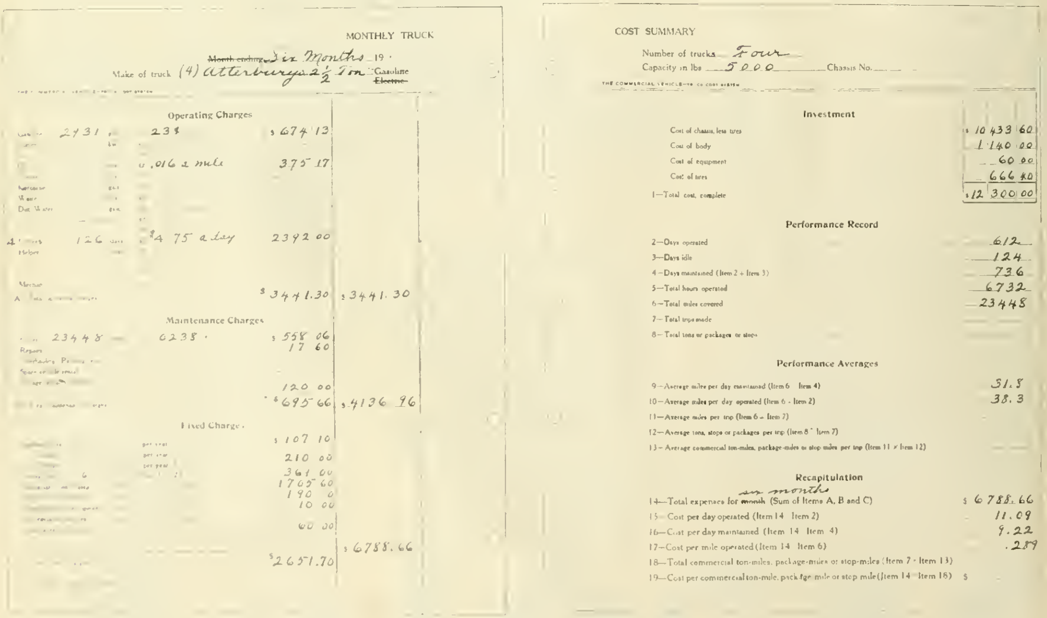
Before going further one might add that the Ford deliveries are not very often used for public hauling purposes. Their principal occupation is that of doing emergency work for the heavier trucks. They haul rope, tools and men from one job to another. For example, should an order come in that a truck is wanted to perform a given job, and when the truck gets there it is found that tools or extra help, the latter at the expense of the one hiring the truck, are wanted, the driver telephones the office, and at once the Ford carries the necessary essentials to the job.

One of the things the firm is very particular about is the kind of drivers it employs. Before a man is employed he is first examined by the truck master, one of the officers of the company. If he qualifies morally as well as intellectually, he is employed. They claim that by being particular is the only way to get the best results with your trucks. More than that, as an unusually high scale of wages is paid, they feel that they have a right to insist that the driver come up to their standards.

When a driver starts with them he gets $20 the first week. This weekly wage is increased at the rate of $1 each month he has served until his weekly wage amounts to $25. When the driver works overtime, he is paid time and one-half. Further, as an inducement to get their men to drive carefully a bonus of $50 a year is paid to the men who have been able to keep their truck out of the shop for serious repair. All minor repairs and adjustments they are expected to make themselves. In order that each driver may be held responsible for the particular conditions of a truck, drivers are never switched from one truck to another. Each is asked to set his truck as a model to the other drivers.

The scale of wages and placing on the shoulders of their drivers a sense of responsibility toward their trucks have given them a fine lot of clean-cut, A-1 drivers. Each driver is very jealous of the other fellow's truck. As a result, he will permit no one to tamper with his truck. He is after the bonus.

From 7.30 in the morning until 5.30 in the afternoon, every day in the week



MONTHLY TRUCK

~~Month ending~~ Six Months 19

Make of truck (4) Atterburys 2½ Ton Gasoline ~~Electric~~

Operating Charges

2431	23¢	$674 13	
	.016 a mile	375 17	
Kerosene			
Water			
Dist. Water			
4 ... 126	$4 75 a day	2392 00	
Helper			
Mileage			
A		$3441.30	$3441.30

Maintenance Charges

23448	6238	$558 06	
		17 60	
Repairs			
Overhauling, Painting			
Spare or sub truck			
		120 00	
		$695 66	$4136 96

Fixed Charges

		$107 10	
	per year	210 00	
	per year		
	per year	361 00	
6		1705 60	
		190 0	
		10 00	
		60 00	
			$6788.66
		$2651.70	

COST SUMMARY

Number of trucks Four

Capacity in lbs 5000 Chassis No.

Investment

Cost of chassis, less tires	$10 433 60
Cost of body	1 140 00
Cost of equipment	60 00
Cost of tires	666 40
1—Total cost, complete	$12 300 00

Performance Record

2—Days operated	612
3—Days idle	124
4—Days maintained (Item 2 + Item 3)	736
5—Total hours operated	6732
6—Total miles covered	23448
7—Total trips made	
8—Total tons or packages or stops	

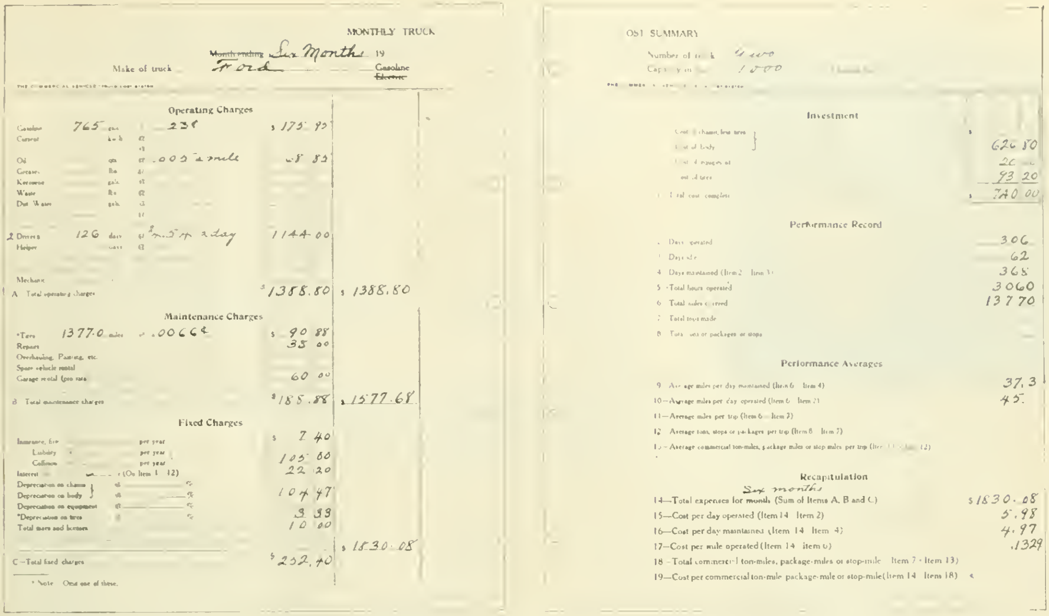
Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)	31.8
10—Average miles per day operated (Item 6 ÷ Item 2)	38.3
11—Average miles per trip (Item 6 ÷ Item 7)	
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 × Item 12)	

Recapitulation

14—Total expenses for ~~month~~ six months (Sum of Items A, B and C)	$6788.66
15—Cost per day operated (Item 14 ÷ Item 2)	11.09
16—Cost per day maintained (Item 14 ÷ Item 4)	9.22
17—Cost per mile operated (Item 14 ÷ Item 6)	.289
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)	
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18)	$

Cost figures covering four 2½-ton Atterburys over a 6-months period. The items are set down on the monthly summary sheet of THE COMMERCIAL VEHICLE Standard Cost Keeping System for motor trucks



MONTHLY TRUCK

~~Month ending~~ Six Months 19

Make of truck Ford Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges					
Gasoline	765	gals.	@ .23¢	$175 95	
Current		k-w-h	@		
Oil		qts.	@ .005 a mile	68 85	
Grease		lbs.	@		
Kerosene		gals.	@		
Waste		lbs.	@		
Dist. Water		gals.	@		
2 Drivers	126	days	@ [illegible] a day	1144 00	
Helper		days	@		
Mechanic					
A—Total operating charges				$1388.80	$1388.80
Maintenance Charges					
*Tires	13770	miles	@ .0066¢	$90 88	
Repairs				35 00	
Overhauling, Painting, etc.					
Spare vehicle rental					
Garage rental (pro rata)				60 00	
B—Total maintenance charges				$185.88	$1577.68
Fixed Charges					
Insurance, fire			per year	$7 40	
Liability			per year	105 60	
Collision			per year		
Interest			(On Item 1 12)	22 20	
Depreciation on chassis } Depreciation on body }		@	%	104 47	
Depreciation on equipment		@	%		
*Depreciation on tires		@	%	3 33	
Total taxes and licenses				10 00	
					$1830.08
C—Total fixed charges				$252.40	

* Note: Omit one of these.

COST SUMMARY

Number of truck Two
Capacity in lbs. 1000 Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

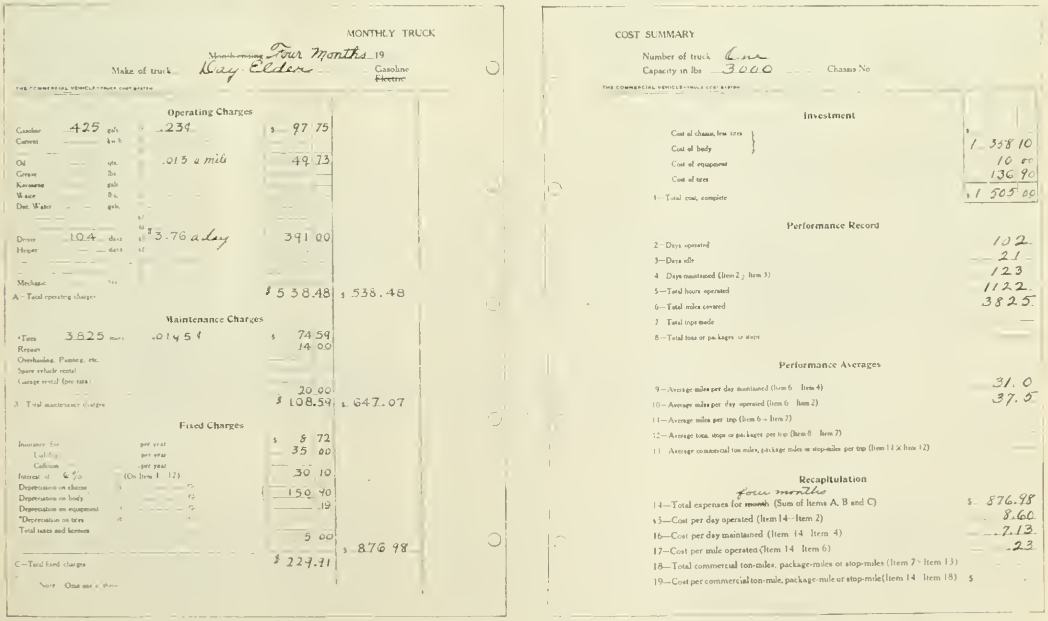
Investment	
Cost of chassis, less tires } Cost of body }	$626 80
Cost of equipment	20 00
Cost of tires	93 20
1—Total cost, complete	$740 00
Performance Record	
2—Days operated	306
3—Days idle	62
4—Days maintained (Item 2 + Item 3)	368
5—Total hours operated	3060
6—Total miles covered	13770
7—Total trips made	
8—Total tons or packages or stops	
Performance Averages	
9—Average miles per day maintained (Item 6 ÷ Item 4)	37.3
10—Average miles per day operated (Item 6 ÷ Item 2)	45.
11—Average miles per trip (Item 6 ÷ Item 7)	
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 × Item 12)	
Recapitulation	
14—Total expenses for ~~month~~ Six months (Sum of Items A, B and C)	$1830.08
15—Cost per day operated (Item 14 ÷ Item 2)	5.98
16—Cost per day maintained (Item 14 ÷ Item 4)	4.97
17—Cost per mile operated (Item 14 ÷ Item 6)	.1329
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)	
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18)	$

Figures covering the cost of operation of two Fords over a 6-months period in the transfer business in Buffalo, N. Y. The cost per mile is shown at 13 cents with a daily mileage of 45

except Sundays, all drivers are on the job. Their duties are many, and they are often called upon to work overtime. They really average about 1 hour overtime each day in the week.

The Erie Service Co.'s system of letting out its trucks to hire is quite simple. It charges a flat rate of $25 for a 10-hour day. This includes the driver's lunch hour. If the truck is used less than a day, the charge is a certain figure per hour. This depends on the length of the trip. Each morning when the drivers get to work the truckmaster gives each driver his instructions for either part or all of the day. When the truck arrives at the job, the driver loads and

(*Continued on page* 14)



MONTHLY TRUCK

~~Month ending~~ Four Months 19

Make of truck Day-Elder Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges					
Gasoline	425	gals.	@ .23¢	$97 75	
Current		k-w-h	@		
Oil		qts.	@ .013 a mile	49 73	
Grease		lbs.	@		
Kerosene		gals.	@		
Waste		lbs.	@		
Dist. Water		gals.	@		
Driver	104	days	@ $3.76 a day	391 00	
Helper		days	@		
Mechanic					
A—Total operating charges				$538.48	$538.48
Maintenance Charges					
*Tires	3825	miles	@ .0145¢	$74 59	
Repairs				14 00	
Overhauling, Painting, etc.					
Spare vehicle rental					
Garage rental (pro rata)				20 00	
B—Total maintenance charges				$108.59	$647.07
Fixed Charges					
Insurance, fire			per year	$8 72	
Liability			per year	35 00	
Collision			per year		
Interest at 6%			(On Item 1 12)	30 10	
Depreciation on chassis		@	%	150 40	
Depreciation on body		@	%		
Depreciation on equipment		@	%	.19	
*Depreciation on tires		@	%		
Total taxes and licenses				5 00	
					$876 98
C—Total fixed charges				$229.91	

* Note: Omit one of these.

COST SUMMARY

Number of truck One
Capacity in lbs. 3000 Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment	
Cost of chassis, less tires } Cost of body }	$1 358 10
Cost of equipment	10 00
Cost of tires	136 90
1—Total cost, complete	$1 505 00
Performance Record	
2—Days operated	102
3—Days idle	21
4—Days maintained (Item 2 + Item 3)	123
5—Total hours operated	1122
6—Total miles covered	3825
7—Total trips made	—
8—Total tons or packages or stops	
Performance Averages	
9—Average miles per day maintained (Item 6 ÷ Item 4)	31.0
10—Average miles per day operated (Item 6 ÷ Item 2)	37.5
11—Average miles per trip (Item 6 ÷ Item 7)	
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 × Item 12)	
Recapitulation	
14—Total expenses for ~~month~~ four months (Sum of Items A, B and C)	$876.98
15—Cost per day operated (Item 14 ÷ Item 2)	8.60
16—Cost per day maintained (Item 14 ÷ Item 4)	7.13
17—Cost per mile operated (Item 14 ÷ Item 6)	.23
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)	
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18)	$

The cost of a 1½-ton Day-Elder over a 4-months period, in which the cost per mile is shown to be 23 cents. The truck averaged 37.5 miles per day over the period covered and traveled in all 3,825 miles

Solid Tires Should Be Removed When Worn to 1 Inch of Rim

THE THREE QUESTIONS ASKED

1—How do you determine when to remove a worn tire?

2—If a tire is kept in place until it is worn down almost to the top of the edge of the steel base, have you found that greater vibration has resulted and consequently greater repairs?

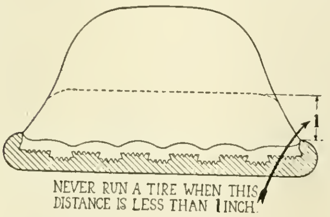
3—What experience have you had with tire companies in adjusting mileage on solid tires which they claim still have more mileage in them?

When the wheels begin to pound, no matter how much rubber is in the tire, it's time to put on new tires, according to G. H. Pride, who owns a fleet of trucks numbering close to 100

GEORGE H. PRIDE, president of the Heavy Haulage Co., New York City, removes the tires from the wheels of his large fleet of almost one hundred vehicles when the rubber is worn down to such a point that the wheel begins to pound, even though there is a certain amount of soft rubber remaining on the wheel. He has found, however, that in most instances a tire has outlived its usefulness when the rubber is worn down to a point about 1 inch above the edge of the steel base and that this maximum amount of wear is very clearly indicated by the flattening of the tire in different places on the circumference, which produces the same effects on the truck as is caused on a freight car when it has a flat wheel.

Mr. Pride has found that it pays to remove tires while they still have about 1 inch of rubber above the edge of the tire base. Nine years ago, when he got his first experience in motor truck operation, he used to keep the tires on the wheels until the base separation occurred or the soft rubber was worn off. He found that this was a most expensive economy, as the increased vibration produced broken front axles and steering knuckles. The cost of making such repairs was far in excess of the sum saved by running the tires a few hundred miles more.

In respect to his experience in adjustment with tire companies, Mr. Pride has found very little need for such adjustment, since in a great majority of cases the tires have given far in excess of their guaranteed mileage. In the event of a flat tire he has found that the tire companies make no complaint and that tire adjustment is a matter of honor on the part of both parties concerned. Mr. Pride has found that the large tire companies are more than willing to meet the truck owner half way provided that they feel that the truck owner is acting in good faith.



Tires which wear flat on the surface and which separate from the base have given the Heavy Haulage Co. the most trouble in such few cases as have called for adjustments because the guaranteed mileage was not reached. Flat tires may be caused by imperfections in the tires themselves or by improper care on the part of the truck driver. In the latter instance, a too sudden application of the brakes most often produces flats since the rear wheels become locked and slide along the surface of the pavement without revolving in the ordinary manner. This causes an excessive friction at the point of the tire in contact with the ground, with the result that the tire at that point is worn slightly out of round.

Base separation when the tire is not defective may be caused by changing the direction of the truck motion too suddenly while it is traveling at a good rate of speed. Turning the front wheels to a cramped position to get away from the curb while the truck is standing still also produces an excessive side thrust that tends to tear the soft tread rubber away from the hard rubber base.

Other pointers which the fleet owner can follow with good results in order to obtain greater tire mileage include a strict inspection of the truck loading and a close supervision of the drivers to prevent overspeeding. Overloading and overspeeding are two of the most important causes for rapid tire wear. Both should be avoided to the greatest possible extent and when this is done it will be found that the great majority of any of the reputable makes of tires will give at least the guaranteed mileage and in some cases many more miles than set down in the guaranty.

In most cases, it has been found impracticable to fix solid rubber tires by vulcanizing when the tire tread has become cut. Every time a cut in the tire comes in contact with the road, a spreading and tearing action occurs and this soon causes an extension of the cut down to the base and also to the tire. One of the best methods of repairing a cut in a solid tire is to trim out the rubber on both sides of the cut until the cut itself has been entirely removed. Practice has shown that when an attempt is made to vulcanize the two sides of the cut together, that portion of the tire around the cut becomes weakened and under action of heavy loads soon breaks away, weakening the tire almost as much as if the cut were neglected. The safest remedy is to trim out the cut as explained.

Another cause for rapid tire wear is improperly adjusted brakes. While even the most careless driver knows that locking the brakes or skidding produces excessive tire wear, he does not realize that skidding often results from improperly adjusted brakes as well as applying the brakes too quickly. Often skidding results from brakes which are improperly adjusted and when one of the brakes locks or binds at regular intervals in the regular revolution of the wheel, even when the full braking pressure on the pedal is not exerted.

Running trucks in car tracks is another source of rapid tire wear, especially where the edges of the tracks are sharp. While in some cases running a truck on the car tracks results in less damage to the tires than attempting to run it over an adjacent road full of ruts and holes, the wheels should always be turned out of the tracks at switches or frog points, since the sharp switch and frog points tend to cut the tread in much the same manner as a sharp knife.

Extra Oil Tanks Help Banish Bearing Troubles

It Will Help to Eliminate Burned Out Bearings by Forestalling Any Chance of Your Driver Being Without an Extra Supply of Oil

HERE is a scheme to eliminate burned out bearings that is working out successfully for a fleet owner of nineteen trucks. In order to overcome such trouble and to forestall any chance of a driver being without an extra supply of oil while out on the road, all of this owner's trucks have been equipped with an auxiliary 3½-gallon tank attached to the side frame member, as shown below.

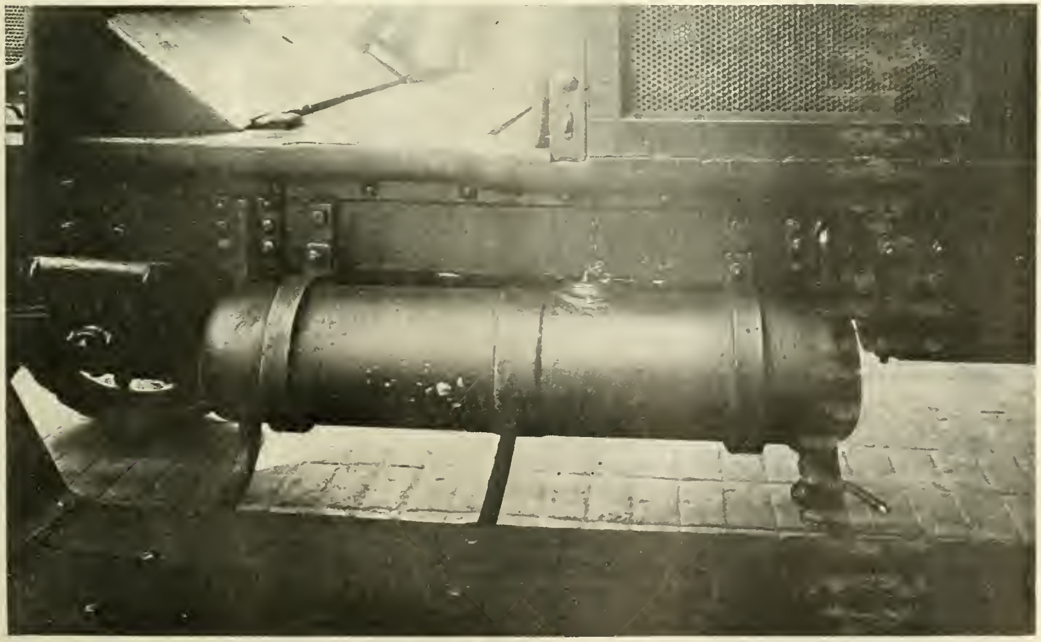
It is a rule of Kirkman & Son, large soap manufacturers in Brooklyn, N. Y., who operate these trucks, that none of their vehicles are to leave the garage without the drivers first ascertaining whether these auxiliary tanks are filled or not. As a result, the drivers have no legitimate excuse for running out of oil or having bearing trouble.

All the driver has to do is to turn on a petcock at one end of the tank and fill his 1-quart measure, after which the oil reservoir in the engine is replenished. Fleet owners operating trucks in territory which is out of reach of garages will be interested in this scheme. Frequently a driver, who is driving far out in the country districts or in hilly country, will find himself stranded or in particular danger of burning out his bearings because his oil supply has run out. It is then a matter of luck whether he is able to get oil from some nearby farm house or some passing vehicle. If not, he is then forced to walk to the nearest garage, probably miles away, to get his oil. This is all a waste of time and energy, as well as conducive to an increase in the cost of maintenance.

The Kirkman people have experienced no trouble whatever in regard to burned out bearings. By equipping their trucks with these auxiliary tanks, all responsibility for proper engine oiling and bearing troubles has fallen on the shoulders of the drivers. Thus there is no come-back from the drivers for lack of oil or for lack of money to buy oil while on the routes. The capacity of these tanks is large enough to get any of the trucks home, no matter how far they have to go.

Carrying the extra oil on the trucks at all times does not allow the drivers to claim that they did not have sufficient money with them to purchase oil. It also works the other way. Before this system was installed, the drivers would buy any needed oil at other garages, making it hard to keep the books in good condition. Then again, occasional dishonesty in the matter of purchases would crop up. Now, there is no chance for outside purchases.

In the case where the driver is also a salesman, it is of advantage to him to see that his truck is kept on the route. Therefore, he is always alert to any pending troubles, such as lack of oil or burned out bearings. This is so in the case of the Horton Ice Cream Co.'s trucks. That company has put complete charge of its trucks in the hands of the drivers. As an added precaution, each of its trucks is equipped with a 1-gallon can of oil for emergencies. This is carried in the tool chest on the running board.



Place your auxiliary oil tank in such a prominent place that it will be a constant reminder to the driver to keep it filled

One of the Big 8 in Truck Operation

7—INTEREST

TWO WAYS TO FIGURE INTEREST

1—On a Constant Value Each Year
2—On a Decreasing Yearly Value

OF all the items which should be considered in calculating the operating cost of a motor truck, that covering the interest on the truck investment is the one most often neglected. This failure to calculate the cost of the interest on the investment and include it in one of the fixed charges against the operation of the truck is most prevalent with the smaller truck owners. With the large fleets owned by corporations who usually have forces of skilled accountants, interest on an investment, particularly on corporation property such as buildings, etc., is well known and well understood. For such concerns to figure interest on the truck investment is another step which merely follows the practice in corporation accounting.

The importance of figuring interest on truck investment may be realized when it is considered that it may equal the cost of oil lubrication or even spare vehicle rental, or repairs during a period when the truck is comparatively new.

The Why of the Charge

To understand the reason for a charge for interest on the investment of a motor truck it may be best to begin at the very beginning and point out that when a motor truck is purchased, money must be taken from the treasury or from the credit of the purchaser to cover its cost. This operation is an investment and all investments should constantly earn interest. If a sum of money does not earn interest, it no longer is an investment which is worth anything. In the business of the concern such investments as trucks or any other equipment are supposed to earn a legal rate, usually 6 per cent in most states.

An investment when made is assumed to be permanent, and unless it is liquidated should constantly return its interest of at least the legal rate of 6 per cent a year.

With the reason for the interest on the investment charge thus explained, it should be clear to every truck owner that it is a legitimate charge. If he does not include it he may be losing money. But even when the fleet owner has clearly understood the reason for computing such a charge, considerable difficulty has arisen as to exactly how the item should be calculated.

Where Depreciation Comes In

There seems to be no set rule on the method of figuring interest because of the great many methods by which depreciation on an investment may be charged. While interest on the investment is calculated entirely separately from the depreciation charge, both interest on the investment and the depreciation charge are closely linked together because the depreciation value of the truck as carried on the books is the basis on which most interest is calculated.

If a truck costs $3,000 to buy it would obviously be wrong to charge the entire amount to the first year's operation. Some portion of this initial cost should be charged against the operation of the truck, since it is a real part of the cost of motor transportation. To be really more accurate, therefore, an attempt is made to spread the charge over the entire period of the truck's life. Here again conditions arise which determine the assumed life of the truck. Some contractors even charge the full amount against the first year's operation. In some such cases the jobs for which the trucks were bought are completed during the year, at which time the trucks are of no more value to the contractor unless he has another job with which they can be used. He often sells them as soon as the first job is completed and buys new ones on the next work. Under ordinary conditions, however, this method of charging the entire depreciation in one year is hardly reasonable. As a rule, the life of a truck is assumed as 5 years, so that 20 per cent of the cost of the truck is written off annually.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

Some Depreciation Charges

This sum is known as the depreciation charge, or in other words a charge to cover the decrease in the value of the truck which has taken place during the year. As a matter of fact, however, a motor truck does not depreciate at a uniform rate of 20 per cent a year even though the assumed life of 5 years is found to be correct. While the marketable value drops greatly in excess of 20 per cent during the first year, the actual depreciation is really less than 20 per cent. Again, a truck which is properly cared for should, and usually does, last considerably longer than 5 years. The practice of writing off depreciation at a uniform rate is customary as it is much simpler, and over a period of years it arrives at identical results as would a more scientific but more complicated system of figuring. Furthermore, it is unlikely that the more complicated system would be properly used by the great majority of busy motor truck owners.

Before discussing the actual method of calculating interest on the truck investment, there is one other point which must be considered and that is the amortization charge or sinking fund. This item is known by either of these terms and represents a sum taken from the earnings of the truck and set aside in a fund for the purpose of buying a new truck when the old one shall have been so worn out that it is no longer serviceable as a vehicle of highway transportation.

Theoretically this sum is each year invested in 6 per cent bonds or other securities, but in practice it may be put into the treasury of the concern or put back into the business. This sum is known as an amortization fund and justifies taking from the treasury of the company a sum equal to the purchase price of the truck to buy a duplicate at the end of the 5-year period of the first truck or at the end of the period of the life of the truck assumed when it was first bought. With these two fundamentals of depreciation and amortization or sinking fund well understood, one is thus prepared to calculate the actual dollar and cents value of the daily, monthly or yearly charge which must be included in the fixed charges to cover the item of interest on the truck investment.

Two Methods of Figuring

Briefly, there are two methods at present in use by truck owners to calculate the interest on the investment. One is to charge 6 per cent on the original investment every year. The other is to assume a different book value of the truck at the end of each 1-year period and to calculate the interest on this varying investment by means of a formula which will give an average interest over the period of the assumed life of the truck.

The first method is of course the simplest because only one operation is necessary, namely, multiplying the initial cost of the truck minus tires by the 6 per cent interest charge. This method of calculating interest, however, while extremely simple, is only justifiable when no sinking fund or amortization fund is kept. Figuring interest in this manner may best be explained by a simple example. Suppose a truck costs $5,000 minus the tires and that it is assumed to have an actual or book life of 5 years. Then assume that it depreciates equally each year at the rate of 20 per cent. By the simple method, the interest charged on the investment for the first year is 6 per cent on $5,000, or $300. At the end of the first year the truck has depreciated one-fifth of $5,000, or $1,000, leaving a book value during the second year of $4,000. If this $1,000 difference between the value of the truck during the second year as compared with the first is not put into some fund where it earns 6 per cent interest, it may be justifiable to charge 6 per cent on the full $5,000 value of the truck during the second year and during each of the succeeding years and during each of the 5 years assumed to represent the life of the truck.

If this $1,000 fund is put into the bank or invested in any other way so as to earn the legal rate of interest, it is only necessary to figure 6 per cent on the $4,000 during the second year of the truck's life. The interest at 6 per cent on $4,000, the book value of the truck during the second year, plus the 6 per cent interest on the $1,000 sinking fund or amortization charge, will be identical with the 6 per cent interest on the full $5,000 initial cost of the vehicle. Thus it is seen that there is in reality no new investment, but the original one stands indefinitely.

THE BIG 8

Read Them All

THOSE PUBLISHED AND
STILL TO APPEAR

The Big 8 Defined......April 15
1—Driver ....May 1
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7—Interest ....August 1
8—Garage ....August 15

Assuming that a sinking fund is carried by the concern owning the truck and that the money in the fund is invested so that it earns at least the legal rate of interest, the varying book value of the same truck, as in the example just mentioned, may be assumed as the amount of investment on which the interest charge must be calculated. For the first year this would be $5,000; for the second year, $4,000; for the third year, $3,000; for the fourth year, $2,000; and for the fifth year, $1,000. At 6 per cent, the interest on the investment charged for the first year would be $300; for the second year, $240; for the third year, $180; for the fourth year, $120, and for the fifth year, $60. The summation of $300 plus $240 plus $180 plus $120 plus $60 gives a grand total of interest on the varying investment over a 5-year period of $900.

This method of figuring interest requires a separate calculation for each year or five operations in all. Some truck owners employ a formula whereby the average interest charged over the 5-year period may be calculated at one time and the same charge made each year. This formula contains two factors which are multiplied together to give the average yearly interest charged.

The Average Formula

The first factor is the number of years taken as the assumed or book life of the truck plus 1 divided by the book life of the truck. The second factor is the initial investment of the truck minus tires times the rate of interest charged, divided by 2. In the example cited above, the first factor would be 5 for the assumed life of the truck plus 1 divided by 5 or 6/5. The second factor is 6 per cent times $5,000 equals $300 divided by 2 equals $150. The $150 multiplied by 6/5 gives $180 a year as the average interest on investment charged. This is the same as would be obtained by figuring the interest on the $5,000, $4,000, $3,000, $2,000, and $1,000 amounts during the first, second, third, fourth and fifth year, as was done above, and which showed a total interest on the investment charge of $900 for the 5-year period. Of course the average charge per year for $900 over a 5-year period would be $180 each year, which is exactly the same as obtained through the use of the formula just given.

While this average charge does not, of course, give an accurate yearly interest figure with the variation in the investment minus the sinking fund from $5,000 the first year to $1,000 during the fifth year, it gives a fair charge over the entire period of the life of the truck. This is really more important since it tends to even up the charges for this item during each year so that it is not excessively high the first year and exceedingly low during the fifth year.

Separate Charge for Repairs

With these two methods of figuring interest on investment fairly understood, it may be well to point out that repair costs should not be paid out of the depreciation charges. Some authorities urge that repair costs be taken from depreciation charges and that no separate repair and depreciation accounts be carried because money spent for repairs is expended to prevent depreciation. This view is generally considered erroneous, for while constant repairing will increase the life of a truck indefinitely, the time will come when the main parts of the vehicle have become so worn and every metal portion has been so seriously affected with the fatigue of metals, that the cost of repairing will be extremely excessive. When that time arrives, it is generally cheaper to scrap the truck and buy a new one than to attempt to keep the old one in running condition.

This is very important, because the fact that a vehicle has to be laid up continually for repairs is often liable to result in a much greater loss than the mere cost of truck operation, in view of the fact that business and profits which could have been done or made have to be foregone. While this period is supposed to occur at the end of the assumed book life of the truck, it may not occur until several years later and the problem then arises of how to value the truck after a sinking fund equivalent to the initial cost of the vehicle has been obtained and has earned its own interest. Most concerns then consider the interest charge which should be charged off but is not because the truck has no book value, as what is prominently known as velvet. It would seem that the more scientific method would be to assume a longer book life so that the yearly charges over that period would be more nearly equal the actual charges.

When figuring depreciation, that on the truck body and equipment may be divided into separate heads, since these may or may not depreciate as rapidly as the truck chassis itself.

Drivers' Uniforms Help Cut Repair Cost

Department Store Finds Uniforms Pay in Package Work

Coats and caps are only worn by the drivers of the electric trucks used in the delivery of packages. Each suit consists of a whipcord coat and cap. It costs $14 complete and is furnished to the driver free of charge

THE uniforming of motor truck drivers has two important advantages. In the first place it adds distinction to the equipment of the concern. In the second place, it makes the drivers neater with themselves and a driver who is neat with himself is generally also neat with his truck. A driver who is neat with his truck is generally the one who has the least cost of repairs charged against him. This is simple psychology. Nine times out of ten, a slovenly man in his appearance is also slovenly in the care of his truck and as a result it does not receive the care to which it is entitled.

Both of these advantages are clearly brought out in the case of the drivers of the Boston Store, Chicago, one of the largest department stores in that city. It provides suits for the drivers of its electric trucks engaged in the delivery of packages. The Boston Store also has meat, grocery and vegetable departments, but the drivers of trucks handling this class of material are not furnished with suits because of the difficulty in keeping them clean. It is evident that a driver who has to deliver twenty or thirty bags of potatoes in a day would have considerable difficulty in keeping a uniform spic and span. As a result the suits are only furnished to the package delivery trucks.

Uniform Consists of Coat and Hat

The suits consist of a whipcord coat and a hat, but no trousers. They are given to the driver without cost to him and last from 1 to 1½ years. The same suit is used winter and summer, no overcoats being furnished in the winter. Instead, the coats are large enough to permit the driver to wear a sweater underneath them in winter weather. This has proved satisfactory in view of the fact that a coat, if not of the peajacket type, often hinders the action of the driver in making deliveries and slows up the time of delivery considerably. Furthermore, all of the electric trucks are provided with built-in cabs so that the driver is well protected except when he is actually making deliveries, at which time he is moving about and is not so liable to become chilled as would be the case if no cabs were fitted to the vehicles.

The suits cost $14 apiece, including coat and cap. They are cleaned and pressed free of charge to the driver as often as necessary in the clothing department of the Boston Store.

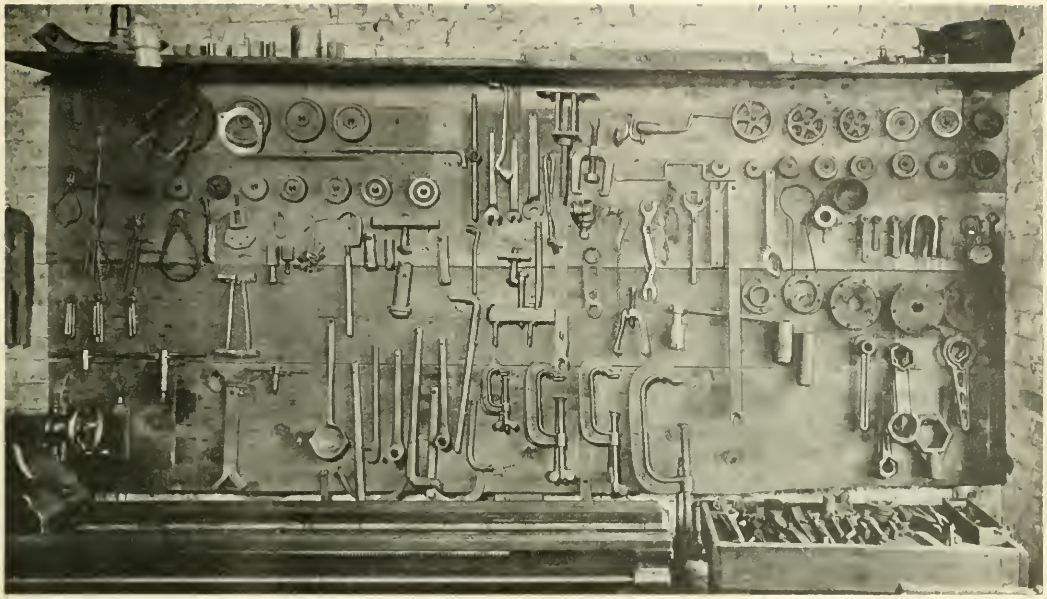
George J. Peters, delivery superintendent of the Boston Store, says that the suits have given a certain distinction or class to the company's delivery service and furthermore have resulted in cleaner trucks. The drivers with suits take better care of their vehicles than before they were provided with uniforms.

Thirty suits are used in all, fifteen of these being furnished to as many drivers of electric trucks and the other fifteen to the helpers employed on such trucks to increase the speed of delivery and enable more ground to be covered daily.

Cost $14 a Suit

At a pre-war value of $14 to the suit, the entire outfit represents an investment of $420 a year and Mr. Peters is of the opinion that their use has justified the expense many times over. This has occurred in a reduction in the cost of repairs. When a truck is kept clean, repairs are less than when it is allowed to remain dirty. Loose parts are discovered and tightened in time and cracks are found which would not be discovered until too late if covered with a film of grease and oil or the muck and mire of dirty streets. It is also a well-known fact that a driver takes a certain pride in his truck when it is clean and this results in greater care in its operation. He does not take foolhardy chances and more often considers the truck as really his own, so that he keeps it in good running order so that it does not have to be laid up and some other truck in poorer mechanical condition assigned to him. Then again, a clean driver and a clean truck do better work over any given period than does a slovenly driver with a dirty truck. The cost of obtaining these advantages is very small in comparison with the results achieved. For instance, in the case of the Boston Store, it cost only $28 a year per truck for uniforms for both the driver and his helper.

The advantage of uniformed drivers in raising the level of the delivery service is hard to set down in any dollar and cents value, although its presence is realized. Every housewife prefers to see a clean, natty-looking vehicle drive up to her house when making a delivery in preference to a truck which appears to be falling apart, due to a lack of proper attention. Department store heads know that this is so, although they cannot of course attribute any definite percentage of business increase to it.



Wrenches, lathe parts, gears and miscellaneous tools each have their own particular place on this board. It has saved its cost many times over in the time previously wasted in getting tools together for starting jobs

Tool Board Increases Mechanics' Work

IN the maintenance of a fleet of over sixty gasoline and electric trucks, the item of the cost of the mechanic's time in making repairs is an important one. If the tools used by mechanics in such work are not kept in an orderly manner the machinist sometimes spends more time in gathering his tools than in actually doing the work.

It was to overcome the waste of time in this manner that George Heron, maintenance superintendent for the Boston Store, Chicago, devised the 6 by 10-ft. tool board shown above. The board is hung on the wall of the repair shop so that the tools, supported on pegs near the top, may be easily reached by a man standing on the floor.

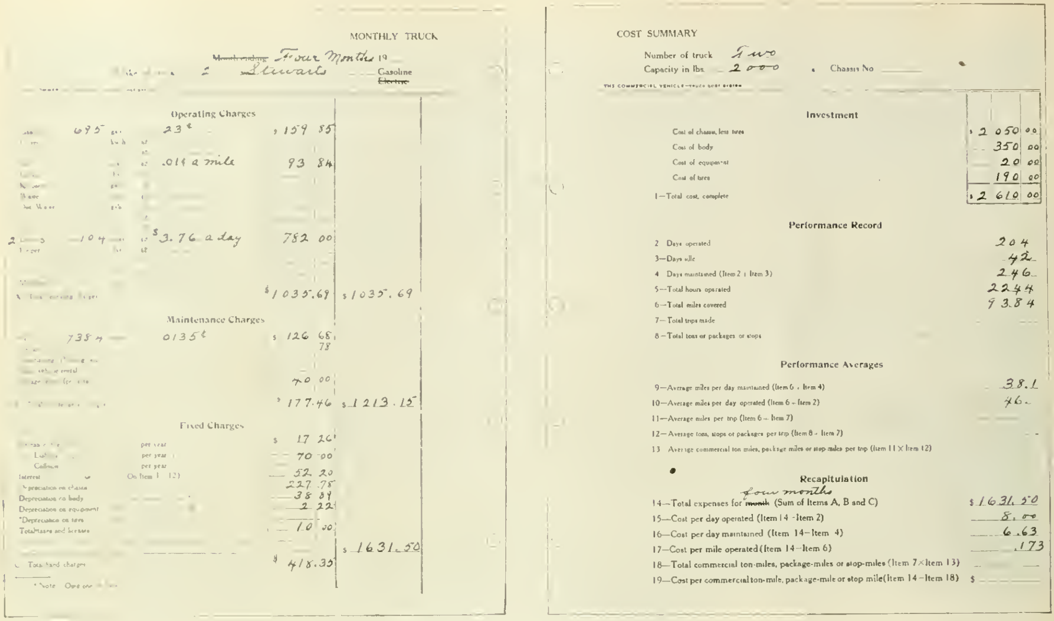
The board was easily made, and cost very little. It has proved so worth while, however, in saving the time of the garage mechanics that a second board is being made to hang up still other tools which were formerly kept in tool boxes or in drawers under the work bench, from which it was sometimes necessary to take out all the tools before the particular ones desired could be found.

Loss of time searching for tools is eliminated by the use of the board on which are hung all of the special tools, such as wrenches for taking off axle nuts, special engine wrenches, socket wrenches, clamps, lathe gears, spark plug socket wrenches, etc. Thus every tool has its place, and the superintendent sees that every tool is in its place when it is not in actual use by one of the mechanics, or out in the service truck making roadside repairs. The superintendent is always able to know what tools are in use by noting what pegs on the board are empty. Generally, all of the tools are in their places each night, so that there is no delay in looking for tools on the following morning should a rush job have to be done.

The idea of this board may be applied to good advantage no matter how many trucks are maintained. A smaller board will result in saving the mechanics' time when four or five trucks are maintained, just as well as when sixty are kept in repair. Mr. Heron, who devised the board, is shown below.

The board is set up in that portion of the garage used as a machine shop. As shown in the illustration above, it is directly behind one of the lathes, so that all the operator has to do is to reach out his hand to pick off any tool desired. Each tool is placed on its own peg, so that it may be removed without disturbing any other tool.

George Heron, who devised the board shown above, at his desk in his garage



MONTHLY TRUCK

~~Month ending~~ Four Months 19

2 Stewarts Gasoline ~~Electric~~

Operating Charges

695	23¢	$159 85	
	.01¢ a mile	93 84	
2 104	$3.76 a day	782 00	
		$1035.69	$1035.69

Maintenance Charges

7384	0135¢	$126 68 78	
		70 00	
		$177.46	$1213.15

Fixed Charges

per year		$17 26	
Labor	per year	70 00	
	per year		
Interest	On Item 1 (12)	52 20	
Depreciation on chassis		227 75	
Depreciation on body		38 84	
Depreciation on equipment		2 22	
*Depreciation on tires			
Total taxes and license		10 00	
			$1631.50
C Total fixed charges		$418.35	

*Note

COST SUMMARY

Number of truck Two

Capacity in lbs. 2000 Chassis No

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires	$2 050 00
Cost of body	350 00
Cost of equipment	20 00
Cost of tires	190 00
1—Total cost, complete	$2 610 00

Performance Record

2—Days operated	204
3—Days idle	42
4—Days maintained (Item 2 + Item 3)	246
5—Total hours operated	2244
6—Total miles covered	9384
7—Total trips made	
8—Total tons or packages or stops	

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)	38.1
10—Average miles per day operated (Item 6 ÷ Item 2)	46
11—Average miles per trip (Item 6 ÷ Item 7)	
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	
13—Average commercial ton miles, package miles or stop-miles per trip (Item 11 X Item 12)	

Recapitulation

14—Total expenses for ~~month~~ four months (Sum of Items A, B and C)	$1631.50
15—Cost per day operated (Item 14 ÷ Item 2)	8.00
16—Cost per day maintained (Item 14 ÷ Item 4)	6.63
17—Cost per mile operated (Item 14 ÷ Item 6)	.173
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)	
19—Cost per commercial ton-mile, package-mile or stop mile (Item 14 ÷ Item 18)	$

Operating costs of two 1-ton Stewarts over a period of 4 months. Each truck averaged 46 miles per day and cost approximately 17 cents per mile to operate

Operating Costs of Buffalo Transfer Trucks

(*Continued from page 7*)

hauls anything the one hiring the truck asks of him. But the reader must bear in mind that the drivers have specific instructions. One hard and fast rule is never to overload or to drive their trucks more than 15 miles an hour. The drivers adhere to this rule very strictly, as they realize that taking chances means a possible loss of employment or the bonus for careful driving.

At the end of the day the drivers report on a slip of paper their fuel and lubricant consumption and the number of hours they worked on each job. These are filed until the next morning, when they are posted in an individual truck book.

One might say, after examining the cost figures as shown with this article and which have been adapted to THE COMMERCIAL VEHICLE cost system, that they are making big profits with their trucks. Before coming to this conclusion it is well to take into account that overhead expenses, such as office rent, heat, light, telephone bills, stationery, clerical and executives' salaries have to be added to the truck expenses before a profit balance can be struck. After deducting the truck cost and overhead expenses from the gross income it will be found that the profit is only a fair one.

Their system, be it either their methods of operating the trucks or collecting truck performance history, could be considerably improved upon. In the first place, it would be better if they had all of their trucks housed in one garage instead of three. Then their repair shop, gasoline and lubricants storage tanks and barrels would be within easy reach of all trucks. As it is now, some of the trucks have to drive to one of the other garages to get their gasoline and lubricants. And when it comes to getting orders, they usually have to drive to the office. All of this is a waste of time. Office, repair shop and all truck storage should be centralized. Then if an order came in to have a truck go to a certain place, some one would not have to put on his hat and coat and walk several blocks to the garage.

Secondly, a driver's daily report card such as got up by THE COMMERCIAL VEHICLE would be a very much better plan than making his report out on slips of paper.

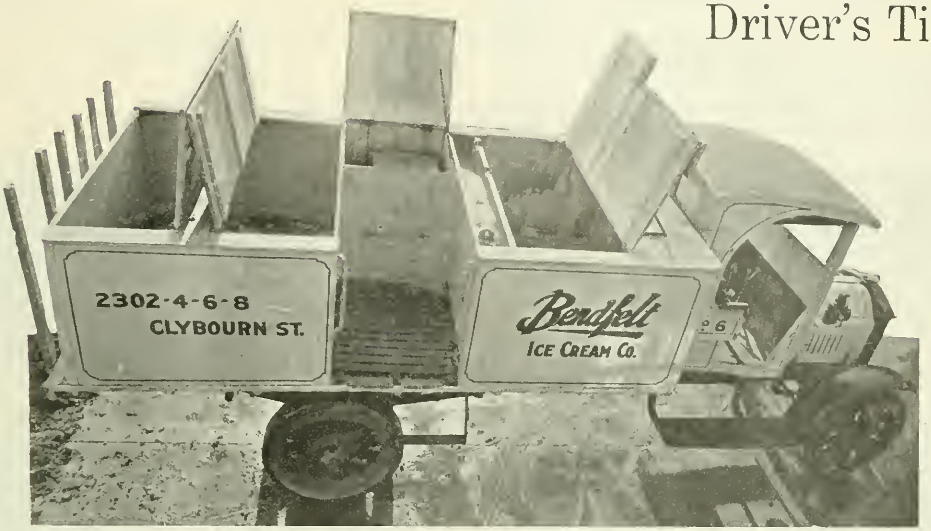
Thirdly, each driver should be given enough work in the morning when he starts out to keep him busy all day without having to drive back to the office to report a completed job. If the driver should find toward the end of the day that he cannot attend to all of the orders which were given to him in the morning because one of the customers asked him to do some extra hauling, he could then telephone the circumstances so that one of the idle trucks could jump into the harness and take this extra work off his hands.

Fourthly, it would pay them to keep a record of the tonnage they carry and the different kinds of material hauled on each truck. They will never be able to arrive at what the truck is able to do if they don't. It would be well to tabulate the tonnage of each kind of material hauled and the time spent in loading, unloading, running empty and loaded.

And, lastly, they could make more money if they carried out the fourth suggestion. Then, instead of letting out their trucks at so much an hour with the one hiring having the privilege of hauling as much as he likes and have the exclusive use of the truck during that period, they could contract to haul a given amount of a given commodity a given mileage with the privilege of loading another customer's wares on the same truck. Under such circumstances the truck could always be loaded to capacity and do work for two or three customers at once instead of only one.

EDITOR'S NOTE—*Since the above story was written the Erie Service Co. has enlarged its business to such an extent that an additional article will be published later covering the method of operation. The company also operates a transport line through Batavia to Rochester and another line to Niagara Falls. The company has also purchased a large garage to enable it to concentrate all of its trucks at one point for inspection and maintenance.*

New Ice Cream Body Protects Product and Saves Driver's Time



Bird's-eye view of the ice cream body, showing the crosswise amidship unloading aisle, open on the side facing the right curb. The brick ice cream compartment is at the closed end of the aisle, with two can compartments fore and aft. All compartments have hinged covers. The rear stakes serve as a protection against rear-end collisions

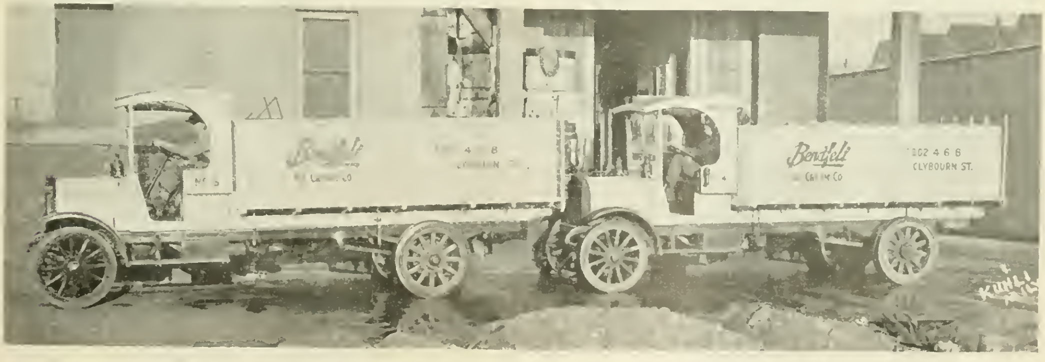
NOW that the National Prohibition Law is being enforced, the ice cream manufacturers throughout the country are preparing for a greatly increased business, based on sales made last summer in bone-dry sections of the country. The wholesalers and manufacturers were so rushed at that time that many were forced to reorganize their delivery equipment in order to take care of the increased business. Particular attention was paid to the body design on all new trucks ordered, with a view toward quick loading and unloading, as well as fully protecting the ice cream against dirt and the heat of the sun and providing the proper drainage facilities for the salt water.

The body was made by the Auto Body Co., 2033 Sycamore Street, Milwaukee, Wis., and cost $450, complete with cab. It was designed particularly for use on the Federal chassis, although it may be supplied on order to fit other vehicles with the same frame length and width. The overall dimensions of the body are 12 feet long, 6 feet wide and 30 inches high.

It weighs approximately 1200 pounds and is made of cypress and fir, 1¼ inches thick, on account of the superior water-resisting qualities of such wood. The entire floor is covered with a No. 20 gage galvanized iron lining, as are all three of the compartments so as to prevent the salt brine leaking down through the joints of the wood onto the truck chassis. This is further prevented by placing all of the iron work inside or at the center of the 1¼-in. panels to prevent rust from discoloring them. The compartment measurements for the cans of ice cream, for the brick cream and for the ice or salt may be varied according to the wish of the purchaser, even though the outside dimensions of the body remain unaltered.

In order to make quicker deliveries and

(*Continued on page 25*)



The two 2-ton Federals, as seen from the closed left side of the body which is always away from the curb during side unloading. The two triangular-shaped members seen on the top of the body on the truck to the left are supports for the front compartment cover when it is open

Overcoming Disadvantages of Poor Garage Layout by Excellent Maintenance Methods

All of the Kirkman Trucks Are Backed Into the Garage

Though the garage is 65 feet wide and 115 feet deep and plenty large enough to store the nineteen Kirkman trucks, there is little chance for turning around inside on account of the number of supporting columns. As a result, the trucks must be backed into the garage in order to permit a quick exit in the morning. None of the trucks are stored on the second floor because it is not strong enough to hold even one. That floor is reached by a hand-operated elevator, which is used only for hoisting the engines to and from the machine shop on the upper floor. All overhauling is accomplished on the first floor in the front part of the building, where lighting conditions are suitable

THIS story concerns a fleet owner who overcame the disadvantages of a poorly laid out garage and eliminated the need of costly machine shop equipment by paying strict attention to the daily running condition of his trucks, thus preventing the consequences from possible neglect during longer periods of inspection. As a result of this careful scrutiny each day for wear and tear of their trucks, Kirkman & Son, Brooklyn manufacturers of soap, are not forced to do very much heavy repair work or to call for outside assistance. Serious breakdowns are never allowed to occur, therefore there is little need for a large machine shop or a large or a well laid out garage.

Garage Not of Standard Design

The Kirkman garage is a two-story building, 65 ft. wide and 115 ft. deep. Though it serves the purpose of its owners, it is doubtful whether the building would come up to standard garage design. The second floor is of wooden construction, and barely strong enough to hold even one truck. It is reached by a hand-operated elevator, and as a result none of the trucks can be stored or repaired there. The first floor is used entirely for that purpose. Though this floor is of cement construction, and large enough for the storage and repair work of the nineteen Kirkman trucks, it is rendered impractical on account of the number of supporting columns. There are twenty 1-ft. wooden columns, in two rows of ten, extending in 10-ft. widths the length of the building. The space between the two rows of columns is 20 ft., just large enough for two rows of trucks. The space on either side of the columns is 25 ft., making room for four more rows of trucks. By virtue of the narrow turning radius all of the trucks are backed into the garage through the two entrances on either side of the front of the building. All trucks parked between the two rows of columns must be backed carefully into this space so as to prevent any damage from bumping into these supports. To make matters worse, the counterweight of the elevator occupies space directly in the path of incoming trucks in between the columns, thereby adding further to their difficulties. However, by backing the trucks in at night it has made conditions better for the exit of the trucks in the morning, as they can then run out head on.

Poor Lighting Facilities

Lighting facilities are poor. There are no open windows on the sides or in the back of the building that give very good lighting, and the only natural lighting that amounts to anything comes through the two entrances. As a result of these parking and poor lighting conditions, Kirkman & Son have governed their present maintenance system.

The fact that the second floor could not be used for storing or repairing the trucks, and that the spacing on the first floor was such as to render it impossible to overhaul more than two trucks at a time without blocking the entrance and exit of the trucks, made it imperative to perfect some overhauling system that would suit these conditions. As a result, the space between the two entrances directly behind the two windows is used entirely for overhauling work. Here advantage has been taken of the natural lighting facilities for all overhauling work during the day. No overhauling work is done at night.

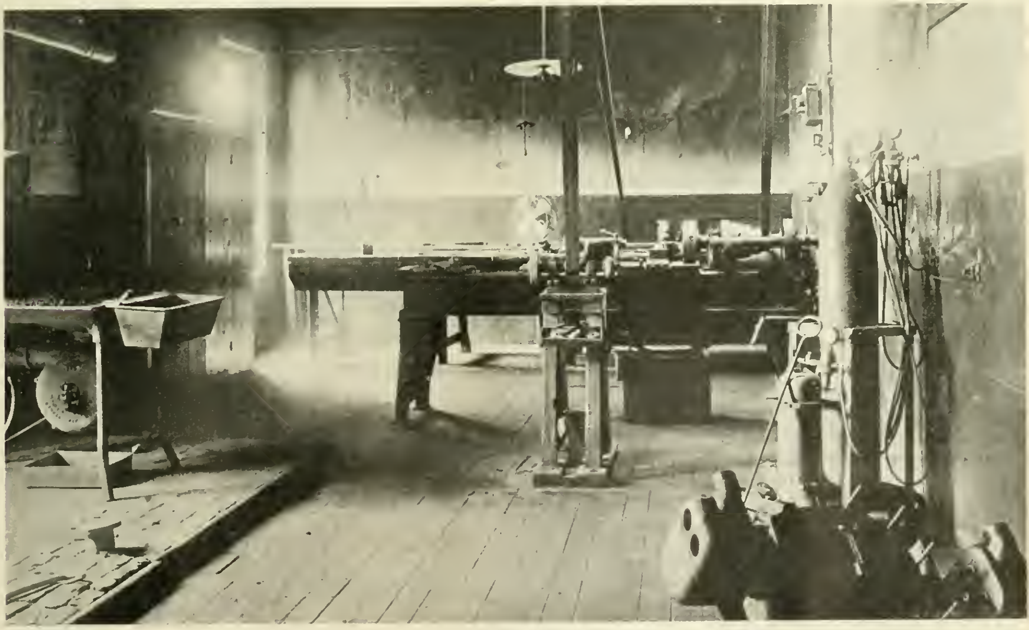
Three Weeks to Overhaul Each Truck

On account of the limited overhauling space set aside, the Kirkman company has arranged so that that space will be used constantly for overhauling; that is, that it will be occupied continually throughout the year for overhauling purposes. Therefore, the overhauling schedule calls roughly for from 2 to 3 weeks to be spent on each truck during the year. The trucks are completely torn down and practically remade, so as to stand up during another year's work on the routes.

All work on the engines is done on the second floor, where a small machine shop, equipped with an oxy-acetylene outfit, a forge and anvil, a grinder, and a lathe, has been set aside in a fireproof room. The engines are lifted out of the frames by a chain pulley hung overhead, near one of the entrances. They are then dropped onto a specially built portable stand and rolled onto the hand elevator, which conveys them to the second floor and the machine shop. A small repair bench near the

Two Entrances to Kirkman Garage

These alleviate the backing in of the trucks at night by allowing them to be placed on either side of the garage without the need of crossing between the columns to any great extent, thus obviating any possible damage thereby



This Machine Shod Equipment Is Sufficient for All Repair Work

All work on the engines is done in this fireproof room on the second floor. The equipment includes an oxy-acetylene outfit, a forge and anvil, a grinder and a lathe. There is little need of any other equipment. The engines are lifted out of the frames by means of a chain pulley hung overhead on the lower floor where the trucks are overhauled. They are conveyed to the upped floor by means of a portable stand and a hand-operated elevator

A Practical Way of Saving Space

The oil tanks have been placed on the second floor instead of on the floor below, where they would occupy much needed space. They are filled by running the oil barrels up to the top of the tanks on two board tracks. The tanks stand on a copper drip pan. The lids are equipped with louvres which serve as handles. The oil is always protected from dust

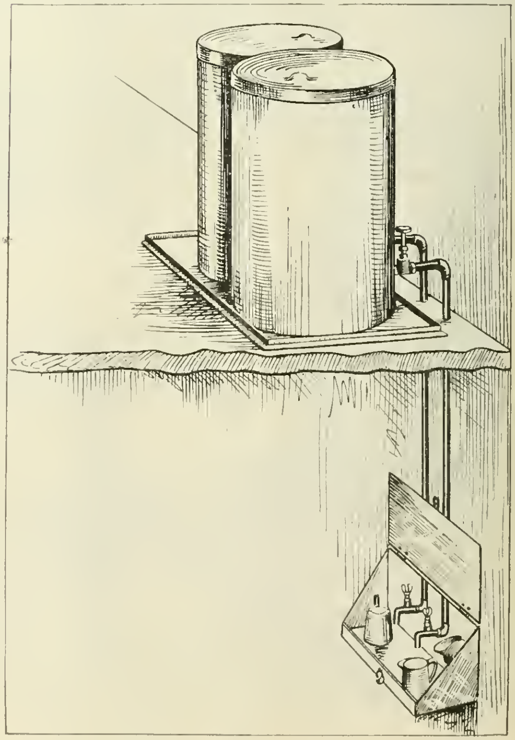
Two Points for Efficiency in a Truck Garage

Save your men time and energy by placing the oil supply and waste boxes next to each other. A mechanic always takes waste with him when carrying oil. Therefore, place the two near each other. Have a box for soiled waste when the oil can is returned to the filler stand. The Kirkman soiled waste box is equipped with a sliding bottom which, pulled out, allows the contents to be emptied by gravity

overhauled truck is used for most of the other work. The forge and anvil are used for straightening and bending purposes, and the portable welding outfit facilitates in all frame and other work. This equipment, together with a fully equipped stockroom, constitutes the sole means of repair in the Kirkman garage.

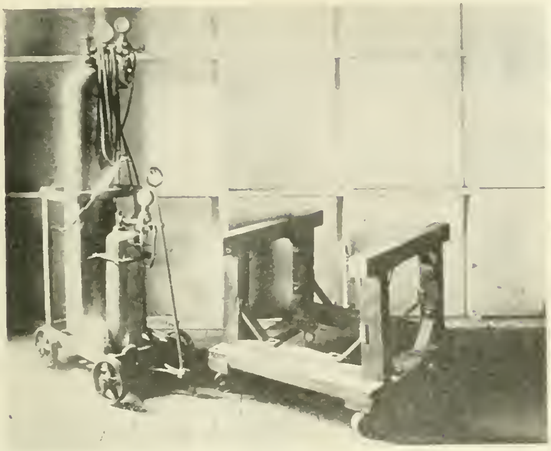
As a result of this overhauling system of always having at least one truck in the repair shop, the Kirkman fleet must needs be composed of one spare truck which will take the place of the overhauled one. As stated before, after a truck has been overhauled it is expected to run without serious breakdowns for at least 1 year. In order to accomplish this the trucks are inspected every morning, just before going out on their routes. This work is taken care of entirely by the garage foreman, who is responsible to the traffic manager for their running condition. The engines are run so as to locate any knocks and loose bearings, and the springs, driveshafts, etc., are looked over for wear and tear. All bearing and carbureter troubles are handled entirely by the foreman. At night ½ hour is spent by the driver in going over the truck. He is expected to report any breakage. However, little trouble is experienced by broken springs, etc., because the trucks are not overloaded or run over very rough roads. Most of the routes are centered around New York City, Staten Island and the Bronx. The Kirkman company has two trucks whose territory is confined solely to New Jersey, where they are also garaged. As a result, these trucks give that company more trouble than the other nineteen, because they are not under the direct supervision of the garage foreman, and therefore do not receive as much attention. These two trucks are inspected once a week at the Brooklyn garage.

Much of the bearing trouble has been eliminated by paying strict attention to the engine oiling. In order to overcome this trouble and to forestall any chance of a driver being without an extra supply of oil, all of the trucks have been equipped with an auxiliary 3½-gal. tank, attached to the side frame member. This tank is always filled. All the driver has to do is to turn on



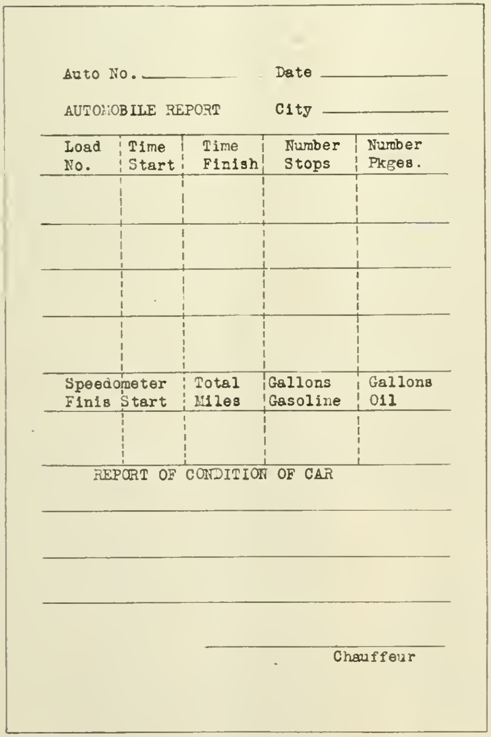
The Kirkman Method of Supplying Oil

Space and time are saved by placing the oil tanks on the second floor and running two pipes from them to a filler stand located on the first floor where the trucks are stored



Two Useful Devices in Truck Maintenance

Portable oxy-acetylene and engine stands are necessary in every garage where trucks are maintained. The above oxy-acetylene stand is made entirely of angle iron, which supports the wooden platform and forms a guard for both tanks. The four-wheeled swivel-castor engine stand is made up of 2 by 4s



Auto No. ________ Date ________

AUTOMOBILE REPORT City ________

Load No.	Time Start	Time Finish	Number Stops	Number Pkges.
Speedometer Finis	Start	Total Miles	Gallons Gasoline	Gallons Oil

REPORT OF CONDITION OF CAR

____

____

____

____
Chauffeur

A Daily Report That Is Necessary

In order to keep an accurate record of the running condition of the trucks, a report somewhat similar to the above is handed in each day by the drivers

Useful Equipment in a Garage

The forge and anvil, familiar in horseshoeing work, has become a necessary equipment in truck maintenance practice. It is especially handy in all straightening and bending work. Kirkman & Son find it invaluable during the overhauling periods. This equipment is located in the machine shop, where it is mounted on a brick floor in order to come within the fireproof laws of Brooklyn

a petcock at one end of the tank and fill his 1-qt. measure, after which the oil reservoir in the engine is replenished. Kirkman & Son have supplemented this oiling precaution by emptying the old oil out of its Pierce-Arrow trucks once a week and once a month from the other vehicles. This old oil is used for the drive chains.

The Kirkman fleet consists of two 5-ton Macks, which are 12 years old; three 2-ton Hewitts, six 3-ton Macks, for 3½-ton Alcos, four 5-ton Pierce-Arrows and one 2-ton Pierce-Arrow and two 1-ton Fords. Two of the six Macks are used in New Jersey.

Much pride is taken in the appearance of the trucks as they go on their routes. The curtains must be neatly rolled up, and everything must look spic and span. The trucks are painted once or twice a year, the number of times being governed wholly by their appearance. This attention to neatness and cleanliness is reflected in the drivers, who take pride in keeping their particular trucks up to these standards.

Most of the truck operators are former horse drivers for that company. They have risen from the ranks in point of service records in that branch of the company's work. It has been figured that better results can be had by schooling their own drivers rather than getting experienced men from the outside. These men are schooled only in the necessary driving rules, and are given a few pointers on how to locate small troubles while out on the road. Otherwise, it is expected that they do no other work on the trucks except the regular route work. The reason for this is that experienced men, or those drivers who are eager to learn, will tamper with the trucks, thinking that they are helping the foreman. In a majority of cases more harm is done than good, thus hampering the foreman. A new man's schooling, at first, consists of work in the machine shop and around the garage. He is given such work as taking off bolts, nuts, etc. After this and sundry odd jobs

(*Continued on page* 30)

THE TON-MILE—

What It Is
How to Figure It

A NEW DEFINITION OF THE COMMERCIAL TON-MILE

Two Kinds of Ton-Miles

1—The Absolute Ton-Mile
2—The Commercial Ton-Mile

CAPACITY for doing work and the cost of doing it are the two items by which all forms of machinery are compared. In the older forms of mechanical apparatus such as locomotives, machine lathes, electric current generators, boilers, etc., etc., recognized units of comparison have been in use for many years. In regard to the use of motor trucks, however, there seems to be at the present time no recognized unit upon which their operation may be compared, either with horse equipment or with motor trucks.

Before the use of motor trucks became as prevalent as it is to-day, the majority of operators of horse equipments did not deem it necessary to determine the unit costs of their businesses. This was due to either their inability to make such mathematical calculations as are necessary for the determination of the unit costs, or to their disinclination to spare any of their time for this so-called unnecessary work. The general thought seemed to be that so long as they made money in their business there was no necessity for delving into such obscure things as unit costs.

Adoption of motor trucks in almost all lines of haulage work where horses previously reigned supreme has caused the more progressive of the teaming concerns to evince considerable interest in the previously-neglected unit costs.

This understanding of unit costs and particularly of the cost per ton-mile is becoming more and more important as the number of motor trucks increase. This is particularly shown by what has recently occurred in the State of Nebraska, where the Nebraska State Railway Commission has attempted to determine maximum rates to be charged by trucks hauling goods between points not within the same city or village in eastern Nebraska. The rates established by the commission are based upon the ton-mile cost, without giving any clear definition of exactly what the ton-mile is. Furthermore from information now available, the commission drew up its cost per ton-mile on a basis of one truck with a load of 4000 pounds driven 50 miles a day. This estimated table showed the cost per ton-mile as 25 cents.

The whole calculation seems to be so muddled up at this time that no attempt will be made to discuss it intelligently at this moment. It is mentioned now simply to show the great importance which a proper understanding of the cost per ton-mile will have in the days to come, for it may be expected that other states will follow Nebraska's lead.

HOW TO FIGURE IT

1—*The commercial ton-mileage is obtained by multiplying the total tonnage carried on any trip by the mileage of that trip divided by 2.*

2—*Commercial ton-mileage may be figured per trip. The ton-mileage for a day is the addition of the ton-mileage of the trips covered in that day.*

3—*It may also be figured per trip per day, per month, etc., with equal ease. Multiply total tons carried during any period by ½ the average trip distance during that period.*

4—*Commercial ton-mileage cannot be obtained by multiplying the tonnage carried per day by the mileage covered in that day.*

5—*A trip is the period from the time a truck starts out on a job until it returns to the starting point for the next job or reports at another point.*

Many valuable and exhaustive sets of cost figures of both horse-drawn and motor vehicles have been made from actual experience. But each set has been compiled by a different accountant, each of whom has his own ideas as to what constitutes a ton-mile of motor truck work, what the life of a motor truck should be and how these figures should be compared to similar figures compiled from observations of horse-drawn wagons. This lack of uniformity of the basic premises upon which the cost computations are based has rendered them practically useless insofar as their comparison with the operation of other motor trucks or with horse transportation is concerned.

Applicability to all cases and simplicity of calculation are two prime requirements that must be met first of all in the determination of the proper unit of comparison.

The ton-mile is the unit which the best authorities have selected because it represents the combination of the two principal features of tranportation, the weight, and therefore the measure of the amount of goods to be moved, and the relative difficulty of moving them; the distance, the coefficient of the work involved in moving a given number of tons.

Therefore, the cost per ton-mile is the final figure to be sought for. Efficiency is input divided by output, expressed mathematically; therefore that truck which for the least cost produces the greatest number of ton-miles must be the one which is most efficient, most economical.

If the equipment of Jones delivers a certain class of goods over a certain route for, say, 15 cents per ton-mile, and that of Smith delivers the same class of goods over the same route for 30 cents per ton-mile, it is costing the latter just twice as much as the former. These results are comparable.

The total cost of the operation of each of the above equipments is easily determined by adding the costs of the different items which make up the operating, maintenance and fixed charges. The total cost of operation of each equipment in any given period of time divided by the number of ton-miles of work accomplished by each equipment in the same period will give the cost per ton-mile in each case. But to arrive at this result we must clearly define a ton-mile, so that if the figure so determined is to be compared with some other, the same premise must be used in both cases.

The Absolute Ton-Mile Defined

Two understandings of the unit, ton-mile, are in use at the present time. These are known as the *absolute* ton-mile and the *commercial* ton-mile. The absolute ton-mile may be defined as the carrying of a mass of 1 ton over a distance of 1 mile. This is analogous to the engineering unit of the foot-pound, meaning the raising of a mass of 1 pound through a distance of 1 foot. As applied to the operation of any vehicle, be it horse wagon or motor truck, the absolute ton-mile takes into consideration the number of tons hauled and the distances over which all or portions of the load were carried. Consider as an instance, if a vehicle started from some certain point with a load of 5 tons and traveled 2 miles, it would have accomplished $5 \times 2 = 10$ absolute ton-miles of work. If at the 2-mile point the vehicle had delivered 1 ton, leaving 4 tons of load, which it delivered 3 miles further along on the route, the absolute ton-mileage would have been $3 \times 4 = 12$. If it then returned empty over the 5 miles to the starting point the absolute ton-mileage of this portion of the trip would have been $5 \times 0 = 0$. The total ton-mileage of the entire trip is the summation of the number of work units accomplished on each portion, or $10 + 12 + 0 = 22$ absolute ton-miles.

Empty Mileage Important

While at first thought the absolute ton-mileage calculation does not take into account the empty running miles from the point of the last delivery to the starting point for the next load, this empty running mileage is really taken into account in the cost of operation of the truck on that particular trip or for the total day's work during which the particular trip was made. It is to be remembered that this empty running mileage is very important because it is a measure of the efficiency of the motor truck operation. It costs almost as much, if not more, to run a motor truck empty, if not fitted with a governor, due to the excessive vibration of all parts on account of the stiffness of the vehicle's springs designed to carry a heavy load when no load is moved.

The ton-mile unit adopted must be applicable to all cases. Consider the three cases shown in the two illustrations on the two following pages.

Case 1—A truck starts out with a load of 5 tons, travels 15 miles, delivers all of its load, and then returns empty to the starting point.

Case 2—The same truck starts out with the same load, travels the same distance, but delivers parts of the load at different points and picks up another 5 tons at different points along the route with which it returns to the starting point.

Case 3—The same truck starts out with a load of 5 tons, travels 15 miles, drops all of its load and picks up at the same point another 5 tons which it carries back to the starting point.

The number of absolute ton-miles of work done in the first case is $(5 \times 15) + (0 \times 15) = 75$.

Using the absolute unit in Case 2, the number of ton-miles is the summation of the tons carried from the starting point to the first stop multiplied by the miles traveled to that point, the tons carried from the first stop to the second multiplied by the distance between them and so on for each stop until the truck returns to the starting point. The number of absolute ton-miles of work done between each stop are as indicated within the small rectangles which make up the absolute chart of Case 2. The ton-mileages are obtained as follows:

Tons Carried	Miles Covered	Absolute Ton-miles
5	× 2	= 10
4	× 3	= 12
1½	× 4	= 6
2	× 2	= 4
0	× 8	= 0
½	× 2	= 1
2	× 1½	= 3
3	× 2	= 6
4	× 2	= 8
5	× 3½	= 17½
		67½

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined...... April 15
1—Driver .... May 1
2—Tires .... May 15
3—Gasoline .... June 1
4—Overhauling .... June 15
5—Depreciation .... July 1
6—Insurance .... July 15
7—Interest .... August 1
8—Garage .... August 15

Determination of the ton-mile in this case by the use of the absolute formula requires ten separate multiplications, one for each stop at which a portion of the load is delivered. If there had been twenty stops instead of ten, twenty multiplications would have been necessary; if thirty stops, thirty multiplications, and so on, provided the absolute unit were used.

Drawback of Absolute Unit

Furthermore, in order to determine the absolute ton-miles in the case just cited, an observer would have been necessary on the truck to weigh the portion of the load delivered at each stop and note the distance covered between each successive stop. The driver could not do the work and drive the truck at the same time, for if he did, he would in all probability do very little driving. The employment of an observer on each truck to determine the number of ton-miles accomplished on each trip is out of the question.

While the number of absolute ton-miles is easily determined in Cases 1 and 3, it is a decided task in Case 2, and for this reason the absolute unit is not suitable for the motor truck owner whose vehicle is operating under ordinary conditions.

Field of the Absolute Unit

The absolute ton-mile, however, has a field all its own. This is in the determination of the operating efficiency of trucks. For example, consider Case 2, using the absolute unit. The chart drawn shows clearly the empty miles. The several small shaded rectangles in the absolute chart of Case 2 show graphically the work done by the truck between each stop. If the truck in this case had carried its maximum load of 5 tons over the entire distance of 30 miles, it would have been operating 100 per cent load factor and the chart drawn with the absolute unit as a basis would have been one large rectangle with an altitude of 5 units, tons, and a base of 30 units, miles. The ratio of the summation of the small areas as shown to the one large area is the efficiency of the truck operation. In Case 2 the ratio of the loaded miles to the empty miles is as 67.5 is to 82.5, thus showing that the truck was operated at a load factor of but 45 per cent.

It is therefore seen that the absolute ton-mile would be a desirable unit to employ, provided it could be readily obtained. One of the values of determining cost figures is to judge of the efficiency of one truck as compared to another and the absolute ton-mileage chart of Case 2 shows clearly on exactly what portions of the trip no load was carried. While the absolute ton-mileage would be desirable for these reasons, the great difficulty in obtaining it by calculation when loads are picked up at different points of a trip and delivered at perhaps other points makes its use impracticable.

Some other unit which will give approximately the same results as the absolute unit but which can obtain these results in a simple manner must, therefore, be discovered. For the past 5 years THE COMMERCIAL VEHICLE has advocated the use of the commercial ton-mile, the modifying adjective commercial having nothing whatever to do with the name of this magazine but simply being a modifying adjective to prevent any misinterpretation of the kind of ton-mile meant when the term is used. This commercial ton-mile was defined as being obtained by multiplying the tonnage carried on any trip by the mileage of that trip. This is a very simple operation containing only one multiplication. Under this definition of the commercial ton-mile, the ton-mileage made by the truck in Case 1 would be 5 tons times 30 miles equal 150 ton-miles.

The New Definition

Recently, through the courtesy of S. S. Merithew, truck cost expert of the Packard company, it was pointed out that while certain comparisons are not incorrect in the commercial ton-mileage obtained under that definition, a ton-mileage nearer the absolute ton-mileage in any case may be obtained by figuring the ton-mileage as the total tons carried per trip multiplied by the total distance of the trip *divided by two.*

In practically every case this new definition of the commercial ton-mile will give a ton-mileage nearer to the absolute ton-mileage than would be the case if the former definition requiring the multiplying of the total tons carried per trip by the total miles covered per trip were employed.

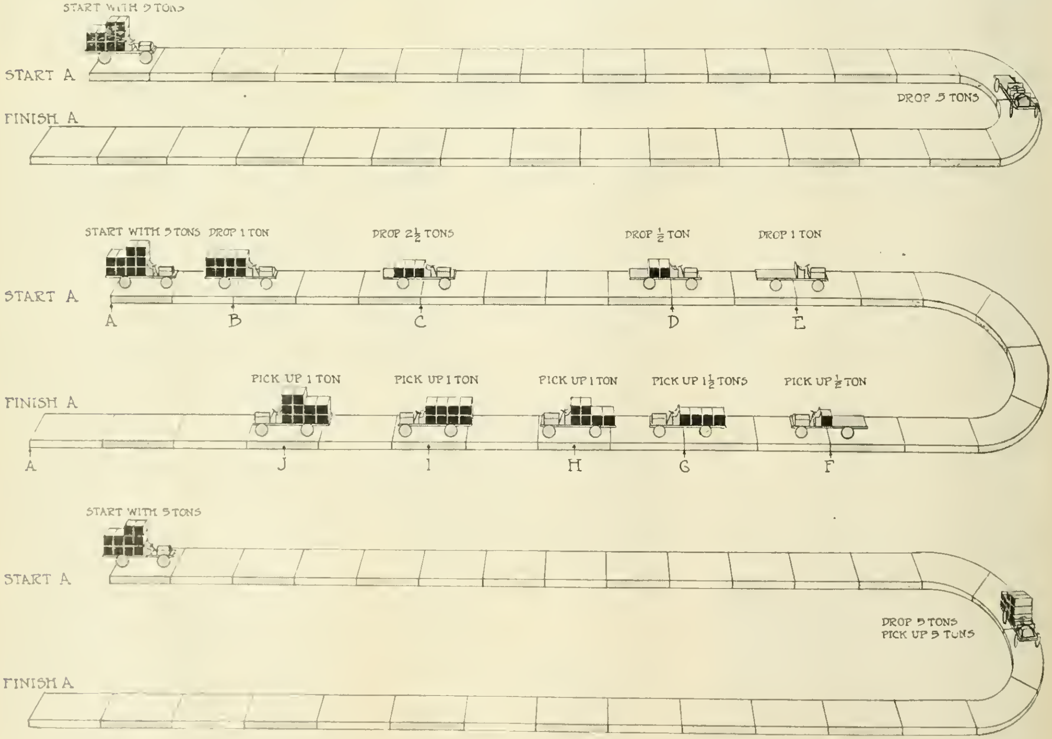
THE COMMERCIAL VEHICLE has, therefore, adopted a new definition for its commercial ton-mileage which differs from the former definition in that the mileage of any one trip is divided by two before being multiplied by the total tonnage per trip to obtain the total ton-mileage of that trip.

This means that the commercial ton-mileage figured by the new definition would be exactly one-half of that figured under the old definition, so that the cost per unit ton-mile for any particular case will be exactly double the figure using the new definition instead of the old. In other words, if by the old definition of the commercial ton-mile, the unit cost was 10 cents it will be 20 cents under the new definition.

The several hundred motor truck owners who have been employing THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks during the past several years may or may not use the new definition of the commercial ton-mile as they choose. Either method will give cost figures which are comparable, but the new definition will give a total number of commercial ton-miles more nearly equal to the ton-miles obtained were the absolute or more scientific method employed.

Trip Must Be Used

In any event, it must be borne in mind that ton-mileage must recognize the trip. This requires that we define the meaning of the word trip. A trip in most cases means the operation of a truck starting from any given point until it again returns to that point for another load. In some cases a trip may



Cases 1, 2, and 3, shown above, depict a motor truck traveling over the same route but under different conditions, as follows: Case 1—Full load for half the trip, returning empty; Case 2—Dropping and picking up portions of the load at various points on the route; Case 3—Full load on outward portion of trip and full load on return portion. The route of each case is 30 miles, the lengths of the small divisions on the tracks each being 1 mile. The small black squares carried on the tracks each represents ½ ton. In case 2, the letters A, B....A, indicate the points of delivery and pick-ups. The number of commercial and absolute ton-miles accomplished in each case is shown on the opposite page consume a full day, or in overland haulage work, 2 or 3 days. Perhaps the bearing of the trip upon the ton-mileage performed by any truck during any given trip may best be expressed by an example in order to prove that commercial ton-mileage cannot be obtained by simply multiplying the tonnage hauled in a day by the mileage covered in a day. Suppose a truck makes two such trips as stated in Case 1 and shown in the chart at the bottom of page 22. The actual commercial ton-mileage per trip under the new definition would be 5 tons times 30/2 miles equal 75 commercial ton-miles. For two trips the total commercial ton-miles would be two times 75 or 150.

Where the Error Occurs

If, on the other hand, an attempt were made to multiply the tonnage carried per day by the mileage covered per day in order to obtain the ton-mileage, the error of this method is evident because the false ton-mileage would be 5 plus 5 equals 10 × 30 plus 30 equals 60, with a total of 600 ton-miles or 4 times the proper commercial ton-mileage.

Undoubtedly many truck owners have attempted to calculate commercial ton-mileage in this manner and even the truck manufacturers have sent out data which showed such a ridiculously low cost for a ton-mile that it was apparent that some such erroneous assumption was made.

The commercial ton-mileage under the new definition may be obtained just as readily as under the old definition because in either case only one multiplication is required to determine it for any trip. This is clearly shown in the working out of the three cases in the chart shown at the bottom of this page. In all three of the cases, the base line of the shaded rectangles is laid out to represent the length of the trip of 30 miles, as indicated in the tracks in the chart at the bottom of page 22. The altitudes of the shaded rectangles represent the tons carried per trip in each case. Using the absolute ton-mile as a basis in Case 1, two calculations are necessary. Using the old definition of the commercial ton-mile, as shown by the center rectangle, only one calculation is necessary. The same holds true for figuring the commercial ton-mileage under the new definition. The only difference in the value in figuring the commercial ton-mileage under the new definition is that the area of the rectangle is only one-half as large and is represented by 75 commercial ton-miles instead of 150. Similarly in Case 2, only one operation is required to calculate the commercial ton-mileage under the new definition as compared with ten operations if the absolute unit is used. In Case 3, two operations are required to determine the absolute ton-mileage and only one in each of the other two instances.

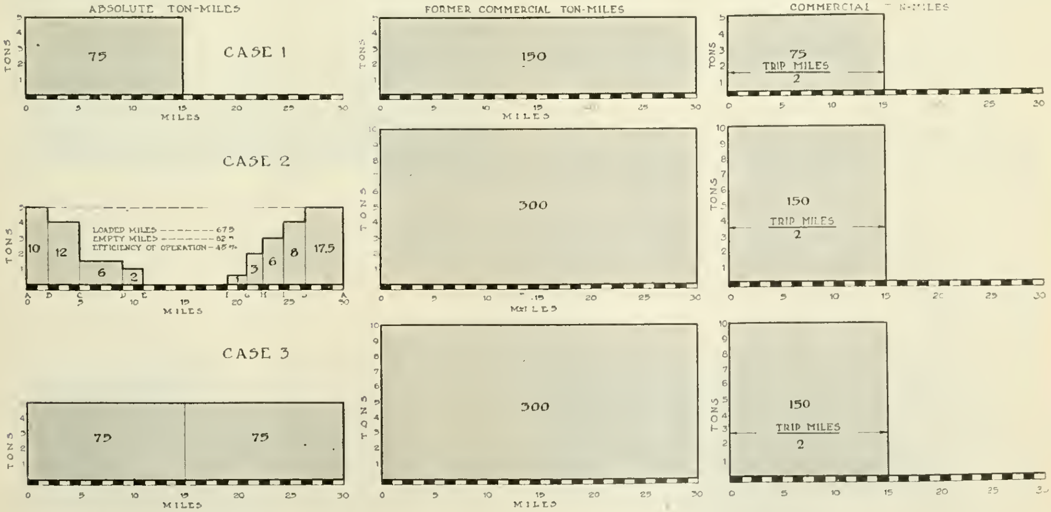
The Percentage of Error

The greater value of the new definition of the commercial ton-mile is clearly shown by comparing the two right-hand columns of rectangles of commercial ton-miles with the left-hand absolute ton-mileage rectangles. In Case 1, by the old definition, the commercial ton-miles were exactly double the absolute ton-miles. By the new definition the commercial ton-miles are exactly the same as the absolute ton-miles. Similarly in Case 3, the commercial ton-miles by the new definition are exactly equal to the absolute ton-mileage. In Case 2, the commercial ton-mileage obtained by the old definition was 4.5 times the absolute ton-mileage. With the new definition the commercial ton-mileage is only 2.25 times the absolute ton-mileage, thus showing only one-half as great an error.

Smaller Error in New Definition

It is thus noted that in the two cases of where a truck starts out with a full load, delivers it and returns to the starting point empty, or picks up a second full load at the point at which the first full load is delivered and carries the new load back to the starting point, there is no error whatever between the absolute ton-mileage and the commercial ton-mileage under the new definition. In the case where loads are delivered and picked up piecemeal during a trip, there exists an error, as shown by the ratio of 67.5 absolute ton-miles as compared with the 300 commercial ton-miles under the old definition and 150 ton-miles under the new definition. In this instance it is noticed, however, that the ratio of error by the new definition is only one-half that by the old.

Although it is decidedly difficult to state with accuracy just what percentage of trucks are operated with loads according to any one of the three cases, it is generally accepted that the majority of trucks are operated as in Case 1, with a smaller number as in Case 2, and, perhaps, a still smaller number as in Case 3, in which the full work ability of the truck is realized. It is thus seen that the new definition gives no error at all in the large percentage of cases and only a comparatively small ratio of error where trucks are operated as in Case 2.



Graphical representation of the work done by the truck in the three cases shown in the chart on the opposite page. The areas of the shaded rectangles show the work done if the absolute or commercial ton-mile unit is employed. The right column of rectangles shows the commercial ton-mileage obtained in each case with the new definition of the commercial ton-mileage as obtained by multiplying the tonnage per trip by ½ the mileage of the trip

Dailey 4-in-1 Bodies for 1- to 4-Ton Trucks

1—Prices, with Hand Hoist, Range from $244 for 90-Inch Length to $260 for 132-Inch Length
2—Four Body Combinations Include the Platform, Express, Dump and Stake-Sided Types
3—Conversion from Any One Type to the Other Can Be Made in Less Than Five Minutes

FLEET owners whose trucks handle a variety of loads, and as a result require the use of different body designs to give the best results, will be interested in the Dailey 4-in-1 body produced by the Simplex Mfg. Co., Conneautville, Pa., and for which H. R. Dailey, Chicago, is the sales agent.

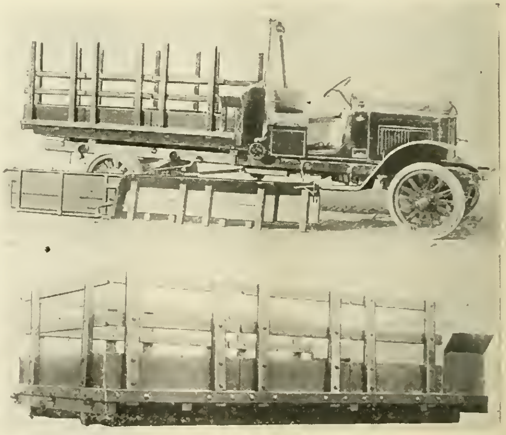
The new combination body can be converted in about 3 minutes to any one of four types. The Dailey outfit includes a platform body for hauling bulky loads, such as bagged cement, waste paper, light rubbish, pasteboard boxes, etc.; an express body which is best suited to carrying loads of materials that cannot be closely packed but must be heaped on the body; a dump body, the same as the express body, except that the double-acting tailgate is hinged at the top; and a stake body, the same as the platform type, with the exception that it is equipped with stakes 42 in. high. The express body is useful for carrying lump coal, trunks, packages, groceries, meat, and odd loads, while the dump body will be of most use in contracting and building work, where such loads as crushed stone, sand, gravel, fine coal, cinders, etc., are carried. The stake body is useful for hauling barrels, boxes, furniture, lumber, pipe lengths, etc.

The Dailey 4-in-1 body, complete with a hand hoist, ranges in price from $244 for a 90-in. size to $260 for a length of 132 in. Though known as 4-in-1 bodies, they may be bought in split units. A coal dealer, for instance, will find little use for any but the express or dump body. The price of the express and dump body is $150. The stakes cost $45 and the hoist $75.

The 4-ton hand hoist occupies but 9 in. of space between the body and the cab. The hoist frame is triangular shaped and constructed of steel. The load on the frame is hung from the apex. The hoist weighs only 237 lb.

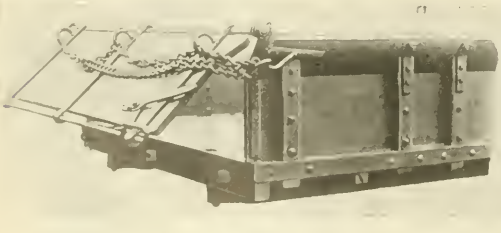
The shaft on the hoist carrying the cable drum is 1 3/8 in. in diameter and runs on roller bearings. The drum is spirally grooved to conform to the cable. The gears give a reduction of 3 1/3 to 1. The brake operates on the pinion shaft, and has but one moving part. Wear is taken up by tightening one nut. A pawl holds the hoist at any desired elevation.

A crucible steel cable 3/8 in. in diameter, with a breaking strength of 9600 lb., is used. The cable being double in the hoist, the total breaking strength is 19,200 lb. The effort applied at the crank is multiplied eighty times in lifting the load. The track attached to the front of the body carries the sheave which raises the load and it also forms the support upon which the hoist leans, maintaining perfect alignment between the body and hoist at all times. The top of the track is made to lock the hoist to the body automatically when the latter is down. A

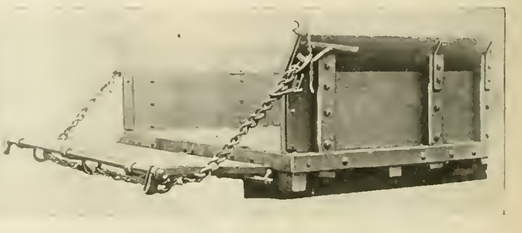


Upper—Showing complete equipment of Dailey 4-in-1 bodies as applied to a motor truck. This includes a dump, an express, stake, and platform body. The complete equipment with hand hoist ranges in price from $244 to $260

Lower—This stake body is the same as the platform body with stakes 42 inches high fitted in place. Separately, the stakes cost $45



The dump body is equipped with a double-acting tailgate, which is hinged from the top or bottom. The price is $150

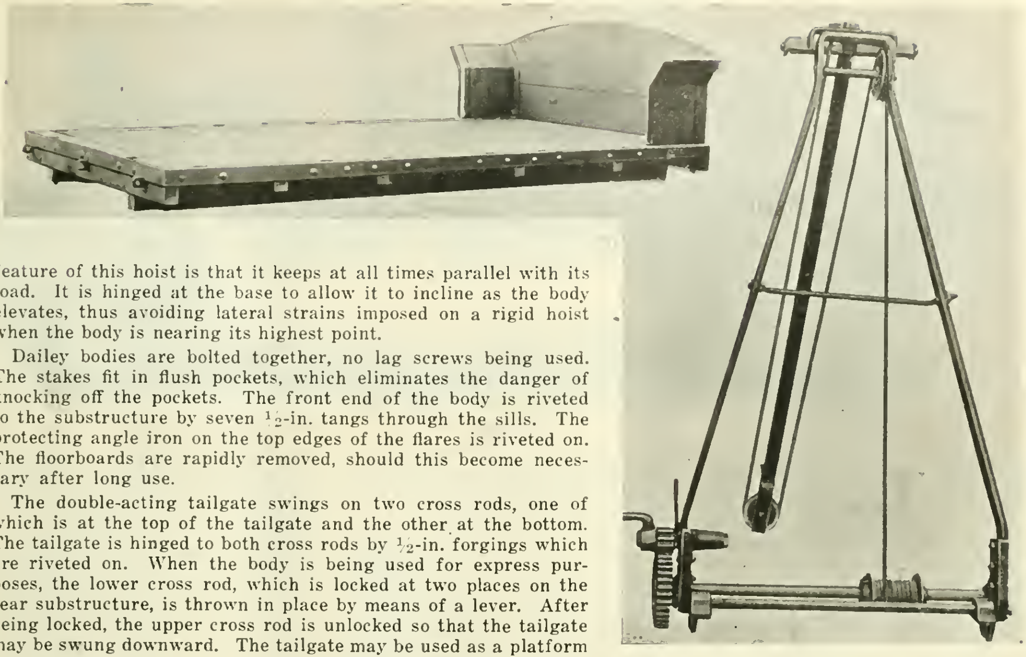


The express body is the same as the dump type, but with the tailgate hinged at the bottom to form a platform extension feature of this hoist is that it keeps at all times parallel with its load. It is hinged at the base to allow it to incline as the body elevates, thus avoiding lateral strains imposed on a rigid hoist when the body is nearing its highest point.

Dailey bodies are bolted together, no lag screws being used. The stakes fit in flush pockets, which eliminates the danger of knocking off the pockets. The front end of the body is riveted to the substructure by seven ½-in. tangs through the sills. The protecting angle iron on the top edges of the flares is riveted on. The floorboards are rapidly removed, should this become necessary after long use.

The double-acting tailgate swings on two cross rods, one of which is at the top of the tailgate and the other at the bottom. The tailgate is hinged to both cross rods by ½-in. forgings which are riveted on. When the body is being used for express purposes, the lower cross rod, which is locked at two places on the rear substructure, is thrown in place by means of a lever. After being locked, the upper cross rod is unlocked so that the tailgate may be swung downward. The tailgate may be used as a platform by adjustment of the chain equipment. These chains are somewhat different from the usual type, for no hooks to adjust the length are used. Instead of the hooks a pear-shaped loop is used. Dropping the chain into the smaller diameter of the loop gives a quick adjustment of one link at a time. When the body is used in dumping work the tailgate is swung open from the top cross rod by unlocking the lower rod.

The floors and sides are of white oak lumber 1 in. thick. The substructure is constructed of heavy material. The runners are 2¾ by 4½ in. in size, while the cross bars are 2⅜ by 3 in. The bottom board on the stake sides is 1 by 8 in. in size. The upper slats are 1 by 3 in.



Upper left—By removing the sides, the body is turned into a platform type. The operation takes about 3 minutes time. Lower—The Dailey hand hoist occupies but 9 inches of space on the chassis

New Ice Cream Body Protects Product and Saves Time

(*Continued from page* 15)

the greater mileage gained thereby, the latest type of ice cream bodies has been designed to eliminate all waste motion during the unloading period. This has been accomplished by providing an aisle between the two ice compartments holding the containers. The Bendfelt Ice Cream Co., Milwaukee, Wis., operates two 2-ton Federals with bodies well adapted for this work. Three compartments, metal lined, are provided for ice or containers and another for salt. Partitions can be set in in order to facilitate the handling of brick ice cream or regular freezers. Space is left in the center of the body which enables the driver to unload with ease. This space is open on the right side only. It is reached by a step and is equipped with a raised flooring made of slats to facilitate drainage. Drain pipes lead from each compartment and these carry all water well below the truck parts.

This method of draining the salt solution is an important feature on account of the corrosive action of the salt spray on such parts as the rear axle members, springs and brakes. Though a solution of the problem has been effected by a non-leak type of body, the drainage facilities must be such as to bring the salt water far back of the rear axle and springs in order to protect them from the salt spray which these truck members travel in when the drain pipes are set further forward in the body.

In order to protect the rear ice compartment from damage, the rear end of the platform has been equipped with stakes. This rear compartment is provided with two covers, hinged so that it is a comparatively easy matter to take out a can of ice cream and swing it to the side of the truck where it can be lifted into the aisle. There is a compartment, occupying the width of the aisle on the left side of the truck, which is used for brick ice cream. This compartment is also equipped with a hinged cover. The salt box runs the width of the body, being partitioned off from the front ice compartment. Both the salt box and the front compartment have a common hinged cover. In order to protect the ice cream, this cover has a smaller hinged section at its lower end.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

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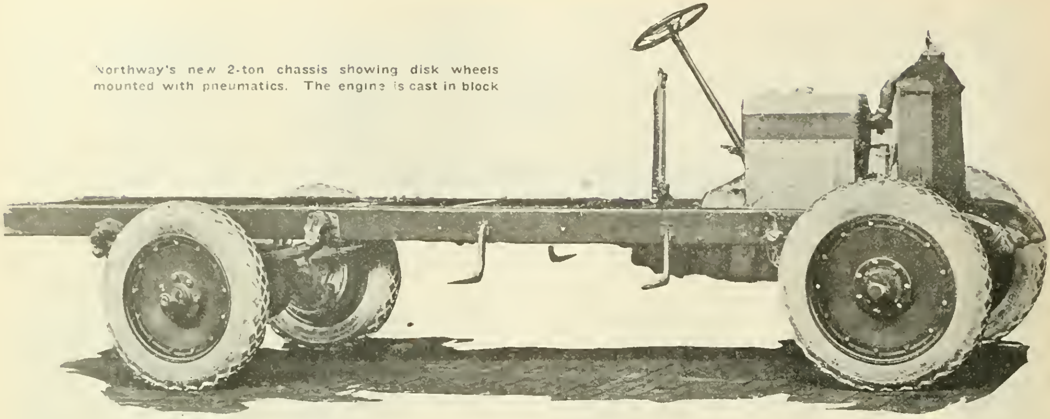


Northway's new 2-ton chassis showing disk wheels mounted with pneumatics. The engine is cast in block

Northway Enters Truck Field with Worm-Driven 2- and 3½-Ton Models

NORTHWAY SPECIFICATIONS

Capacity, tons	2	3½
Price		
Wheelbase, in.	146	160
Tires, front	36	36
Tires, rear	5	5
Bore, in.	4	4
Stroke, in.	6	6
N. A. C. C. hp.	25.6	25.6
Speed, r.p.m.		
Speed, m.p.h.		
Gear ratio in high gear	7.75 to 1	10.25 to 1
Final drive	Worm	Worm

R. E. NORTHWAY, well known in the automotive industry as a designer of engines, has entered the truck field with two worm-driven models, of 2- and 3½-ton capacities. These two models have been completely designed and engineered by Mr. Northway. Production is now under way at the Northway Motors Corp. plant in Natick, Mass.

The two models use the same sized engines and are similar in design with few exceptions. The 3½-ton model differs from the 2-tonner in that it has a longer wheelbase, larger rear wheels, lower gear ratios, and larger brake diameters and widths. Both models are made up of standard parts, including a Northway engine, Wagner ignition, Willard battery, Pierce governor, Schebler carbureter, Fuller clutch and gearset, Sheldon front and rear axles, Ross steering gear, and Spicer universal joints.

The vertical, four-cylinder engine is cast in block with the valves placed in a detachable head. The valve chambers and ports are machined smooth over the entire surface. The three-bearing crankshaft is drop-forged and heat-treated. The centers of the crankshaft and crank pins are drilled to decrease weight and unbalanced forces, and afford passage for oil, which is fed through it by a positive force-feed gear-pump, to all bearings. The oil system is splash-pressure. A brass tube, which carries the oil to the bearings, is cast in place in the crankshaft, with plugs at each end to allow cleaning of any sediment that might collect in the tube. A hole of large diameter, plugged at the outside of the case, is drilled through a boss cast in the crankshaft, connecting this tube to the bearings, and thence with the crankshaft, which permits a wire or rod being pushed through to clean out any sediment or deposit. The connecting rods dip in troughs. The flywheel is a semi-steel casting, having a forged steel ring gear attached to it for an electric starter. The camshaft, pump, generator and other accessories are driven through a Morse rocker joint high-speed silent chain fitted with compensator adjustment to allow for wear.

The governor is driven from the camshaft by a pair of spiral gears. Packing-nuts, pump-case and pump-impellor are of phosphor bronze castings. The valve-operating mechanism is completely inclosed. The intake and exhaust manifold are combined upon a principle which insures vaporization of the mixture, the pre-heating to a satisfactory temperature and elimination of condensation.

A centrifugal pump forces the circulation of water through a honey-comb type of radiator with a cast-iron case. The radiator core is attached by header-plates to the top and bottom tanks, which are supported by strong side members having a ball and socket joint attachment carried in a bracket on the frame, with springs both under and above the ball joint, which absorb the vibrations from road shock. The cap is equipped with a temperature indicator.

Ignition can be had either in a direct current distributer system or a high tension magneto, as desired. The Northway company is offering a Wagner generator with a Willard battery for ignition, starting and lighting. The battery is supported on spiral springs to absorb vibration.

Fuel is fed to the carbureter by vacuum

New 2-ton Northway model

3½-ton Northway truck

from a tank located under the seat. The clutch is of the multiple-disc type, completely inclosed. It is fitted with a ball-bearing, throw-out collar and alternate plates which are lined with woven asbestos fiber. The four-speed transmission is of the unit power-plant type. The gears, which are made of alloy steel, heat-treated, have teeth of large pitch and wide face. The power take-off arrangement is provided for on the countershaft of the transmission, to which is fitted a power pump for pumping up pneumatic tires. The springs are all of the one-half elliptic type, with bronze-bushed eyes at both ends. The rear springs are made sufficiently strong to take the torque and drive on the Hotchkiss principle. The spring brackets and shackles are of the special design incorporating a large oil reservoir, from which oil is fed to the bearings by means of a tube and wick system. The pins and bolts work in bronze bushings.

The hollow drive-shaft is equipped with three universal joints. The bearings are completely inclosed. A large annular bearing is placed in the center.

Both the hand and service brakes are internal expanding on the rear wheels. The frame is of pressed steel and of semi-flexible construction. It is heavily reinforced and braced at the rear to take care of all strains. The length of the frame back of the driver's seat is 118 inches and the over-all length of the chassis is 222 inches. The width is 71 inches.

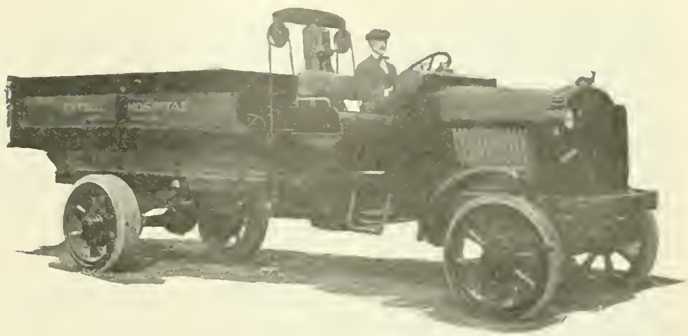
The steering gear is of Ross design. Steering is on the left and control in the center. Both hand and foot brakes are fitted with bar equalizers and rocker-shafts. The brake foot pedal, rocker-shafts and levers are fitted with graphite impregnated wood bushings that do not require oil or grease.

Pressed steel wheels of disk or web construction are fitted all around on both models. Both models are mounted with single solids. Pneumatics and dual rear solids are also equipped at the option of the owner.

Equipment includes a pressed steel running board, attached front fenders, front and rear electric lights, fully inclosed cab, tools, tool box and jack.

PRODUCTS HAULED BY TRUCKS

WASHINGTON, D. C., July 29—The Bureau of Animal Industry of the U. S. Department of Agriculture has recently estimated that in 1917 the amount of milk produced throughout the United States was valued at $1,692,277,000. These figures are based on an estimated production of 84,611,350,000 pounds of milk at an average price of $2 per hundredweight. This immense quantity of milk is used in various ways. For making butter 1,650,000,000 pounds are used; cheese, 420,000,000 pounds; condensed milk, 975,000,000 pounds, and ice cream, 210,000,000 pounds. Trucks are being used more and more to haul these products from the farm to the cities for consumption there.



New 3½-ton Denby model with cast steel wheels

New Denby 3½-Tonner Follows Closely the Design of the 5-Ton Model

DENBY SPECIFICATIONS

Capacity, tons	3½
Price	$4,100.00
Wheelbase, in.	170
Tires, front	36x5
Tires, rear	36x10
Bore, in.	4½
Stroke, in.	5½
N. A. C. C. hp.	32.40
Speed, r.p.m.	1050
Speed, m.p.h.	11½
Gear ratio in high gear	10 to 1
Final drive	Int.-gear

A 3½-TON internal-gear-driven model, following in construction the design of the 5-tonner, is being manufactured by the Denby Motor Truck Co., Detroit. This truck has been designed for heavy-duty work and is made up of heavy load-carrying parts. The engine is the same size as that used in the 5-ton model and the gearset is of the four-speed selective type as in the larger model. Denby trucks are also made in 1, 2 and 2½-ton capacities.

The four-cylinder Continental engine is mounted amidships. The cylinders are cast in pairs with the valves located at the left. The water is circulated by means of a centrifugal pump through a vertical finned-tube radiator. The radiator case is of cast iron. Fuel is fed by gravity from a tank under the seat to a Stromberg carbureter.

The Duplex governor is of the centrifugal type, being driven from the engine. Ignition is taken care of by a single high-tension Eisemann magneto with hand spark control. The Warner clutch is of the multiple dry-disc type with eighteen discs and faced with Raybestos. The four-speed Denby gearset is suspended at three points. The drive-shaft is equipped with Universal universal joints and the driving torque and propulsion are taken through the Detroit Steel Products half-elliptic springs.

The hand brakes are of the internal-expanding type while the service brakes are of the external-contracting type. The frame is made of pressed steel and is semi-flexible. The length of the frame back of the seat is 140 in. and the width is 34 in. The body allowance is 1600 lb. The distribution of the weight is 3050 lb. at the front and 3840 lb. at the rear. The road clearance is 13 inches and the turning radius is 30 ft. The regular body size is 13 ft. long and 6 ft. wide.

The new model is equipped with Dayton cast steel wheels as in the case of the 3- and 5-tonners. The spokes are hollow. The wheels are mounted with single solid tires all around. The front axle is of the Shuler type while the internal-gear-driven rear axle is of the Clark type.

The Ross steering gear is located on the left and gearshift and brake levers are mounted in the center. Equipment includes two side and rear oil lamps, front fenders, horn, and seat.

TRUCKS AND THE FARMER

NEW YORK CITY, July 29—The use of trucks on the farms is being advocated and practiced to a great extent, but there are still many farms where trucks have not yet been introduced. According to the 1910 Government census there were 6,361,502 farms in the United States covering 46.2 per cent of the entire area of the United States. In 1918 the average income of the farmers amounted to approximately $2,400. That would make an average income on all the farms in the United States of about $27,000,000,000. The farmer needs trucks for long-distance hauling as well as work around the neighborhood, as it nets him a saving in time and money. Farmers are aware of this, as proved by the estimate that more motor trucks were used on the farms in 1918 than in any other line of business, and that 34 per cent of the total number of trucks made during the year were bought by farmers. Motor trucks are being used more and more for the hauling of live stock. Farmers living near St. Louis save $13,760 each year in shrinkage alone by hauling their hogs by trucks to the stock yards.

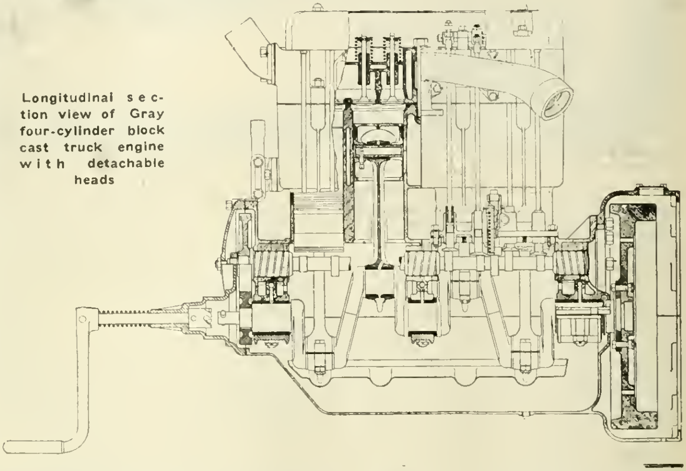
Accessibility and Hot Spot Device for Vaporizing of Fuel Feature New Gray Truck Engine

Hart Roller Bearing Has Staggered and Meshed Roller Arrangement—B & L Electric Primer—Atlantic Pneumatic Grease Gun Moves Grease by Compressed Air

A NEW four-cylinder block cast engine of interest to truck owners because of its accessibility, fuel vaporizing, efficiency and economy features is in production at the factory of the Gray Motor Co., Detroit. The bore is 3½ in. and the stroke 5 in. It is of the valve-in-head type. The cylinders are cast with the upper half of the crankcase. As the cylinder heads are separate from the cylinder block, it is possible to completely machine the compression spaces, and thus insure uniform compression in all cylinders. The piston displacement of this engine is 192.4 cu. in. and the S. A. E. horsepower rating is 19.6, while on the dynamometer the engine shows 34.6 hp. The engine complete with cast iron base and bell housing weighs 495 lb.

Both sets of valves are interchangeable, and in order to permit of making them of large sizes, the cylinders are counter-bored from the top end. The valves have carbon steel stems and cast iron heads, the latter of 2¼-in. outside diameter.

Oil is fed to the three main crankshaft bearings under pressure by means of a plunger pump operated from an eccentric on the camshaft. The plunger of this pump, instead of moving in a horizontal plane, has an up and down motion. In addition to supplying oil to the main crankshaft bearings, oil is delivered from this pump to the timing gears, and to the connecting-rod splash troughs. All other interior parts, including the camshaft bearings, pistons, connecting-rod bearings and cylinders, are lubricated by splash. Oil is drawn from the main oil base through a fine mesh screen. The base will hold 5 quarts of oil, and is provided with a positive dial indicator showing the oil level.


Longitudinal section view of Gray four-cylinder block cast truck engine with detachable heads

Provision is made for fitting a complete electrical equipment. A starting motor flange is provided on the detachable bell housing, which is of the No. 3 S. A. E. size. An ignition generator or plain lighting generator, a magneto or both can be mounted on the detachable magneto or generator bracket, and can be driven by a standard two-bearing magneto shaft and coupling.

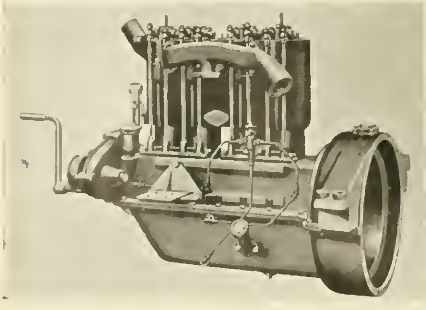
The engine is designed to take a standard 1-in. carbureter. Either a horizontal or a vertical outlet carbureter can be used, the vertical outlet type going on the left-hand side, and fastening to the inlet manifold, while the horizontal outlet type is placed on the right-hand side and connects directly to the cylinder block. With the horizontal type carbureter the intake passage leads through the space between cylinders Nos. 2 and 3.

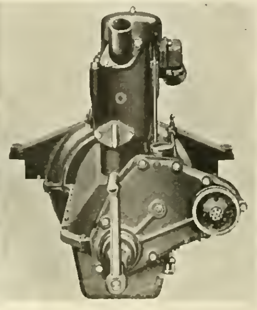
The flywheel is secured to an integral flange of the crankshaft by means of six heat-treated bolts. It is regularly furnished to accommodate standard clutches used in connection with the No. 3 S. A. E. bell housing.

The cooling system is designed for thermo-syphon circulation, and the water connections are made appropriately large, the inlet being 2 in. in diameter and the outlet 2¼ in. A malleable iron adjustable fan bracket is provided.

The cylinder bores are ground to size and the cylinders are offset from the crankshaft axis to reduce the mean side thrust of the pistons against the cylinder walls. Inlet and exhaust passages are cored in the cylinder head, and there are two hot spots which are claimed to insure thorough vaporization of the fuel and consequent complete combustion. A McKim gasket is placed between the cylinder block and head. The latter is held in place by means of heat-treated cap screws fitted with lock washers. The bottom half of the crankcase is made of cast iron.

The pistons are of conventional design, of cast iron, and are provided with three diagonally split expansion rings each. The connecting rods are I-section drop forgings and measure 9¼ in. between centers. The crankpin bearings are 1¾ in. in diameter and 2 in. long.


Left side of Gray engine, showing the accessible oil line on the outside of the crankcase


Front end of Gray engine. Note adjustable fan bracket

They are made of die cast babbitt. Bearing caps are held in position by nickel steel bolts with caste nuts and cotter pins.

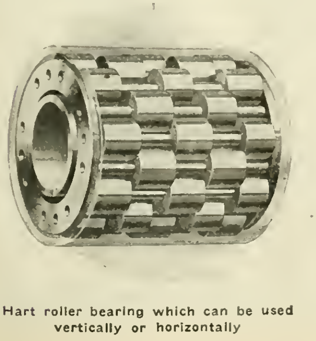
The crankshaft is made of carbon steel, heat treated and ground. It is supported in three die cast babbitt bushings, all 2 in. in diameter, and of the following lengths: (front to rear) 2¾ in., 2 in., 3⅜ in. The bearing caps are made of malleable iron, and are held to the cylinder block by means of heat treated studs fitted with castle nuts and cotter pins Laminated shims are placed between the caps and the upper half of the bearing.

A three-bearing camshaft is used, made from low carbon steel, carbonized and ground. This shaft is 1 1/16 in. in diameter and has its bearings directly on the cast iron of the cylinder block. For driving the camshaft, use is made of helical toothed gears, cut with 10-pitch teeth of ⅞-in. face. The pinion on the crankshaft and the magneto driving gear are of steel, while the gear on the camshaft is made of cast iron. The timing gears are inclosed by a malleable iron cover, the hub on which for the crankshaft is turned off cylindrically to form the third point of support for the engine. This cover is held in place rigidly by means of cap screws, lock washers and dowel pins.

Hart Roller Bearing

A NEW type of roller bearing with several staggered rows of rollers has been developed by the Hart Roller Bearing Co., East Orange, N. J. It is claimed that the distinctive feature of this roller bearing—its staggered and meshed roller arrangement—gives the bearing a greater load capacity than that of other bearings. This bearing is suited for use on trucks and for both light and heavy duty purposes, where radial bearing loads have to be supported.

The Hart bearing can be arranged for operation in either a horizontal or a vertical plane, without any tendency to dragging due to frictional resistance between the rollers and cage, it is claimed. The staggered arrangement of the rollers results in a reduction of the angular distance between adjacent lines of contact, which is claimed to reduce the strain to which the bearing rings are subjected. It also provides space for free circulation of oil or grease. The end of any roller which is lightly loaded is free to rotate independently of the heavily loaded end. The result is a differential movement between individual sections of a given roller.



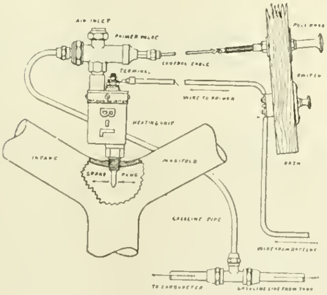
Hart roller bearing which can be used vertically or horizontally

The rollers are made of chrome-vanadium steel and are carefully heat-treated. All parts of the bearing are accurately machined and ground.

In the Hart bearing the rollers are staggered, and two different widths of rollers are used, arranged with the staggered end in assembly and meshed, so that the entire surfaces of the shaft and the outer casings are covered. The rollers are mounted on alignment shafts supported at the end by retainer rings, in which they revolve freely.

The design of the Hart bearing shown in the accompanying illustration incorporates a new idea in bearing construction, since it employs a mulit-unit bearing surface on parallel centers. It is made for radial loads only.

Atlantic pneumatic grease gun, operated by compressed air



B & L electric primer which gives an explosive mixture in about 10 seconds

B & L Electric Primer

AN electric primer, designed to give a hot, vaporized and explosive mixture in about 10 seconds regardless of weather conditions, is being manufactured by the Auto Distributing Co., Plainfield, N. J. This primer, styled the B & L, sells for $20.

The gasoline is vaporized in a small pipe by means of an electric heating coil which heats the pipe and vaporizes the liquid fuel. This then passes out of two holes in the bottom directly into the branch of the intake manifold. The device can be easily installed, the only operation necessary being the drilling and tapping of a hole in the manifold into which the device is screwed. The current taken is 15 amperes when the coil is cold, and this reduces to 5 amperes when the coil heats.

This primer can only be installed on trucks equipped with storage batteries. It is operated by an electric switch, connected to the dashboard. This switch is installed by drilling a ⅞-in. hole through the dash, near the electric switch. The wire is connected from the switch to the battery wire on the dash or some other convenient place in the electric wiring. The switch and the primer are then connected by the wire.

Atlantic Pneumatic Grease Gun

A GREASE gun, designed to move grease by compressed air from a tube, by simply pressing a button, is being manufactured by the Atlantic Motor & Supply Co., West Somerville, Mass. The price is $6.

The gun is in the form of a brass cylinder, 1 foot in length and 2 inches in diameter, holding 16 ounces of grease. It is operated by means of air pressure supplied by a tube connecting the gun with either the power or foot pump or with the spare tire or a compressed air system. All that is necessary to get the desired amount of grease is to press a button on the gun with the thumb of the hand holding the gun. By using this power gun the hard grease may be forced into joints with such force as to expel the old grease, leaving the new grease in its place. About 2 lb. air pressure is needed.

A small screw is supplied for use with the compressed air system or from pneumatic tires. This is removed when a power pump is used. A safety valve is in the plunger so when the gun is empty air will go through the gun and through the nozzle, preventing air from backing up and bursting the tire pump. A release hole in the gun lets the air out from behind the piston so grease will not be pushed out when the gun is idle.

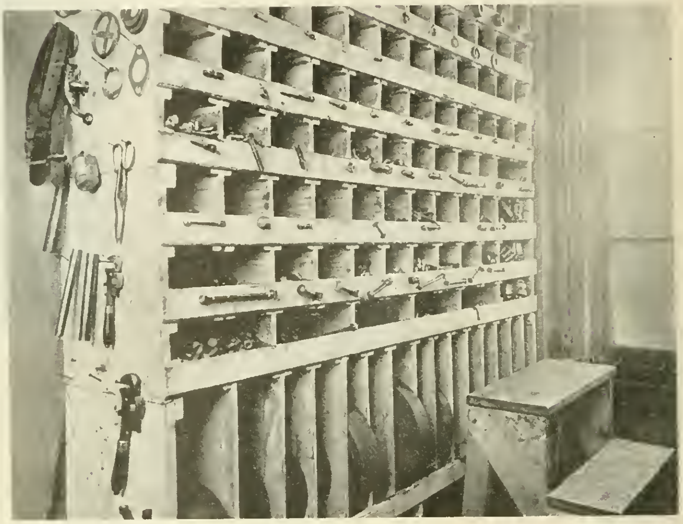
Good Maintenance Overcomes Poor Garage Layout

(*Continued from page 19*)

around the building, comes his first elementary work in engines and driving. A driver is judged by the running condition and appearance of his truck.

Though no fuel-economy schemes are tried, the gasoline consumption is watched closely. The company makes known to its drivers each month just what their particular truck has averaged in miles per gallon in gasoline consumption. These figures, together with oil-consumption averages, are typewritten and placed in a conspicuous place in the garage, where they stand as a silent challenge for the betterment of the next month's averages.

Supplementing the close watch kept on fuel consumption is that on tire mileages. Each month a separate record is made, showing exactly the number of miles on each tire made during the previous month. This record includes the date of purchase and gives the history of each tire to date. Due to the peculiar scheme of overhauling its trucks, three of the Kirkman trucks are idle at one time. As stated before, one is being overhauled and a second one is used as a spare truck. Still another is idle because of the company's policy of painting its trucks twice a year. All this means that twelve tires are idle. Therefore, in order to get proper adjustments on its tires, should they not come up to the guarantees, the foregoing record must be kept. Each tire is numbered. For instance, on the No. 5 truck, the right front tire is 51, the front left is 52, the right rear is 53, and the left 54. The tires on the No. 19 truck are respectively 191, 192, 193 and 194. As a result, should Nos. 5 and 19 trucks be idle for any of the above reasons, their tires are used for other trucks when needed. Therefore, it is a simple matter to note on the record sheet that such and such a truck has been mounted with either of these truck's tires and to note their mileages to date. The record also helps in selecting tires.



Little Time Wasted in Looking for Parts

This well-stocked parts room would be impracticable if its contents were not labeled as above. On the outside of each bin is mounted a sample of its contents. As a result, little time is wasted in going from one bin to the other to look for parts. All bolts, screws and other repair parts taken out during the day are noted by the foreman, who makes a report to the company, so as to keep tabs on purchases

Several devices that will be of interest to fleet owners have been built at the Kirkman garage. The oxy-acetylene tanks are carried on a four-wheeled stand made up for the most part of angle iron. The wooden floor sets in four pieces of angle iron, which are bolted together. Both the acetylene and oxygen tanks are kept from sliding off the stand by means of a guard rail on the floor and also by means of four upright pieces of angle iron bolted and connected at the top by four more pieces of angle iron to form a square guard in which the oxygen tank stands. The acetylene tank sets in another square guard, composed of four smaller pieces of angle iron bolted to a crosspiece on the larger stand. The front axle is swiveled and the stand is pulled.

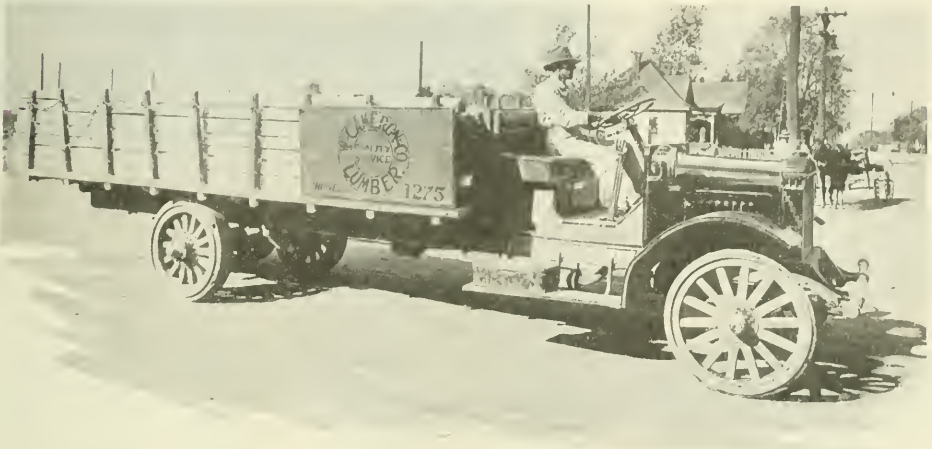
During the overhauling period the engines are conveyed to the machine shop on a four-wheeled swivel-castor truck. This consists of a base made up of 2 by 4s, and reinforced by eight angular pieces of iron, which are bolted to four uprights. These uprights support two cross beams to form a cradle for the engine. The cross beams are also bolted to the supporting columns by means of four more pieces of angular iron.

In order to save room on the first floor, the oil tanks were placed on the floor above; and in order to save time at night, when the trucks were being filled with oil, it was arranged so that the men would not have to go to the second floor every time they refilled their oil cans. This was accomplished by running two pipes from the tanks on the second floor down to the first floor and equipping them with faucets. In order to keep a record of all oil used, the company has deemed it wise to lock the oil stand, which is bolted to the wall, when not being used during the day. This stand is made up entirely of galvanized tin, and consists of a hinged cover which closes over the faucets and the floor of the stand, as well as the sides. The front end of the stand is equipped with a protecting flare piece to prevent oil cans falling off the stand and also to hold the lock.

All waste is kept in two specially constructed tin boxes fastened to the wall. One box is for clean waste and the other is for dirty waste. Both are equipped with hinged covers. A feature of the box for spoiled waste is the fact that in cleaning it out little time or effort is needed. This is accomplished by means of a sliding piece which forms the bottom of the box. This piece is equipped with a handle, which facilitates the sliding out of the piece. After it is pulled out the dirty waste is emptied by gravity into another receptacle and carted away.

Trucks Enable Retail Lumber Merchant to Increase Sales Area Sixteen Times

Had to Buy Fleet of Fifteen Trucks to Get Business Because Delivery Was Determining Factor in Getting Orders—Horses for Short Haul Work



One of the 2-ton Service trucks which has given exceptionally good service in handling retail deliveries of lumber in 24-foot lengths. It has a wheelbase of 16 feet or 192 inches. The body is fitted with removable side stakes for side loading and unloading

THE war undoubtedly did more for the development of motor truck transportation in the great Southwest than any other one factor. Of course the work of the truck was most spectacular in the oil-well district, as told previously in THE COMMERCIAL VEHICLE. There the trucks were operated over the wildest kind of territory, literally jumping from rock to rock, in hauling all forms of well-drilling machinery required as a result of the big oil boom due to the great amount of gasoline consumed by all forms of our automotive war equipment.

The development of the trucks in ordinary lines of business was just as phenomenal, although not so spectacular. Take, for example, the case of the Cameron Lumber Co. of Ft. Worth, Tex. In 1917 that company owned five double teams, or ten horses, and no motor trucks. Late in the Fall of 1918 it operated fifteen motor trucks without replacing any of the horse equipment.

Trucks Satisfy

These trucks proved so satisfactory that the concern states that it could not get business unless it had trucks. The location of Camp Bowie, 3 miles out of Ft. Worth, and of Camp Hicks, 18 miles away, started a great lumber boom in Ft. Worth, the like of which had never been known before. Practically all of the lumber used in the construction of the buildings at those two camps was bought in Ft. Worth and carried over the roads from that city to the camp sites by means of motor trucks. The Cameron company, in fact, furnished almost three-quarters of all the lumber used at the two camps. It would never have been able to secure this business had it not owned motor trucks. While horses might have hauled to Camp Bowie, only 3 miles away, the use of animals in making deliveries to Camp Hicks, 18 miles away, was out of the question.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

Now that the war is over, the many advantages of motor transportation learned by the Cameron company during the two years of our active participation in the war are being put to good effect during these days of reconstruction.

Three Yards with Horses

With horse wagons the company found it necessary to maintain three different yards, each serving a territory within about a 5-mile radius. Due to the limited distance-covering ability of the horse, these three yards were found most economical. When trucks were installed much of the value of the three yards from that standpoint was lost, due to the fact that all of the yards were within the city limits and that the trucks could deliver with equal facility in territory which formerly belonged exclusively to one of the yards.

Nevertheless, trucks were assigned to each of the yards and, as a general rule, operated from that yard unless called away to handle rush deliveries on a big order consisting of lumber from one yard but which the trucks from that yard could not handle alone.

This set up somewhat unusual conditions of maintenance in that the trucks assigned to each yard were garaged and maintained at the yard. It was soon found, however, that while this plan worked out satisfactorily in making minor repairs and adjustments, it was not economical when major repair work had to be done. As a result, one first-class mechanic was provided with a temporary shop at the main city yard to which trucks having major work to be done on them were brought.

Trucks Assigned to Yards

The city yard is the most important of the three and as a result has nine of the fifteen trucks assigned to it. Three trucks are assigned to each of the north and south side yards.

Due to the necessity for a quick expansion in the delivery equipment of practically all of the lumber companies' work, several makes of trucks were included in the delivery equipment of practically every concern. There are about thirteen retail lumber companies in Ft. Worth and of these every one which is still in business is now employing trucks. Very few of the fleets employed in the lumber delivery import work are of one make of truck, because the need during the building of the camps was for truck equipment first and economical truck equipment second.

The Fleet Make-up

These conditions held true in regard to the Cameron company, for its fleet is made up of Republics, Services, G. M. C.s and Seldens. The nine trucks assigned to the city yard include four Republics, three of 2-ton capacity and one 3½-tonner; two Services, one of 1-ton capacity and one long wheelbase 2-tonner; two G. M. C.s, both of long wheelbase length, one of 1½-ton capacity and one 3½-tonner, and one 3½-ton Selden. At the two other yards the six trucks employed include four 2-ton G. M. C.s, one 3½-ton G. M. C. and one 1½-ton Republic.

Before these conventional trucks were purchased the company tried out two Ford chain-driven attachments, but found that these wore out excessively fast under the hard service. As a result, no more converted vehicles were employed.

One of the 2-ton Republics with a long wheelbase which makes it usable for carrying 24-foot lengths of lumber or building materials such as lime, cement, etc.

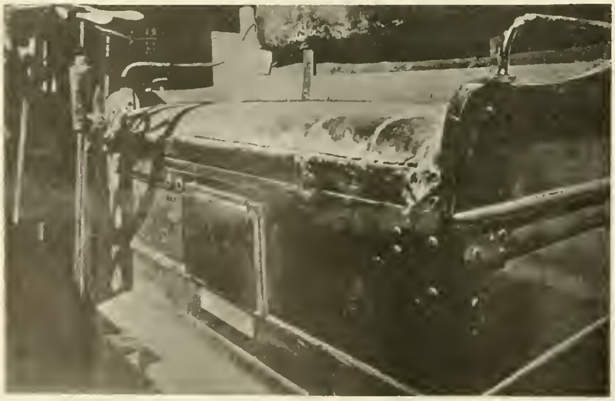
The Cameron company has found that in the average delivery work in the lumber industry two sizes of trucks are desirable. These include a 2-tonner with a long wheelbase and a 3½-tonner made up of a shortened wheelbase tractor and a pole semi-trailer. As most of the lumber companies, including the Cameron concern, also deal in building supplies, such as cement, lime, roofing and building hardware, the 2-ton trucks may also be used for that work.

Two Truck Sizes Desirable

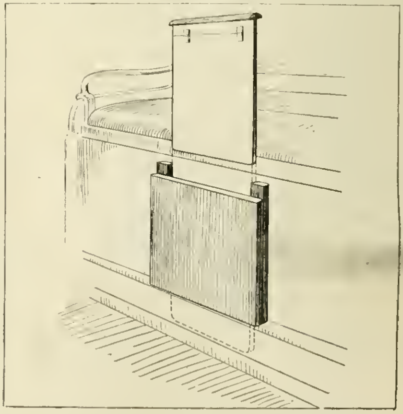
Where small loads are to be carried, the 2-ton truck is preferable to the 3½-ton tractor-trailer unit, since it is more easily maneuvered. In the 2-ton class the Service truck has given a very good account of itself. That size as used by the Cameron company has a wheelbase of 16 ft., or 192 in., which is considered just the right length to carry 24-ft. lengths of lumber. The body is fitted with removable side stakes held together at the top by means of individual chains between consecutive stakes. The side signboard panels, which are held in place on the platform by means of the first three stakes on either side directly in back of the driver's seat, are also removable so that when necessary side loading instead of rear-end loading may be carried on.

For longer lengths of lumber, from 18 ft. up to a maximum of 30 ft., the pole trailer is more desirable. These vehicles, however, were found to give the best service when they were loaded to capacity with one order instead of several small ones. When only one order was carried, it was possible to pull out the load from the rear, while this could not be done if a mixed load was carried and had to be delivered piecemeal at several locations.

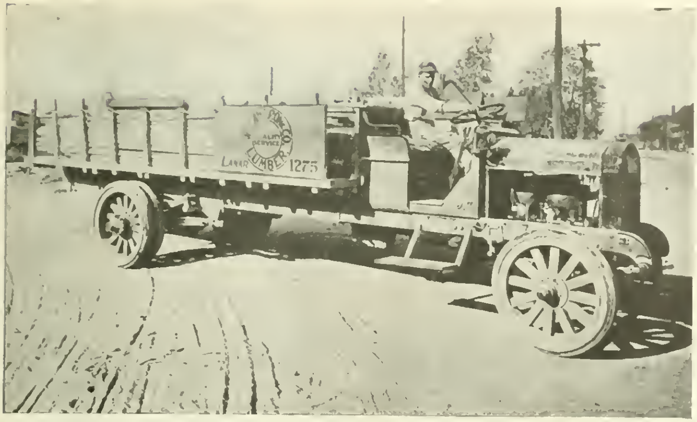
The same length of body is used on the 2-ton trucks as on the 3½-tonners, those on the larger units carrying the same maximum lengths of lumber but in larger units or orders. The 3½-ton trucks deliver the larger loads more economically than do the 2-tonners, since they are



The novel book holder as attached to the front seat riser. The aluminum holder is shown in place. The wide hinge end prevents water from getting into the slips inside the holder



Sketch of the wood pocket, showing how it is made and how the holder is fitted into it



A Service long-wheelbase 2-tonner, showing the type of side stakes used and how they are held in place by chains. The signboard panel is also removable to permit side loading and unloading

sometimes overloaded to carry 4 tons and thus deliver in one load the same amount of lumber that would require two trips by any of the 2-tonners.

Radius Increased Sixteen Times

All of the company's trucks deliver within a maximum radius of about 20 miles, as compared with a delivery radius by horse wagon of only 5 miles. As the area of a circle varies with the square of the radius, it is thus seen that the use of trucks by the Cameron company has increased its sales area in the ratio of 400 to 25, or approximately sixteen times. The results of this great business expansion, which has been due exclusively to the employment of trucks instead of horses, are shown by the fact that during 1918 the company did 100 per cent more business than it did in the previous year. Of course, this large business expansion was due primarily to the location of the army establishments in close proximity with Ft. Worth, yet none of the business could have been handled by private individuals unless they had employed trucks.

The Cameron company found that white drivers were preferable to colored ones, since the former were more intelligent than the latter and as a result took a much greater interest in their vehicles. During 1918 the drivers were paid somewhere between $16.50 and $21 a week and no helpers were used.

One Truck Worth Three Teams

Although the Cameron company kept no accurate records of the cost of operation of its trucks, it found by experience that one 3½-ton truck would deliver the same amount of goods in a day as three double teams of horses. What cost figures were available showed that the 2-ton truck averaged about $40 a month for gasoline and oil and that the 3½-tonners cost about $52 a month for the same material. As no mileage records were kept, these figures were, of course, robbed of much of their usefulness as a means for other truck owners in the same territory to judge of comparative fuel and oil consumption. The Cameron company does not employ any helpers on any of its trucks, pointing out that they are unnecessary in a great majority of cases since laborers are generally available on most every job to assist in unloading, so that the truck is not held for undue times during such periods.

One novel scheme evolved by the Cameron company is a carrier for the driver's order or receipt book. This book is an aluminum affair with a hinge cover. The order slips, which contain the name and address of the purchaser and the amount of the lumber to be delivered on the order, are held in place between the hinge cover and the aluminum back of the book. The back serves as a rest for the customer to sign for the goods when received, while the hinged cover prevents the orders from being torn or covered with grease from the driver's hands after each slip has been receipted.

The Order Book Carrier

At first the book used to be carried under the cushion on the driver's seat, but this did not prove entirely satisfactory in that the driver had to remove the cushion each time a delivery was made. As a result, one of the drivers evolved a simple holder, shown by illustration and sketch at the bottom of the opposite page. The device consists of two vertical strips of wood nailed to the front seat riser. A thin board is nailed to the two vertical strips and provides a sort of pocket into which the book is deposited with the hinged end uppermost. The thin board between the two strips serves as a protection for the book to prevent it being kicked by the driver's heels. Placing the book open end down in the pocket prevents water from getting at the pages when it rains, even though the truck is not provided with a driver's cab.

IOWA TRANSPORT DAY

DES MOINES, IOWA, July 24—Iowa is to have a big Motor Transport and Good Roads day at the state fair this year. The state fair board has named Friday, Aug. 29, for the event.

The Des Moines Motor Truck Assn. is taking the lead in promoting the event and has named a committee of which J. M. Ombler, of the Firestone Tire Co.'s Ship-by-Truck Bureau, is chairman to engineer the day.

Trucks Haul Cantaloupes When Horses Fail, Due to Severe Service

RESIDENTS of eastern cities who are accustomed to enjoy Imperial Valley cantaloupes at breakfast should pay tribute to the motor truck as without this transportation medium melon raising and shipping would be unsuccessful in that section of the United States which has outstripped all others in production. As soon as an Imperial Valley melon grower begins to cultivate the fields for planting he makes arrangement for delivery and this means he contracts with a motor truck owner to do his hauling. Melons have to be moved on time or their market value is lost and conditions in the valley are such that only trucks can meet the needs.

At Brawley, the heart of the melon district, on an average day in the season, 200 freight cars loaded with cantaloupes are started on their way eastward. There usually are 360 crates in a carload and each crate weighs 70 pounds. This means that 5,040,000 pounds of cantaloupes are moved daily. This amounts to 2520 tons.

It usually is figured that a two-horse team can haul a 2-ton load of melons and on the average make two 4-mile round trips daily. This allows for loading and unloading time. To move an average day's supply would require 1260 loads hauled by teams and two loads a day would be the work of 630 teams, a number impossible to obtain. Trucks of various sizes are in use and because of the need for speed all are subjected to overloads so that the 2-ton model usually transports approximately 3½ tons of melons.

Climatic conditions in the valley are such that horses could not survive such intensive work. The trucks have to go right into the fields and fight their way through sand so deep that not infrequently they sink half-way to the hub. Roads are very poor in some sections of the valley and in addition the heat is intense. Water is very valuable to growers, and water drunk daily by 2000 horses would irrigate a good-sized cantaloupe field.

Playing Safe with Fire

IT is a good thing for motor truck fleet owners to know that they can reduce the cost of their vehicle fire insurance by 15 per cent if the trucks are equipped with an approved form of fire extinguisher. Because of the higher premium rate on motor trucks as compared with that for passenger cars, the cost of the fire extinguisher for the truck is much less than the reduction in the cost of the insurance. In other words, it pays a motor truck owner to buy and install an extinguisher because he actually saves money on his insurance, even after paying for the extinguisher.

The next step to be considered, once the decision has been made to install an extinguisher, is to determine just what kind of a device to select. Because fire extinguishers will actually save fleet owners money, it is wrong for them to consider such devices as playthings or ornaments. However, this attitude among fleet owners has grown up partly because of the manner in which such extinguishers have been attached. In some cases where fires have occurred on trucks with extinguishers, the fire got too much of a headway for the extinguisher to put it out because the device was attached to the truck so securely to prevent its rattling or dropping off that, when the crucial moment came, valuable minutes were wasted in trying to solve the riddle of its removal.

There is undoubtedly a wide field for improvement in fire extinguishers to be fitted on motor trucks. When this improvement is made, it will undoubtedly help to overcome the attitude that extinguishers as a class are playthings and ornaments.

Statistics have shown that almost 90 per cent of the fires on motor trucks have started under the engine hood. Notwithstanding this evidence, most of the extinguishers in use are mounted in the driver's cab. This means that the driver, after he is certain that there is a fire under the hood, must first unlock the extinguisher and then get down on the ground and perhaps burn his fingers in lifting the hood before the extinguisher can be brought into play. Thus valuable minutes are lost, and in one instance which the writer recently witnessed it was necessary to call out the fire department, including several fire engines, two hook and ladders and one or more chemical wagons, to put out a small blaze under the hood which might have eventually burned up the driver's cab, truck body and the load carried.

Because 90 per cent of the truck fires begin under the hood due to backfiring in the carbureter, short-circuiting of ignition wiring or the like, it seems that the first step in the improvement of our present-day truck fire extinguishers must be to place the extinguishers directly under the top of the hood and design the apparatus so that it will automatically expel its fire-quenching substance as soon as the heat under the hood becomes so high as to indicate the presence of a fire. In this respect, the improved extinguisher must operate much like the automatic water-sprinkler systems now almost universally installed in our loft and business buildings.

The fire extinguisher designer must then go one step further and support the device under the hood in such a manner that it can be easily and quickly removed by the driver should a fire break out in the cab due to short-circuited wiring or in the body due to a disarrangement of the muffler or hot exhaust pipe.

In this connection, it is encouraging to learn that one accessory manufacturer has already been working exactly along these lines and it is to be hoped that his efforts will be crowned with a success that is sure to prove a boon to the motor truck owner.

Going a step further, the fleet owner should pay more attention to the fire risk in his garage. Where gasoline fires are liable to occur, water simply serves to increase rather than decrease the blaze. Sand as an extinguisher has many advantages, but likewise many disadvantages, since the pails are occasionally knocked off their supports and sometimes not immediately refilled or the sand becomes impregnated with dust and dirt when not renewed for long periods. Under these conditions, the truck fleet owner will welcome some improved form of automatic fire extinguisher for garage use which will be both certain and cheap.

The Readers' Forum

A BUSINESS-GETTING BOOKLET

Progressive Transfer Co. Distributes Pamphlet to Advertise Its Work

To the Editor, COMMERCIAL VEHICLE:

I was much interested in your article entitled "Problems Which the Fleet Owner Doing Overland Haulage Work Must Solve" appearing on pages 5 to 7 and on pages 30 and 31 of THE COMMERCIAL VEHICLE for July 1, 1919. I was particularly interested in the illustration of the monthly booklet issued by the Progressive Transfer Co., St. Louis, Mo., and shown on page 30 of your publication.

Will you please tell me whether the Progressive Transfer Co. considered that the publication of such a book has produced results. I should also like to know how many copies of the book were printed each issue; whether one or two color type was used and how much the book cost to get out?

I was very much interested in the statement on page 6 that the Progressive Transfer Co. carries complete insurance on its trucks and the loads carried in addition to making it mandatory for the drivers to take out stock in the company. Will you please tell me the amount of the insurance carried, by whom it is written and the cost of the yearly premium?—K. F., New York City.

The Progressive Transfer Co. has considered its booklet a very good means of acquainting prospective shippers with the service it has to offer. The first two books were published about two months apart and 1,000 copies of each were printed at a cost in each instance of $61. The booklet has eight pages 4 by 6 in. with a two-color red and black cover with the trade mark of the company as a headpiece. The same trade mark is used on the company's letter heads, their bills and even on the trucks themselves. The copy or reading matter in the book was prepared by Martin A. Hecht, vice-president and general manager of the company.

The insurance carried on the goods moved in the trucks amounted to $3,000 for each truck. The policy was written by A. A. Cervantes, La Salle Bldg., St. Louis, Mo., and the yearly premium was $75 a year.

The insurance covers the goods while in transit on the truck or after they have been receipted for by the Progressive Transfer Co. and held in the company's dock or pick-up station until loaded onto the trucks.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

MAKERS OF HYDRAULIC PRESSES

Five Second-Hand Machinery Companies Operating in New York City

To the Editor, COMMERCIAL VEHICLE:

Can you give us the addresses of any places where we can obtain second-hand hydraulic presses for applying and removing solid tires?—M. H. HOROWITZ, B. F. Goodrich Rubber Co., New York City.

Second-hand tire presses, such as you inquire about, are very scarce. Our records show but three companies which manufacture such devices. They may be able to advise you where you can secure second-hand presses. These companies are:

Southwark Foundry Co., Philadelphia.

Wellman-Seaver-Morgan Co., Akron, Ohio.

Excelsior Tool & Machine Co., E. St. Louis, Mo.

If none of these companies can give you this information we feel sure that you will be able to get it from one of the following list of second-hand machinery companies which are located in New York City:

Graves Machinery Exchange, 50 Church Street.

J. J. McCabe, 149 Broadway.

MacGovern & Co., 114 Liberty Street.

New York Machinery Exchange, 50 Church Street.

F. H. Niles & Company, 233 Broadway.

BAXTER VACUUM STREET CLEANER

Built in Los Angeles and Mounted on a Moreland Truck

To the Editor, COMMERCIAL VEHICLE:

Will you kindly advise us whether your file shows the names of any vacuum street cleaner manufacturers.—GEORGE J. LAUER, Dearborn Truck Co., Chicago, Ill.

The only vacuum street cleaner which we know of is manufactured by W. E. Baxter, Los Angeles, Cal., and is mounted on a Moreland truck. This outfit was described in detail in THE COMMERCIAL VEHICLE of May 15, 1917, page 23.

NO BEST MAKE OF ROAD TRUCKS

When Making Choice Capacity Must Be Taken Into Consideration

To the Editor, COMMERCIAL VEHICLE:

Please furnish me with the names and addresses of the best makes of trucks, trailers and equipment for moving gravel and top soil for road work.—ISHAM J. DORSEY, Opelika, Ala.

There are no best makes of trucks, trailers and equipment for moving gravel and top soil for road work. We do not know any of the conditions under which you expect to operate your trucks so that we cannot advise you as to the use of any particular make of truck or trailer.

In THE COMMERCIAL VEHICLE for Nov. 1, 1918, you will find complete specifications of all the motor trucks offered on the 1919 market. You will also find in the same issue a tabulation of the same trucks arranged according to capacity. If you know the capacity of truck which you desire to use, you can turn to the table as giving the trucks made of that capacity and determine the names of them. The same issue also contains a complete directory of all the truck makers.

The following is a list of makers of heavy four-wheeled trailers or semi-trailers suitable for hauling road-building material:

Arcadia Trailer Corp., Newark, N. Y.
Automatic Trailer Co., Lapeer, Mich.
Biggam Trailer Corp., Corunna, Mich.
J. M. Case Trailer Co., Grand Rapids, Mich.
Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Defiance Carriage Co., Defiance, Ohio.
Detroit Trailer Co., Detroit, Mich.
Fruehauf Trailer Co., Detroit, Mich.
Glen Wagon & Car Corp., Cortland, N. Y.
Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kansas.
Highway Trailer Co., Edgerton, Wis.
King Trailer Co., Ann Arbor, Mich.
Kleiber & Co., San Francisco, Cal.
Knox Motors Co., Springfield, Mass.
Lapeer Tractor Truck Co., Lapeer, Mich.
Lee Loader & Body Co., Chicago, Ill.
Los Angeles Trailer Co., Los Angeles, Cal.
Martin Rocking Fifth Wheel Co., Springfield, Mass.
Martin Truck & Body Corp., York, Pa.
Miami Trailer Co., Troy, Ohio.
Mifflinburg Body Co., Mifflinburg, Pa.
Ohio Trailer Co., Cleveland, Ohio.
Parry Mfg. Co., Indianapolis, Ind.
Jacob Press Sons, Chicago, Ill.
Ralston Iron Works, San Francisco, Cal.
Samson Trailer Corp., Grand Rapids, Mich.
Schubert Wagon Co., Oneida, N. Y.
Shadbolt Mfg. Co., Brooklyn, N. Y.
Trailmobile Co., Cincinnati, Ohio.
Troy Wagon Works Co., Troy, Ohio.
Variety Mfg. Co., Chicago, Ill.
Warner Mfg. Co., Beloit, Wis.
Watson Wagon Co., Canastota, N. Y.
Western Trailer Co., Kansas City, Mo.

OHIO LAW AFFECTING TIRE WIDTH

Total Tire Width Not That Portion in Contact With Road Is Measured

To the Editor, COMMERCIAL VEHICLE:

In reading the Jan. 1, 1919, issue of THE COMMERCIAL VEHICLE we noticed on pages 26 and 27 where the Highway Industries Assn. recommended a maximum carrying capacity of motor trucks at 28,000 lb., including the weight of the vehicle, its body and load. The same association also recommended a maximum wheel load of 800 lb. per inch of tire width.

Will you please tell us where and how this tire width is to be measured. A month or more ago we had a case come up where a truck driver was arrested in Lorain County, Ohio, for not having sufficient tires to carry a gross load of 23,890 lb. The officials maintained that the width of contact with the road and not the width of the base of the tire should be used as the basis of figuring. Below we are giving you the full details of the case and will appreciate any assistance which you may be able to give us.

A motor truck was equipped with 36 x 5 single tires in front; a left rear wheel with 40 x 7 duals and right rear wheel with 36 x 6 duals. The truck had a gross load of 23,890 lb. The truck owner was arrested for carrying too large a load for the tires fitted. The truck owner argued that his tires were sufficiently wide. The basis of his argument was that he had a total width of tires of 36 in. made up of 2 x 5 equals 10 for the two front tires and 2 x 7 equals 14 plus 2 x 6 equals 12 for the rear tires, giving a total of 36 in. tire width. Thirty-six inches of tire width multiplied by 800 lb. gives 28,800 lb. allowable load. The State Law limits the load to 12 tons or 24,000 lb., whereas the actual load was under 12 tons. The officials argued that the actual contact width of the tire must be taken instead of the total width. Under this argument they gave the 26 x 5 tire only 4⅛ in. of bearing width; the 40 x 7 tire, 5¾ in.; the inside 36 x 6 rear tire 4¼ in. and the outside 3⅝ in. under the load carried. These widths give a total of 27⅝ in. of contact on the road surface. Multiplying this contact by 800 lb. gives 22,100 lb. or, according to the officials, an under tire equipment of the difference between 22,100 lb. and the actual load of 23,890 lb. or 1790 lb.

In addition to the above are three more similar cases.

On Nov. 19, 1918, Brown & Bliss, 3029 West 17th St., Cleveland, operating two 5-ton White trucks driven by Paul Bliss and Herman Niece, were arrested at the corner of Lorain and LaGrange roads, Lorain County, by Deputy Sheriffs McCray and Crowley. Fine paid for both trucks was $28.20 and payments were made $20 on Nov. 19 and $8.20 on Nov. 20, to G. W. Chamberlain, Justice of the Peace, of Elyria, Ohio.

On Dec 4, 1918, Brown & Bliss operating two 5-ton Whites, driven by Fred Bliss and W. J. Brown, arrested in the city of Elyria, Ohio, by Sheriff Whitney, also Deputies Crowley and McCray. Case was tried and the drivers found guilty and fined $35.90 for one truck and $30.10 for the other truck, which fines were paid.

On May 24, 1919, Abbington Cartage Co., 1109 Central Ave., operating two 3½-ton Armleder trucks driven by Harlan Kilner and Lewis Gaeton, arrested in Elyria, Ohio, by Sheriff Backues and Deputy Crowley and Commissioner Ellenberger, fined $60.60, which was paid to Justice of the Peace Chamberlain. This company now has engaged Attorney W. B. Wood, located in the Williamson Bldg., this city (Cleveland).

Will you please tell us what can be done to prevent future arrests of this kind?—GUSTAV SCHAEFER WAGON CO., Cleveland, Ohio.

All of the arrests noted above are based upon the interpretation of the law by local officials and we believe that if the cases were taken to a higher court, the facts would not be sustained and quite probably the cases would be dismissed

This seems to be borne out by the Road Laws of Ohio, 1917 edition. Section 7246 of Chapter XI of those road laws limits the weight of traction engine, trailer, wagon, truck, steam roller, motor truck or other power vehicle to 12 tons, including the weight of vehicle body and load. Section 7248 of the same law states that "Vehicles having tires of rubber or other similar substance may carry a load of 800 pounds for each inch of total width of tire surface on all wheels." It is thus evident that the law does not sustain the Ohio officials in measuring the tire width as the actual width of the tire in contact with the road instead of the total width of the tire at the base.

We would advise truck owners in Ohio who have been subject to such arrests to communicate with Mr. T. R. Dahl, Chairman of the Motor Vehicle Committee of the Ohio Good Roads Federation, 1010 Hartman Bldg., Columbus, Ohio. Mr. Dahl is familiar with the cases mentioned and at the last meeting of the Motor Vehicle Committee of the Federation the subject of a change in the language of the statute mentioned above was discussed and it was determined to work out a new and proper language to be placed before the General Assembly during the coming fall or in January, 1920, at which time other motor vehicle legislation concerning the classification of vehicles for taxation will be considered by the General Assembly.

MAKES OF CONVERTIBLE BODIES

Eighteen Companies Build All-Purpose Bodies for Trucks

To the Editor, COMMERCIAL VEHICLE:

Can you furnish us a list of concerns which make convertible bodies similar to the three-in-one and eight-in-one types?—ARTHUR C. WOLLENSACK, Sterling Motor Truck Co., Milwaukee, Wis.

Below is a list of companies which manufacture bodies that can be converted for several uses:

American Wagon Co., Dixon, Ill.

Auto Truck Steel Body Co., Chicago, Ill.

Commercial Auto Body Co., St. Louis, Mo.

Ell-Kay Mfg. Co., Kansas City, Mo.

Federal Motor Truck Co., Detroit, Mich.

Heil Co., Milwaukee, Wis.

Wm. G. Hesse & Son Mfg. Co., Leavenworth, Kan.

Highland Body Mfg. Co., Cincinnati, Ohio.

Horizontal Hydraulic Hoist Co., Detroit, Mich.

Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.

Luverne Automobile Co., Luverne, Minn.

Martin Truck & Body Corp., York, Pa.

Matthews Carriage & Auto Co., Inc., Des Moines, Iowa.

Metropolitan Auto & Carriage Co., Bridgeport, Conn.

Omaha Body Co., Omaha, Neb.

Republic Motor Truck Co., Alma, Mich.

Simplex Mfg. Co., Conneautville, Pa.

Thomas Wright Co., Jersey City, N. J.

STANDING OF MONARCH GOVERNOR

Second Largest Builder of Governors Used on American Trucks

To the Editor, COMMERCIAL VEHICLE:

We have been requested by one of our connections in Belgium to obtain particulars of the Monarch governor for truck chassis. We should like to know of some of the particulars of the device and get some information as to its reliability and efficiency.—J. A. DEAKIN, E. Isbecque & Co., New York City.

The Monarch governor is made by the Monarch Governor Co., Detroit, Mich. It is of the suction type and has given good satisfaction.

We might add that a table giving the makes of governors used on the 1910 gasoline trucks was published on page 16 of THE COMMERCIAL VEHICLE for November 15, 1918, which showed that the Monarch governor was the second most popular governor employed on American trucks. It was only exceeded in popularity by the Pierce governor, made by the Pierce Governor Co., Anderson, Ind., and differing from the Monarch suction type in that it is of the centrifugal type wherein weights are employed to govern the engine speed instead of the suction of the intake gas. The data regarding the use of the Monarch and the Pierce governors as well as the other types employed are as follows:

MAKES OF GOVERNORS USED IN 1919 GASOLINE TRUCKS

Governor Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Duplex Engine Governor Co., Brooklyn, N. Y.	19	52	10.7
McCanna (Master trucks)	1	4	8
Monarch Governor Co., Detroit	22	63	13.0
Pierce Governor Co., Anderson, Ind.	56	146	29.9
Simplex, Duplex Engine-Governor Co., Inc., Brooklyn, N. Y.	8	25	5.1
Waukesha Motor Co., Waukesha, Wis.	18	40	8.2
	124	330	
Listed as own make	13	55	11.1
Not listed or doubtful	61	104	21.2
	198	489	100.0

The figures are based on specifications published in THE COMMERCIAL VEHICLE for November 1, 1918, from information furnished by each truck maker. The original signed specification sheets are on file in THE COMMERCIAL VEHICLE office.

Chicago's Trucks Show Increase of 124%

Gain for 4-Year Period—One-Tonners Multiply Fastest

CHICAGO, July 24.—Figures furnished by City Collector Fosberg of Chicago to the Trailer Manufacturers' Assn. of America, from the records of licenses issued for vehicles under the wheel tax law in that city, show that during the last four fiscal years ended April 30, 1919, the number of horse-drawn vehicles licensed decreased from 49,582 to 32,489, or 34¼ per cent, while the motor trucks licensed increased from 7384 to 16,061, or 124 per cent, in the same period.

The highest percentage of increase during the 4 years was in motor trucks, buses and coaches of more than 1-ton capacity, which increased 164 per cent, and the next largest increase was in trucks of under 1-ton capacity, which increased 104.4 per cent in number. On the other hand, the greatest decrease in horse-drawn vehicles was in one and two-horse buggies, amounting to about 71 and 80 per cent respectively.

The following table gives the record of licensed vehicles for the 4 years:

VEHICLE LICENSES ISSUED BY THE CITY OF CHICAGO

Class of Vehicle	May 1 to April 30 1915 1916	1916 1917	1917 1918	1918 1919	Per Cent Decrease During 4 Yrs.
1-horse wagon	34 357	31,867	27,098	22,420	34.4
1-horse buggy	1,233	892	529	358	70.9
2-horse wagon	13,415	13,292	11,647	9,429	29.7
2-horse buggy	359	196	103	71	80.2
3-horse wagon	207	212	210	203	1.9
4-horse wagon	11	11	9	8	27.2
Total	49,582	46,470	39,596	32,489	34.25
					Per Cent Increase
Motor trucks, capacity 1 ton or less	4,867	7.738	9,412	9,953	104.4
Motor trucks, bus or coach, capacity more than 1 ton	2,517	3,792	5,423	6,648	164.1
Total	7,384	11,530	14,835	16,601	

NEW MASSACHUSETTS FEES

BOSTON, July 19—After a fight lasting practically 6 months, or since the Massachusetts legislature convened, the fees on motor trucks have been kept within reasonable limits, or $10 per ton. But it was not until the last gun was fired that the battle ended. And when it is remembered that the present increase is from 100 to about 300 per cent, while the advocates of the new law were after a 1200 to 1300 per cent increase, some idea of what the fight meant may be imagined.

The Highway Commission presented to the legislature in January a recommendation calling for an increase in fees which began with $15 for 1 ton, $30 for 1½ tons, $40 for 2 tons, $50 for 2½ tons, $75 for 3 tons, $100 for 4 tons, $150 for 4½ tons, $200 for 5 tons, and $200 for each additional ton above 5. With the present law calling for $5 for 1 ton and $3 for each additional ton, such a recommendation seemed preposterous. Therefore it was planned to make a fight against it.

The only hitch came when it was found that the bill was not worded so that the fees would be effective Jan. 1 next, which is always the case with new taxes on motor vehicles, that being the day when all registrations expire. It now automatically goes into effect on Oct. 7. This will mean confusion, as there is some doubt about whether or not this law supersedes the present one, which would mean reregistration for all trucks in the fall. So a change will be requested. After Oct. 1 vehicles get half rates, and on Oct. 6 a 5-ton truck would be registered for $8.50, while on Oct. 7 it would pay nearly three times the amount, or $25.

The legislature passed a bill making the length and width of the vehicles subject to legislation. Now the width of trucks are limited to 96 in. The length is 28 ft., but with trailers it is 65 ft. overall, but special permits may be granted for a trip with a longer length. There is no limit on the height of vehicles and load. This was to be 16 ft., but it seems there were a couple of box manufacturers in the legislature and they were able to have stricken from the bill any limitations because some of their loads, though light, go above that height. Another bill just passed calls for mirrors on trucks and taxicabs. Also there is a bill calling for a fine for vehicles carrying loads more than 6 tons over bridges which are posted by local authorities for that limit, in case the bridge is damaged. The fine is not less than $50 nor more than $100.

The new fees as passed by the legislature are as follows:

Tons..	1	2	3	4	5	6	7	8	9
Fees..	$10	$20	$30	$40	$50	$60	$70	$80	$90

Electric vehicles carry one-half the above fees; trailers using pneumatic tires, one-half the above fees; if using metal tires, double the above fees; two wheels not considered a trailer.

NEW MEN ON HIGHWAYS BOARD

WASHINGTON, D. C., July 16—John W. Halowell was named by Secretary Lane to represent the Department of Interior in the Highways Committee and Lt. Col. J. M. Ritchie of the Motor Transport Corps was appointed by Secretary Baker to represent the War Department.

New York Recommends Rural Expresses

Reconstruction Commission Sends Report to Governor

NEW YORK CITY, July 21—The Committee on Food Production and Distribution of the New York State Reconstruction Commission has recommended in a report which is on its way to Governor Smith the operation of rural motor truck express systems throughout the state for delivering perishable goods, these systems to be owned preferably by a co-operative association similar to the Farmers' Co-operative Co. of Hartford County, Inc., of Maryland, and described fully in THE COMMERCIAL VEHICLE for June 15, 1919.

In order to further this movement the commission recommends to the Governor that a temporary non-salaried State Highways Transport Committee be appointed to include the Commissioner of Highways, a representative of the State College of Agriculture or the County Farm Bureau Organization, a representative of the State Department of Farms and Markets, and two other disinterested men.

SHAW TO MAKE 1000 TRUCKS

CHICAGO, July 25—Plans to quadruple the production of motor trucks and taxicabs in the Shaw Taxicab Co.'s plant have been made by General Manager John Hertz. A new plant is to be erected on the northwest side of the city, the contracts calling for its completion Nov. 1. It is expected to turn out 1000 trucks during the coming year.

TRUCK DRIVING COURSE

CLEVELAND, OHIO, July 18—The Grant Truck Sales Co. of Cleveland is offering a 6 weeks' course to teach a man the subject of truck driving. The classes are held once a week, at which time authorities on the subject tell the men about the different parts of the trucks and the care which they need.

BUFFALO TRUCK DEALERS ORGANIZE

BUFFALO, N. Y., July 16.—In the July 1 issue of THE COMMERCIAL VEHICLE, on page 40, we announced the formation of a company which would operate between Buffalo and Utica and intimated that the following men were interested in this line: H. M. Damon, Sentinel Motor Truck Co.; Henry May, Jr., Pierce-Arrow Motor Car Co.; J. N. Firman, Packard Motor Car Co., and C. L. White of the Automobile Club of Buffalo. However, these men are interested in an organization just formed of the Motor Truck Dealers of Buffalo, and have nothing whatever to do with the motor truck line which will operate between Buffalo and Utica.

11 Million Federal Aid Asked in June

Total of 23 Millions of Govt. Road Money Now Awarded

WASHINGTON, D. C., July 18.—One hundred and thirty-three State requests for Federal aid for highway improvements were approved by the Department of Agriculture during June. This involved 1,390.29 miles of road at a total estimated cost of $24,220,808.90, on which Federal aid amounting to $11,034,289.12 was requested. This represents the largest cost estimated and the largest amount of Federal aid requested during any month.

During the month 60 projects were executed by the Department of Agriculture and the State Highway Departments, involving 507 miles of roads costing $7,566,089.32, of which $3,404,269.18 was Federal aid.

Up to and including June 30, 1919, project statements for a total of 1319 projects had been approved. The 1319 projects involve 12,790.37 miles of road, a total estimated cost of $133,833,300.67, and a total of 677 project agreements had been executed, involving 5,776.39 miles of road, a total estimated cost of $56,367,334.94, and a total of $23,892,740.97 Federal aid.

NEW YORK IMPROVES ROADS

BUFFALO, N. Y., July 17—Since April 9, 1919, New York has authorized the expenditure of more than $9,000,000 for highway improvement and repair work, according to a report of the highway commissioner. Forty-nine contracts authorizing the building of 176.36 miles of new roads at a cost of $4,255,744 have been awarded. There were fifty-four reconstruction contracts for 127.71 miles of road, amounting to $1,900,164. In addition there is being expended for general repairs to highways $3,028,759.

COMING TRUCK TOURS

NEW YORK CITY, July 23—The recent truck demonstration in St. Louis proved so successful that another one will be started from St. Louis either the last week in August or the first week in September, and in addition demonstrations will also be staged in the following cities at the times mentioned below:

Memphis, Tenn., beginning August 1, for particulars apply to E. O. MacNicol, Automobile Editor News Scimitar, Memphis, Tenn.

Buffalo, N. Y., first week in September, for particulars apply to W. G. Robertson, Ontario Motor League, Lunsden Bldg., Toronto, Ontario, Canada.

Minneapolis, Minn, third week in September. for particulars apply to P. M. Gunsaulus, Firestone Tire & Rubber Co., Minneapolis, Minn.

Madison, Wis., August 26 to 29, for particulars apply to Don E. Mowry, general secretary Madison Assn. of Commerce, Madison, Wis.

Indianapolis, Ind., no date set, for particulars apply to Tom Snyder, Indianapolis Chamber of Commerce, Indianapolis, Ind.

All of the above mentioned demonstrations will prove interesting to truck owners, for the trucks which will be entered for these runs will prove the work which trucks are able to accomplish.

NEW 4-CYLINDER AUTOCAR

ARDMORE, PA., July 18.—As forecast by THE COMMERCIAL VEHICLE as far back as its issue of November 15, 1917, the Autocar Co. of this city has just brought out its first four-cylindered motor truck. The new truck has a capacity of 3½ tons and will not be available for distribution before January 1, 1920.

The first truck, which has been undergoing experiments since 1917, left Ardmore on July 14 for a trans-continental tour following the route of the tour of the Motor Transport Corps trucks described in an earlier issue of THE COMMERCIAL VEHICLE. The new 3½-tonner is accompanied on the trip by one of the 2-ton Autocars with the new wheelbase length of 120 inches. Both vehicles will be loaded to capacity at all times. The 3½-ton truck has already covered 22,000 miles and is now being put through the 4,000 mile cross-country trip under the severest possible conditions as a final test.

In appearance, as shown in the accompanying illustration, the new 3½-ton Autocar model is very similar in design to the well-known 2-ton model. It has the characteristic Autocar radiator and dash with the four-cylinder engine under the seat. The engine has a horsepower of 25.6, S. A. E. rating, and the chassis weights 6,150 pounds. The new chassis will be furnished in optional wheelbase lengths of 120 and 144 inches and starting and lighting systems will be optional.

Urge Truck Tunnel in Boston's Harbor

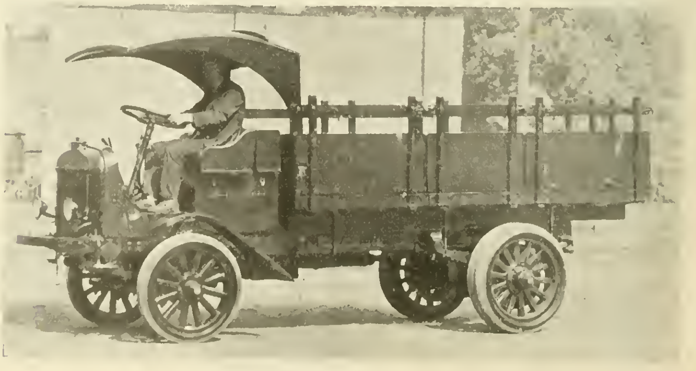
Money Appropriated to Study Possibilities of Plan

BOSTON, MASS., July 19.—Because of the congestion of teams and trucks on the ferries going to East Boston, and the crippling of the business of exports for the city, the Massachusetts legislature has again taken up the question of building a traffic tunnel under the harbor to East Boston. The Cunard line terminal is there, and the Boston & Albany Railroad, which is a lessee of the New York Central, the direct line to the West, has big freight sheds there. So when freight from the West comes in it has to be lightered across the harbor, or taken in trucks which have to make a slow ferry trip or go around through Chelsea, a distance of five miles. This all takes up valuable time. And it is the same story with freight going to the docks.

Some years ago an agitation for a tunnel or a bridge was started. There is one tunnel now for street cars. Plans were considered for a bridge and the cost estimated, but that fell through, as it was thought that the War Department would object because the Navy Yard is up in the very end of the harbor, and a bridge would handicap naval vessels getting in and out. Then there was an investigation for a tunnel, but nothing came of it. Now the legislature has passed a resolution providing a sum of money for experts to make a study of the cost and report to the next legislature. It would not be an expensive undertaking, for it would not be more than a mile long. With the State trying to upbuild the export traffic, now that the war is over, the outlook for a motor truck tunnel seems very bright.

NEW WHITE SERVICE STATION

NEW YORK CITY, July 19—The White Co. of New York City will open a service station in Long Island City. The new building will have 250,000 sq. ft. of floor space.



The new four-cylindered Autocar of 3½-ton capacity

Conflicting Truck and Trailer Licenses

Some States Now Penalize Own Residents Using Trucks

NEW YORK CITY, July 18—Several states have recently enacted new laws increasing registration fees for motor trucks and trailers and imposing new limitations of size, weight and speed. Similar bills are still pending in the legislatures of a few other states. These laws and bills reveal a lack of uniformity that is unfortunate when it is considered that trucks and trailers are used extensively in interstate commerce and are becoming an important factor in reducing the cost of haulage, thereby tending to keep down the rising cost of living.

New laws passed recently limit weight as follows:

Pennsylvania, 26,000 lb. gross weight of vehicle and load.

Wisconsin, 24,000 lb. gross, 18,000 lb. on one axle, and 800 lb. per inch width of tire.

Indiana, 10 tons gross.

Illinois, 16,000 lb. on one axle and 800 lb. per inch width of tire.

North Carolina, 5½ tons load capacity.

Iowa, 14 tons gross, 4 tons on any wheel and 800 lb. per inch width of tire.

Dimensions of trucks (which include trucks with semi-trailers) and length of trailer trains are fixed as follows:

Pennsylvania, length of a single vehicle 28 ft., width 90 in.

Wisconsin, length of vehicle 30 ft., width 96 in., length of trailer train 100 ft. between 8 p. m. and 5 a. m.

Illinois, length of train 65 ft.

A bill pending in Massachusetts limits single vehicles to 28 feet, width to 96 inches, height to 13 feet and length of train to 80 feet.

Another pending in Michigan limits the number of trailers that may be towed by a motor vehicle to two, length of trains to 60 feet and width to 8 feet 6 inches.

There is even wider variation in registration fees for trucks and trailers. As fixed in new laws they range thus:

Pennsylvania, $15 for a truck of 2 tons capacity to $150 for a 7-ton truck, and $2 for a trailer weighing 500 lb. to $15 for one weighing more than 2000 lb. Those weighing less than 500 lb. are exempt.

Indiana, $6 for trucks of ¼-ton capacity to $50 for 7½ tons or more; trailer fees one-half of truck fees.

Illinois, $15 for truck or trailer weighing 7000 lb. with load, to $60 for more than 15,000 lb. gross weight.

North Carolina, $12 for truck of 1-ton capacity or less to $100 for 5½-tons capacity; trailers $10 for first ton of capacity and $20 for each additional ton.

Iowa, $15 for trucks of 1-ton capacity or less to $175 for solid-tired trucks of 6 tons capacity; trailers, $10 for 1-ton capacity to $70 for solid-tired 6-ton trailer. Rubber-tired trailers under 1000 lb. capacity used with passenger automobiles for personal baggage or effects are exempt.

A bill pending in Massachusetts fixes truck and trailer fees alike at $10 for each ton of carrying capacity.

With such widely varying state laws in force, a truck or trailer that complies with the law in one state cannot be operated legally in another, and a truck owner in one state operates at a serious economic disadvantage against the owner in an adjoining state. If the registration fee is much higher in Massachusetts, for example, than in the adjoining New England states or in New York State, the Massachusetts operator cannot compete in interstate haulage with operators in those states at the same rates without loss. Consequently, the Bay State is penalizing her own citizens and allowing non-residents to use her improved roads at a lower rate than her own citizens can use them or the roads in adjoining states.

With a view to removing these inequalities, the Trailer Manufacturers' Assn., which maintains headquarters at 110 West 40th Street, New York, is urging the enactment of uniform motor vehicle laws and has drafted a set of recommendations for trailer legislation. It holds that trailer users do not object to paying reasonable fees for use of the roads provided the money is spent in road maintenance, but believes these fees should be the same in all states and should be less than trucks, as their wheels do not transmit any destructive driving effort to the road surface.

NEW MICHIGAN TRUCK LINE

LANSING, MICH., July 17.—The Western Michigan Motor Transit Co. has made application for approval of its stock to the Michigan Public Utilities Commission. The company will operate a motor truck line of fifteen motor trucks between Grand Rapids and Howard City, with warehouses at its terminals and in the cities through which it will pass, including Hastings, Holland, Muskegon, Fremont, Grand Haven, Allegan, Hart, Shelby, Ionia, Greenville, Belding, Kalamazoo, Lowell, Big Rapids.

STATE HIGHWAY COUNCIL FORMED

NEW YORK CITY, July 18—The New York State Council of the Federal Highway Council was organized at a meeting held July 18 in the rooms of the American Society of Civil Engineers in New York City. The sole purpose of the organization of the council is to secure state-wide support for the enactment by Congress of legislation embodying principles set forth in the Townsend bill providing for the creation of a Federal Highway Commission and the construction and control of a system of national highways with funds appropriated by the Federal Government. Permanent organization of the state council was effected by election of the following officers: Chairman, Arthur H. Blanchard, president of the American Road Builders' Assn. and president of the National Highway Traffic Assn.; vice-chairmen, Fred S. Green, Commissioner of Highways, Albany. N. Y.; Col. Theodore Roosevelt, New York City; E. J. Mehren, managing editor Engineering News-Record, New York; George M. Graham, member Motor Truck Committee, National Automobile Chamber of Commerce, New York, and sales manager Pierce-Arrow Motor Car Co., Buffalo; and D. C. Fenner, of the International Motor Co., New York, and member Legislative Committee, N. A. C C.; sec'y-treasurer, H. W. Perry, general manager Trailer Manufacturers' Assn. of America, New York.

Nebraska Attempts to Set Truck Rates

Railroad Commission Seeks to Fix All Ton-Mile Charges

OMAHA, NEB., July 19—The Nebraska State Railway Commission has attempted to fix motor truck rates by issuing a scale of charges for truck transportation which became effective on July 1, 1919. The rates are based largely on records of operating costs disclosed in hearings held during the past year by the commission and are set in most instance at the rail charges. This action is most important to truck owners the country over, because other States may attempt to follow suit. So far as can be found at this writing the whole case is muddled up, as rates have been calculated on rail rates and on a ton-mile basis, with no definition of the term, ton-mile.

The schedule is appliable to a radius of 60 miles and is divided into four classifications. The rates are charged on a basis of 100-pound shipments not within the same city or village in Eastern Nebraska. The basic charge for first-class commodities is 15 cents, with an additional 1½ cents for every mile. Thus 1 mile would be 16½ cents per hundred pounds, 2 miles 18 cents and so on. Second-class rates are 85 per cent of first-class, third-class rates 70 per cent and fourth-class rates 60 per cent of the first-class. A minimum charge is prescribed of 50 cents for any load of any description regardless of distance.

With a few exceptions the classifications made for goods are almost identical with those of the western railways. One of these is in the shipment of live stock. In shipping by railroad live stock is very seldom sent in less than carload lots, but it is common practice to ship less than truck loads of cattle. For this reason live stock is accepted at the usual rate with a minimum charge for 60 per cent of the truck's capacity Another exception is in shipping household goods. If not in excess of $10 in value per 100 pounds they are to be accepted at second-class rates, but in excess of that value are to be charged three times second class with a minimum weight of 80 per cent of the truck's rated capacity.

NEW R. R. SIGNAL

NEW YORK CITY, July 16—The Youker Bill, calling for uniform warning signs at railroad crossings, has been signed by the Governor of New York State and thus becomes a law. This was introduced and passed upon the request of the New York Motor Federation's legislative committee. This warning sign is to be a circular metal disc 34 in. in diameter with a white field and a black border line one inch wide and with black perpendicular and horizontal cross lines 2½ in. wide with a black letter "B" 5 in. high in each of the upper quarters. It is to be installed on each side of every crossing.

Railways Seek Control of Western Trucks

California Road Commission Attempts New Regulation

LOS ANGELES, CAL., July 17.—There is going to be a battle royal in California between the motor truck interests, as represented by owners and dealers, and other interests, the identity of which has not been disclosed, over the recently enacted law that places the operation of motor trucks under the supervision and regulation of the State Railway Assn. The charge is made openly that railroad interests are involved, but if they are they are working through an organization ostensibly formed as a means of protection to truck operators.

The plan is to make trucks engaged in freight and passenger transportation between cities public utilities and permit their operation only under franchise. They will have to operate over certain prescribed routes at fixed carrying charges. There can be no deviation from the routes and a schedule must be adhered to.

Opponents of the measure declare that there is no justification for making a motor truck a public utility, as no special rights or privileges can be granted, and unless the State grants privileges there can be no assumption of authority upon the part of the railway commission. Further, it is pointed out, control of this nature will put the trucking business in the hands of a favored few and this situation will be followed by an increase in rates over those now prevailing. With free lance competition, as now, trucks are not being operated at a loss, those engaged in the business say, and any restriction that results in higher rates will kill the trucking business and return to the railroads a monopoly.

ARMY TRUCK TRAIN HALF WAY ACROSS CONTINENT

CHICAGO, July 19—Crossing the country from Washington, D. C., to San Francisco, Cal., a journey of approximately 3300 miles, is not much of a stunt in these days of transcontinental touring, but when attempted on such a gigantic scale as the present tour of the Army trucks, the itinerary becomes more than a problem of packing one's linen.

The Army truck fleet, sixty-two trucks in all, arrived at Chicago Heights, Ill., to-day at 3.30 p. m. intact save for one truck which was lost in Pennsylvania. Not one truck in the fleet showed signs of travel an hour after arrival, for everything was washed in gasoline and made ready for inspection.

Only one accident marred the passage through Pennsylvania of the giant transcontinental convoy of army trucks en route from Washington to San Francisco. That occurred ten miles east of Greensburg. Lightning struck a tree a few yards ahead of one of the trucks as the caravan was passing through a gully. The tree fell across the path and the men shut off the power and leaped to safety. The truck continued on its way, struck the tree and plunged to the bottom of the gully, a complete wreck.

Col. Charles W. McClure was so pleased with the condition of Pennsylvania's roads that he had a large banner placed on the canvas of one of the transports bearing the inscription: "Pennsylvania Gave This Convoy a GOOD Road. Pennsylvania during the Next 4 Years Will Spend $150,000 for Road Improvements."

DISPOSAL OF A. E. F. TRUCKS

WASHINGTON, D. C., July 18—The sale to the French Government of trucks, passenger cars and other automotive equipment belonging to the American Expeditionary Forces in France has been held up as a result of what is considered an inadequate offer, according to Director of Sales C. W. Hare. The French Government has offered only $300,000,000 for all American army equipment in France, including automotive commodities which it desired to purchase, and which has an aggregate cost value of $1,500,000,000.

As a result the sales have been suspended and a small party of industrial experts under Mr. Hare will be sent to Europe to organize sales offices and organizations throughout the continent to dispose of the equipment, unless France makes a better offer.

Sales are planned to Belgium, Roumania and Poland. American aircraft in Europe will not be subject to Mr. Hare's disposal, but motor trucks, passenger cars, motorcycles, tractors and practically all other army equipment will be either sold, or, if necessary, returned to the United States.

There are 52,000 motor trucks, 9,800 passenger cars, 7,000 ambulances, 22,000 motorcycles and 5,700 trailers in France belonging to the American Expeditionary Forces.

SALES MANAGERS POSTPONE MEETING

DETROIT, July 20.—The National Assn. of Motor Truck Sales Managers has postponed its national convention to have been held in Detroit, July 25-26. The new dates, either September or October, are to be decided upon shortly.

Coming Events

1919

Sept. 22-24...Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.

1920

Jan 3-10.....New York City, Motor Truck Show, Twenty-second Regiment Armory, 168th St. and Broadway.

Jan. 24-31....Chicago Ill., Motor Truck Show, Drexel Pavilion.

20,522 Surplus War Trucks Allotted

8,711 in Fourth Group Given to States for Highway Work

WASHINGTON, D. C., July 18—The fourth allotment of motor trucks numbering 8771 has been turned over to the Bureau of Public Roads by the War Department and in turn has been allocated to the various states, making a total of 20,522 trucks that have been distributed to the various states for road construction and maintenance. The last allotment included nine types and many used trucks including miscellaneous light deliveries, all used, G.M.C. ¾-ton chassis, used and new; miscellaneous 2-ton trucks, used; Pierce-Arrow 2-ton trucks, used and new; light aviation trucks, used; miscellaneous 5-ton trucks, used; Pierce-Arrow 5-ton trucks, used, and new and heavy aviation types. Texas received the largest number of trucks, being allotted 500; New York was second with 427; Pennsylvania, 394; Illinois, 375, and Ohio, 318.

Here is a complete table showing the distribution.

Alabama	180
Arizona	117
Arkansas	143
California	261
Colorado	149
Connecticut	51
Delaware	14
Florida	99
Georgia	231
Idaho	104
Illinois	375
Indiana	231
Iowa	250
Kansas	249
Kentucky	167
Louisiana	117
Maine	65
Maryland	75
Massachusetts	126
Michigan	250
Minnesota	244
Mississippi	153
Missouri	291
Montana	173
Nebraska	185
Nevada	111
New Hampshire	35
New Jersey	102
New Mexico	138
New York	427
North Carolina	195
North Dakota	132
Ohio	318
Oklahoma	199
Oregon	136
Pennsylvania	394
Rhode Island	21
South Carolina	124
South Dakota	138
Tennessee	193
Texas	500
Utah	99
Vermont	40
Virginia	170
Washington	124
West Virginia	90
Wisconsin	217
Wyoming	104
Department Agriculture	446
Total	8.771

PA. GETS SIXTY WAR TRUCKS

HARRISBURG, PA., July 17.—The first consignment of War Department motor trucks has been received by the Pennsylvania State Highway Dept. There are sixty in the first batch, but 300 in all will be Pennsylvania's share.

The COMMERCIAL VEHICLE
Read by Fleet Owners

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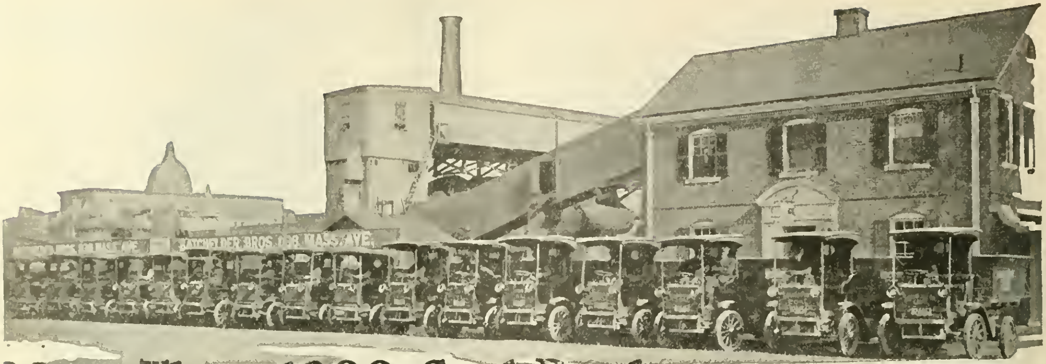

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This proved ability under supreme test has made the Autocar the standard transportation unit for representative firms in more than 400 lines of business.

Its short wheelbase saves time in maneuvering through traffic. Its double reduction gear drive gives effective power at lowest cost. And it is backed up always by the unusual Autocar system of factory branch service.

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The Commercial Vehicle

Read by Fleet Owners

Vol. XXI. August 15, 1919 No. 2

3 WAYS

To Truck Success

In the National Distribution of Groceries to 3900 Chain Stores

SUPPOSE you owned 108 trucks which were operated in fleets of from three to forty-six vehicles in ten cities from Jersey City, N. J., to Chicago and from Boston to Pittsburgh.

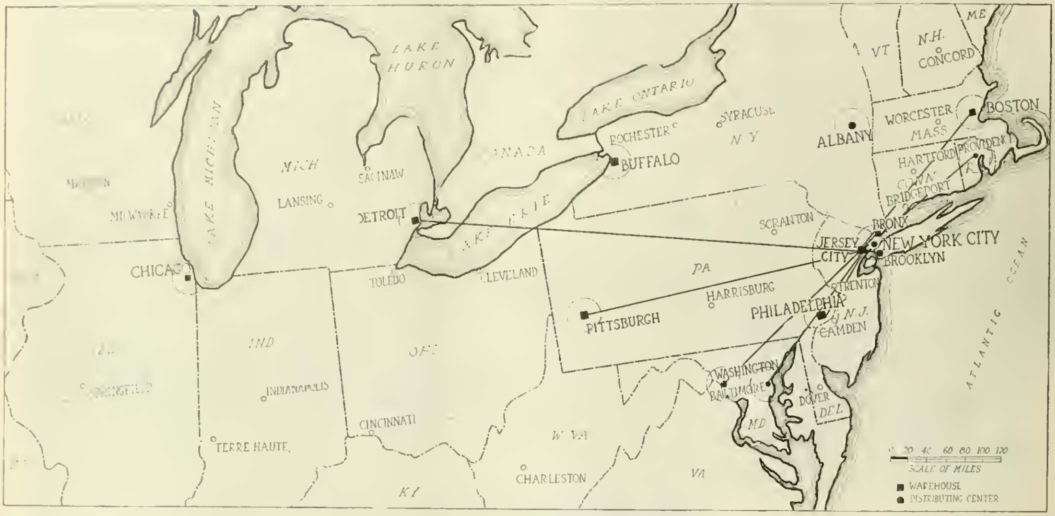
How would you supervise the operation of these trucks?

How would you obtain and check the records of operation and cost?

How would you maintain the trucks?

These are the conditions and problems of the Atlantic & Pacific Tea Co., which employs its large fleet of trucks in the distribution of groceries and bread to a chain of 3900 retail stores situated in an area 1000 miles square.

1—Transportation Department	**Buys Trucks** **Allocates Trucks** **Keeps Costs** **Supervises Operation**
2—Operation Department	**Routes Trucks** **Schedules Loads** **Reduces Loading Time**
3—Maintenance Department	**Overhauls Trucks** **Inspects Trucks** **Centralizes Work**



Map showing the territory served by the trucks and tractors and semi-trailers of the Atlantic & Pacific Tea Co. Warehouses are located at Jersey City; Bronx Borough, New York City; Brooklyn; Boston; Philadelphia; Pittsburgh; Detroit and Chicago. The truck equipment serves the territory within 40 miles of each warehouse, as indicated by the small circles. The heavy black lines show how unit truck parts from all the warehouse districts except Chicago are sent to the centralized repair depot in Jersey City, N. J.

How that company solved these problems is told in the accompanying article.—THE EDITOR.

CENTRALIZATION of general supervision and decentralization of the detailed supervision of the transportation means employed have enabled the Atlantic & Pacific Tea Co., with main offices in Jersey City, N. J., to solve the problem of a national distribution of groceries to 3900 retail stores. This centralization and decentralization have been accomplished by the establishment of three main departments: 1—Transportation Department; 2—Truck Operation Department; and 3—Truck Maintenance Department.

Before going into the detailed work of each department, it is perhaps best to treat briefly of the business scope of the A. & P. company in order that the importance of the truck work may be better understood. In the first place, the problem of a national distributor to a chain of stores differs from the local competitors in the wholesale grocery field in any one city or locality, in that the large territory covered necessitates the use of railroads as well as motor trucks and horse wagons. The very magnitude of the problem makes it necessary that a close study he made of the advantages and disadvantages of the various means at hand for the conveyance of the company's goods.

The A. & P. company maintains its main warehouse and offices in Jersey City, N. J., with subsidiary warehouses in Brooklyn, N. Y., Boston, Philadelphia, Pittsburgh, Detroit, Chicago, Bronx, and Buffalo. Goods are shipped from the main warehouse to the smaller warehouses by railroad. From these warehouses some means have to be provided for getting the goods to the chain stores within the territory served by each warehouse.

It is in this phase of the transportation problem that the motor truck or tractor and semi-trailer has been found indispensable, for without a quick, sure and economical means of getting the groceries from the warehouses to the individual stores, the chain store idea would be a failure.

Quick Turnover Important

This quick, sure and economical service rendered by the motor vehicle is all the more important in the case of the A. & P. company because its 3900 so-called economy stores are operated on the cash-and-carry plan. By eliminating the final delivery from each retail store to the customer's house, the A. & P. company is able to offer its goods at a low price and thereby appeal to and obtain the business of a large element which would rather carry their purchases home and take advantage of the reduced prices than pay a greater price with the delivery service included.

To sell its goods at lower prices than its competitors in the same locality, aside from the reduction in price caused by giving no final deliveries, the A. & P. company has found that the big idea in the chain-store grocery business is that there must be a constant and quick turnover of the stock at every store. This quick turnover enables the company to use smaller and less expensive stores because no excess stock has to be carried in view of the quick service which the motor vehicles render in transporting the goods from the local warehouses to the stores. The use of trucks makes it possible for each store to carry a fresh stock of goods, for any one of the A. & P. stores can be supplied within 1 or 2 hours, if emergency demands.

While the A. & P. company still maintains a series of old line stores in Louisville, Ky.; Tampa, Fla.; Savannah, Ga.; Montgomery, Ala.; Charleston, S. C.; Dallas and Galveston, Tex., and New Orleans, La., these are almost negligible in comparison with the chain of 3900 economy or cash-and-carry stores. The old line of stores are run on an entirely different basis. They advertise, pay a top price rental for stores with

H. B. Anderson, who is in charge of the supervision and operation of the Atlantic & Pacific Tea Co.'s trucks at the Jersey City warehouse

The front entrance to the A. & P. garage at Jersey City. The trucks and semi-trailers are washed in a smaller building next door, the entrance to which is shown at the extreme right in the illustration

a large floor space in the best residential sections and make deliveries in horse vehicles, of which from ten to twenty-five are maintained at each store.

Sixty Per Cent Shipped by Trucks

Some idea of the important part which the company's motor truck and tractor semi-trailer combinations play in the distribution of the goods may be realized when it is known that of the total business of the 3900 economy stores, fully 60 per cent is forwarded by motor trucks and 40 per cent shipped by freight, express or delivered by horse wagons. The 108 motor vehicles employed handle nearly 200,000 tons of groceries a year. As further evidence of the indispensability of the trucks in the work, the A. & P. company has increased its number of economy stores from 712 in 1914, when it first took cognizance of the truck as the business getter, to the present total of 3900.

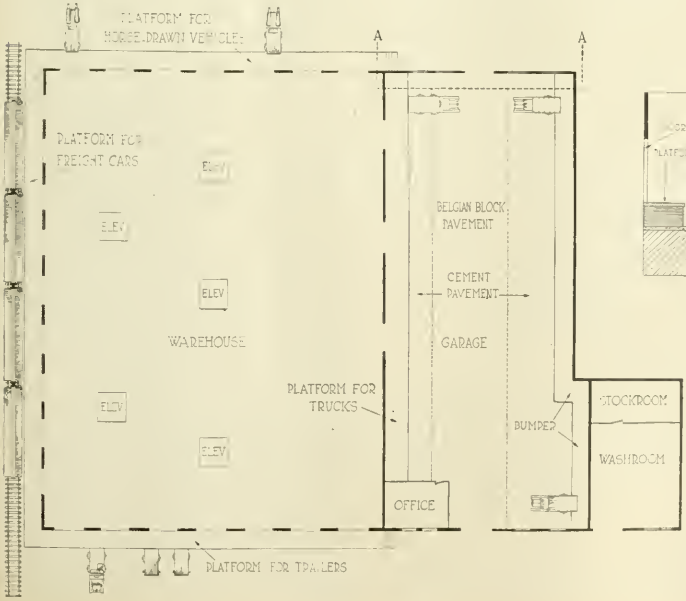
With this brief outline of the company's scheme of doing business one is better able to understand the underlying principles of the three separate departments of Transportation, Truck Operation and Truck Maintenance.

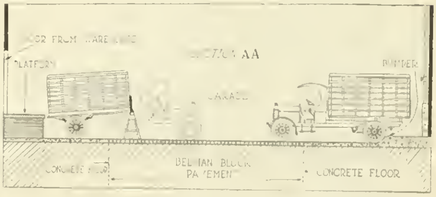
The Transportation Department has to do with all means of transportation whether by railroad, boat, truck or horse wagon. The success of the chain store idea at selling goods is based upon service, which means that the company's goods must reach the various stores on schedule so that they always have a fresh stock on hand and do not run out of goods.

While the transportation from warehouse to warehouse, and from warehouse to retail store is the main consideration, the manner in which the stock is assembled, moved through the warerooms and finally loaded into the vehicles or freight cars determines to a great extent the service which these conveyances can give. While the transportation department has many other problems to solve besides those of truck operation, such as the determination of shipping routes by rail, l.c.l., carload and consolidated car shipments, this article will treat only of its work so far as the motor equipment is concerned. It buys trucks; allocates trucks; keeps truck costs and supervises their operation in a general manner, leaving to the Operation and Maintenance Departments, respectively, the problems of routing, scheduling, and reducing loading time and overhauling, inspecting and centralizing the repair work.

The multiplicity of the truck problems of the Transportation Department may

(*Continued on page* 70)





At the left, a plan view of the combination warehouse and garage, showing the loading platform inside of the garage proper. Under ordinary conditions the horse wagons are loaded outside of the garage to prevent vehicular congestion. To provide for loading wagons inside the garage in stormy weather, a center aisle down through the garage is paved with Belgian block, with the space on either side laid in concrete. The horses stand on the Belgian block pavement so as not to roughen up the concrete. The small cross-sectional view above shows how the semi-trailers are backed up to the platform for loading and the type of raised-floor bumper provided on the opposite side of the garage to prevent the trucks from damaging the rear ends of their bodies in backing up or hitting the radiator pipes.. No trucking maintenance is done in the building shown, it being reserved exclusively for loading and overnight storage

More About the TON-MILE

The Reason for the Commercial Ton-Mile

The Commercial Ton-Mile Defined

WHY BOTH TONNAGE AND MILEAGE MUST BE CONSIDERED IN CALCULATING TRUCK COSTS

EVERY truck owner, every business man and even every high school boy or girl knows that it costs more to carry a ton of goods 10 miles than it does to carry it but 5 miles. From this fundamental axiom it is evident that neither the cost per mile of truck operation nor the cost per ton is any fair indication of truck ability or efficiency.

The cost of operation per mile is no guide to the cost of delivering merchandise because it costs almost as much, if not more, to run a motor truck empty as it does to run it loaded. While at first thought this might seem impossible, it is nevertheless true, for with an empty truck the driver often inclined to attempt to discover the vehicle's maximum speed possibilities, and when traveling over rough roads, sets up severe vibration resulting in rapid wear or even breakage of the various truck parts.

The cost per ton carried is likewise no fair indication of the truck's work ability unless the distance which the goods are moved is known. For example, a 4-ton truck costing $11.64 a day to operate, exclusive of any general overhead expense such as supervision, office cost, advertising, etc., for a daily mileage of 25, would show a cost per ton of $2.91 provided a full 4-ton load was delivered on the one 25-mile trip. If, however, the truck made a 100-mile trip, the corresponding cost per day would be increased to $24.77. If the same 4 tons were carried on the 100-mile trip, the cost per ton would be $6.19, thus showing that the cost per ton is no good indication of the truck work unless the mileage is also taken into account.

The Reason for the Ton-Mile

With this fundamental law of truck transportation understood it becomes apparent that some unit which will take into account both tonnage and mileage must be devised. The much-abused ton-mile has been taken as this unit of work ability. But unless this ton-mile is clearly defined, it is worse than useless as a measure in any kind of truck cost accounting. It is evident that the cost per ton-mile of truck operation with the ton-mile defined in one manner is not at all comparable with the cost per ton-mile defined on some other basis.

HOW TO FIGURE IT

1—The commercial ton-mileage is obtained by multiplying the total tonnage carried on any trip by the mileage of that trip divided by 2.

2—Commercial ton-mileage may be figured per trip. The ton-mileage for a day is the addition of the ton-mileage of the trips covered in that day.

3—It may also be figured per trip per day, per month, etc., with equal ease. Multiply total tons carried during any period by ½ the average trip distance during that period.

4—Commercial ton-mileage cannot be obtained by multiplying the tonnage carried per day by the mileage covered in that day.

5—A trip is the period from the time a truck starts out on a job until it returns to the starting point for the next job or reports at another point.

Some well-understood definition of the term ton-mile must be determined upon and used by truck owners, truck manufacturers, truck dealers and State or Federal commissions inquiring into truck transportation rates. It is the purpose of this article to again point out the one real and readily applied ton-mile and to indicate how it is obtained.

While two kinds of ton-miles have been used to some extent in the past, the absolute ton-mile and the commercial ton-mile, the commercial ton-mile is the only one which can be applied in all cases without undue effort on the part of the truck driver or the accounting force required to keep the cost of truck operation.

Absolute Ton-Mileage Hard to Get

The absolute ton-mile is an excellent unit of work ability because it is analogous to the engineering term of the foot pound, which means the moving of the mass of one pound through a height of one foot. Similarly, the absolute ton-mile may be defined as the carrying of one ton over a distance of one mile. If five tons are carried 10 miles, the absolute ton-mileage of work done is five times ten, or fifty. When loads are carried intact from their point of origin to their destination, there is no difficulty in figuring ton-mileage on the absolute ton-mile basis. It is only when the loads are picked up or delivered piecemeal along the routes that difficulty arises in calculating the absolute ton-mileage.

The magnitude of this difficulty when using the absolute ton-mile as the basis may be readily understood from the following example: A truck starts out with 5 tons, travels 2 miles and delivers 1 ton; it then travels 3 miles and delivers 2½ tons; it next travels 4 miles more and drops off ½-ton, leaving 1 ton on the truck; it then runs 2 miles more before it delivers its last ton of load. Starting on its way back to the loading platform from which the trip was begun, it travels 8 miles and picks up ½ ton; it then goes 2 miles more and picks up 1½ tons; 2 miles further on it picks up another ton and 2 miles beyond that still another ton; 2 miles further on it picks up 1 ton to complete its 5-ton load and run 3 miles back to the starting point with a full 5-ton load. In all, the truck carried 10 tons and traveled 30 miles.

To figure the total absolute ton-mileage in this case, which is not at all improbable, the number of absolute ton-miles is the summation of the tons carried from the starting point to the first stop multiplied by the miles traveled to that point; the tons carried from the first stop to the second stop multiplied by the distance between them and so on for each stop until the truck returns to the starting point. The number of absolute ton-miles of work done in this particular case is represented by the following tabulation:

Tons Carried		Miles Covered		Absolute Ton-Miles
5	x	2	=	10
4	x	3	=	12
1½	x	4	=	6
1	x	2	=	2
0	x	8	=	0
½	x	2	=	1
2	x	2	=	4
3	x	2	=	6
4	x	2	=	8
5	x	3	=	15
				64

Determination of the absolute ton-mile in this case requires ten separate multiplications, one for each stop at which a portion of the load is delivered. If there had been twenty stops instead of ten, twenty multiplications would have been necessary. If there had been thirty stops, thirty multiplications would have been required, and so on, one multiplication for each stop, provided the absolute unit were used.

Another Difficulty Arises

But these multiplications are not all of the difficulty in the use of the ton-mile, for in order to determine the absolute ton-mileage in the case just cited, an observer would have been necessary on the trucks to weigh that portion of the load delivered at each stop and note the distance covered at each successive stop. The driver could not do this work and drive the truck at the same time, for if he did, he would in all probability do very little driving. As the employment of an observer on each truck to determine the number of ton-miles accomplished on each trip is out of the question because of the added expense, the use of the absolute ton-mile in work such as cited in the example just used is impossible as a practicable method. If the ton-mileage is impractical for one case as just shown, it is of no value for use in the other methods of truck operation in which a full load is carried for one-half of the trip and the return made empty, or a full load carried on one-half of the trip outward and another full load on the return half of the trip. While the absolute ton-mileage is readily obtained by two multiplications when the truck carries its load for one-half the trip and returns empty and similarly by two multiplications when a second load is picked up and carried back to the starting point, the value of the ton-mileage just obtained is of no use because a similar ton-mileage value cannot be readily obtained when loads are picked up and dropped off peacemeal.

The Commercial Ton-Mile

It is, therefore, evident that some different ton-mile must be used and that the ton-mileage figured in this new manner must be as nearly as possible equal to the absolute ton-mileage whose main fault is not in its accuracy, but in its difficulty of obtainment. This new ton-mile, which accomplishes these results, is the commercial ton-mile. The commercial ton-mile is a definite unit and can be used no matter how the truck is operated and no matter what size of truck is employed.

The commercial ton-mile is defined briefly as obtained by multiplying the tonnage carried on any trip by the mileage of that trip divided by 2. Commercial ton-mileage may be figured per day by adding the ton-mileage of the trips made in that day, or it may be figured more readily by multiplying the total tons during the day by one-half the average trip distance during the day. To figure ton-mileage per week or month, the total tons carried per week or per month are similarly multiplied by one-half of the average distance during that week or month. The commercial ton-mileage is, therefore, a definite unit and means but one thing. Wherever it is used in THE COMMERCIAL VEHICLE it has but one meaning and the cost per commercial ton-mile under one condition can be compared with the cost per commercial ton-mile under other conditions because the ton-mileage has been determined on the same basis.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined.....April 15
1—Driver ....May 1
2—Tires ....May 15
3—Gasoline ....June 1
4—Overhauling ....June 15
5—Depreciation ....July 1
6—Insurance ....July 15
7—Interest ....August 1
8—Garages ....August 15

It is very important to note in the definition of the commercial ton-mile that the length of the trip in miles must be recognized. Because of this, a trip must be defined. A trip may be taken as the period from the time a truck starts out on the job until it returns to the starting point for the next job or reports at another point.

The commercial ton-mile in the case for which the absolute ton-mileage was figured above may be readily obtained by one multiplication. It is the total tonnage carried on the trip, or 10 tons, multiplied by one-half the trip distance, or fifteen, thus giving a total commercial ton-mileage of 150.

Commercial ton-mileage cannot be obtained by multiplying the tonnage carried per day, month or year by the mileage covered per day, month or year.

If an attempt were made to multiply the tonnage carried per trip by the mileage covered per trip in the case just mentioned, the false ton-mileage would be 10 x 30 = 300, which is twice the proper commercial ton-mileage.

In cases where a truck starts out with a full load, delivers it, and returns to the starting point empty, or picks up a second load at the point where the first full load is delivered and returns with it to the starting point, there is no error whatever between the absolute ton-mileage and the commercial ton-mileage. This is shown by the following example: A truck travels 5 miles with a 5-ton load, delivers it and returns 5 miles to the starting point empty. Using the absolute ton-mileage is 5 x 5 = 25 plus 5 x 0 = 0, giving a total of 25 absolute ton-miles. Using the commercial ton-mile, the total commercial ton-mileage is 5 x 10 (divided by 2) = 25.

No Error in Most Cases

Similarly, if a second load of 5 tons had been picked up at the same point at which the first 5 tons were delivered, the absolute ton-mileage would have been 50, determined by adding 5 x 5 and 5 x 5. Using the commercial ton-mileage unit, the total ton-mileage of the trip would have been $\frac{10 \times 10}{2} = 50$ commercial ton-miles. In cases where loads are delivered and picked up piecemeal during the trip an error exists between the absolute ton-miles and the commercial ton-mile, but this error may be neglected in view of the fact that the ton-mileage determined by the commercial unit is much more readily obtained than the absolute ton-mileage and because any two results determined upon the same basis will be comparable.

It is highly important that this commercial ton-mile be used by all those engaged in determining motor truck cost of operation, for if several units are employed, great confusion will result. Furthermore, it is highly beneficial to truck owners that no such confusion does exist, especially in view of the fact that the great development in the use of trucks in overland haulage during the past two or three years will undoubtedly result in an attempt to fix rates for truck transportation over the highways.

This has already proved to be the case,

(*Continued on page* 57)

TWELVE PRINCIPLES

In the Installation of Trucks in Retail Coal Delivery

1—Utility of Truck Versus Horse
2—Area of Delivery Territory
3—Tonnage to Be Delivered
4—Average Size of Load
5—Layout of Yard
6—Necessity for Changes in Pockets
7—Unloading Conditions
8—Type of Bodies
9—Establishment of Garage
10—Problems of Maintenance
11—Type of Drivers
12—Weighing Facilities

THERE are twelve cardinal principles that must be considered by a retail coal dealer who contemplates the installation of a fleet of trucks. An example of the working out of these principles may be taken from the experience of Roderick Stephens of Olin J. Stephens, Inc., one of the largest coal dealers in New York City.

That company purchased its first motor truck in 1908 and has built up its fleet since that time to twenty-two, including ten Sauers and one Mack of 6-ton capacity, two Sauers and one Garford of 5-ton capacity, four 4-ton and one 3-ton Sauers, and three 2-ton Autocars. Beside the motor equipment it has some eighty horses and fifty wagons. The company's main plant is off Manhattan Island, but its delivery area extends as far south as One Hundredth Street on Manhattan Island, about 3 miles away, and includes all of the Bronx to the Yonkers line on the west, about 8 miles, and Mt. Vernon, about 7 miles, on the east. This territory is served from six waterfront yards, five in the Bronx and one in Manhattan.

Utility of Truck

1—Taking up these twelve principles one by one, according to their sequence in importance, the first to be considered is the determination of the utility of motor trucks versus horse vehicles in hauling coal. The cost of delivery is the paramount issue to be decided upon before anything else is brought up. Mr. Stephens, who thoroughly analyzed the costs of both motor vehicles and horse delivery, found that while horses were reliable in the spring and fall months, they often caused a disarrangement of the delivery schedule in the hot summer because of the heat and in the winter because of the snow and slippery pavements. Another point to be considered is the fact that in the coal business during normal periods there are 2 months, July and August, when business is slack. A coal dealer who keeps a horse wagon equipment, or who has a mixed fleet of horse wagons and motor trucks, must consider the cost of keeping horses during idle periods as against motor trucks. Expenses on one keep on mounting, while on the other they cease, except for the fixed charges. A coal dealer must also decide on the size of his trucks. The size of his trucks must be determined upon the local conditions. If his business is such as to include only homes and small stores, he must then adapt his truck sizes according to the local purchases. He will find in such cases that coal orders will probably average from ½ to 2 tons. Therefore, in order to get the best results as far as economy in haulage is concerned, it will be best for him to use a truck of 2-ton capacity. He may arrage his deliveries so that four of the ½-ton orders will be taken care of by one truck. The question then arises, if these small orders come from customers near the coal pockets, as to whether or not it would be more economical to use horses. The logical answer to this question is in the determination of the time saved in delivery and the number of such small deliveries per day to nearby and distant customers. A horse vehicle may take care of a small part of the nearby deliveries, but it would not be economical in long hauls. As a result, the horse vehicle cannot be used to expand the territory under peak load conditions. On the other hand, the motor trucks could take care of both the short and long hauls, thus being busy all of the time. There are other angles from which this question may be treated. For instance, the dealer whose trucks encounter narrow streets and alleys must generally use trucks of small capacities in order to overcome the difficulties in maneuvering. A dealer who serves a factory district or large business section usually receives large tonnage contracts and in order to get the best economy in haulage, his coal will be hauled in trucks of large capacities in order to cut down the number of trips.

Area of Delivery Territory

2—The next thing to be determined in the installation of a fleet of coal trucks is the area of delivery territory. This goes hand-in-hand with the previous principle, for it determines for a large part the utility of the truck in long and short hauls. Coal dealers who have been using horses entirely in a large territory must consider motor trucks from the viewpoint of quickness and efficiency of service. The experience of a number of coal dealers has shown that motor trucks have cut down expenses in the maintenance of branch yards, which had to be maintained with horse delivery. Dealers serving a large territory and using horses only had to maintain branch yards in various parts of the city in order to eliminate the slowness of delivery by horses. After motor trucks were installed these branch yards were done away with, all deliveries being made from the main coal pockets.

Tonnage to Be Delivered

3—The third principle that must be considered by a coal dealer who contemplates the installation of a fleet of trucks is the tonnage to be delivered. A dealer may do only a retail business on account of the local conditions. His delivery radius has been limited on account of the use of horse vehicles or on account of the small size of his motor truck fleet. As a result he has passed up the big contracts with concerns more distant, who could not be taken care of quickly and efficiently by his trucks. By increasing his motor truck fleet he figures that he can compete with the rival concerns. Coal contracts from factories, etc., usually mean large deliveries at certain given times.

A dealer who contemplates taking care of an increased tonnage of this sort must figure from two angles: 1—The determination of the size of trucks to meet these large contracts, and, 2—The determination of the right number to purchase. In large contract work trucks of 5- and 6-ton capacities have proved the most efficient, for they cut down the number of trips. The number of trucks purchased must be treated from another angle. A dealer must figure on taking care of the large contract work with a minimum number of trucks, so that he will not have too many idle during the slack periods. This point also applies to the purchase of trucks of smaller capacities.

Average Size of Load

4—In order to get the maximum results in coal delivery the average size of the loads must be determined. It would be inefficient to maintain a fleet of 5-ton trucks when most of the orders were for 1 and 2 tons at widely separated points. These conditions must be studied so that the truck sizes will be so distributed that they will take care of the various loads. An example of the result of a study of this kind may be cited in the case of Mr. Stephens, who compiled figures to determine the number of truck capacities to install. Glancing over the various capacities of his trucks, it will be seen that eleven out of the twenty-two trucks are of 6-ton capacity, three of 5-ton capacity, four 4-tonners, one 3-tonner and three 2-tonners. Most of the business is secured through large contract, which is taken care of by the 5- and 6-ton trucks. The rest of the business is proportionate to the number of truck capacities used.

Layout of Yard

5—The layout of the yard is an important factor in the efficient delivery of coal. Much time can be lost at the yards by a poor layout. In order to save the time of incoming and outgoing trucks the yards must be so arranged that there will be no time lost in maneuvering the trucks at the pockets. The drivers should not be forced to do any backing. There should be separate entrances and exits so that the trucks can run up to the pockets one way and leave them reversing their direction.

Changes in Pockets

6—In considering the installation of a fleet of trucks a coal dealer must take the coal pockets into consideration. He must weigh the cost of any needed changes against the benefits of the motor truck installation. A dealer whose business dates back long before the advent of motor trucks will find that his coal pockets are not designed so as to harmonize with the efficiency of motor truck use. The chutes will probably not be high enough to accommodate the higher bodies of the motor trucks. All of these conditions should be considered if the minimum in loading time is to be obtained. Coal loading is dependent on the efficient design of the coal pockets, and if efficient is instrumental in keeping the trucks in motion for the greatest possible time. In the case of Mr. Stephens he was confronted with a situation peculiar only to a coal dealer without railroad facilities. He found it expensive to store coal in large pockets because of the cost of elevating it from the barges. Whenever possible it was stored on the ground, thus eliminating the cost of pocket maintenance. However, shoveling coal from the ground into a truck is very slow work and Mr. Stephens soon found that he was losing money when it took from 20 to 30 minutes to load 6 tons of coal from the ground. To eliminate this costly delay he installed a Haiss mechanical loader which is capable of loading a ton of coal per minute.

Roderick Stephens, who gives on these pages the twelve basic principles on the installation of trucks in the retail coal business

Unloading Conditions

7—Efficient unloading is contingent upon the design of the truck body and a study of the local street and traffic conditions. In order to get the maximum efficiency in coal unloading there must be no unnecessary delay in hoisting the body so as to get the proper angle for chuting the coal. The use of a hoist operated by the engine permits a quick raising of the body. Some coal bodies are equipped with stilt-elevating devices operated through a train of gears by a hand-crank on the side of the truck. When fully elevated the body is inclined at an angle from 30 to 45 degrees. It takes about 4 minutes to raise a body by the hand-operated method and but a minute or so with the use of engine power. Lowering in both cases is a matter of from 20 seconds to ½ minute. Bodies tilted this way enable the coal to be discharged in practically every case without recourse to shoveling. In the case of Mr. Stephens it was found that discharging the coal from the rear end of the truck was faster than from the side. In his particular case the local street and traffic conditions were such as to enable his trucks to be backed up to the curb. In the case of coal dealers working in the lower part of New York City, where traffic conditions are congested and the streets narrow, it is often impossible to back a truck up to the curb. As a result trucks used in such work should discharge coal from the side. A point in favor of the rear end discharge of coal is that only one motion is needed in sliding out the chute from beneath the body. This method permits the use of a chute 26 feet in length, divided in two 13-foot lengths. When pulled out one length slides out from under the other to form the 26-foot extension when needed for chuting coal across the sidewalk. In the case of discharge of coal from the side, two motions are needed to couple up the chutes, as they are carried lengthwise under the body and must be lifted out and carried around to the side.

THE BIG 8

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Type of Bodies

8—Body types have an important bearing in coal delivery. They must be strong enough to withstand the wear and tear in loading and the design must be such as to take care of the unloading of hard and soft coal. Though all coal bodies will carry soft and hard coal, each grade cannot be discharged at the same rate of speed. On a dry day the larger coal will run from a truck at a lesser angle than ,will soft or smaller sized coal, the coefficient friction being less. On a wet day the large lumps of coal will adhere, thus impeding the discharge by clogging at the body exit. Under the same weather conditions, soft and small coal will not run as fast. Therefore, in order to overcome these conditions peculiar to the different grades of coal, Mr. Stephens has designed his bodies with a combination tailgate and chute. The tailgate is used for the soft coal and smaller grades of hard coal. It is hinged on a cross rod at the top of the body and swings open at the bottom, so that the coal may be discharged speedily in bulk when weather conditions require it.

(*Continued on page 73*)

Trailers Increase Efficiency of Trucks in Brick Delivery

Four-Wheeled Trailers Help Cut Unloading Time to Lessen Delivery Charges

TRAILERS have almost unlimited possibilities for increasing the efficiency of trucks used to deliver bricks because of the loading and unloading conditions which require great care and almost individual handling. While some one or two special bodies have been devised to unload brick in bulk without breakage, as for instance the type of body owned by Greer & Fontaine, Roanoke, Va., and described on pages 25 and 26 of THE COMMERCIAL VEHICLE for Feb. 1, 1918, these have not come into general use.

Even where some special form of body is provided to lessen the unloading time it does not solve the problem of rapid loading at the brickyard. Without the addition of any special body, trucks may be used to very good advantage in the delivery of brick by using trailers of the four-wheeled type or even of the semi-trailer design. With the use of the four-wheeled trailer the latter may be loaded in advance at the yard or at the same time as the truck is loaded by the employment of a double crew of men. Then, at the other end of the route or trip, the trailer may be left to be unloaded while the truck runs to its next stop for the delivery of the bricks carried in its own body.

Nest Body Coming

Some day, even the advantages which trailers now offer may be further improved upon by a nest type of body which can be loaded in advance and then deposited, bricks and all, upon truck or trailer. Where derricks or cranes are available at the job at which the brick is to be unloaded, the nest body may be lifted off the truck or trailer and both the loading and unloading time thereby cut to a minimum.

A Knox tractor hauling three four-wheeled trailers loaded with building brick. By the use of tractors and trailers, the Salt Lake Pressed Brick Co. changed a deficit of $1,200 a year for brick delivery into a profit of $1,900 a year

Brick carried from a Washington, D. C., yard by truck and four-wheeled trailer. The truck is a $3\frac{1}{2}$-tonner and the trailer of $2\frac{1}{2}$ tons capacity. The former carries 1,600 brick and the latter, 1,000 brick

Clamp Device Reduces Loading Time

No matter whether trailers are used or not, the loading and unloading time may even now be considerably reduced by a sort of clamp device with a handle by means of which the workman may pick up seven or eight bricks at one time. The device is somewhat like an ice tong, except that it is longer with plain flat ends instead of the sharp prongs used to grip the ice without slipping. When the bricks are lifted the handles of the device tend to close upon the end bricks in the row. Reversely, when the bricks are again set down the handles open so that they may be used immediately to pick up another row of bricks.

Aside from the greater truck efficiency which the use of trailers makes possible, the need for more rapid handling both in loading and unloading is important because most bricks are sold at the yard at a fixed price. When they are delivered by horse wagons or trucks to the job where they will be used, there is an additional charge for the delivery, the actual rate depending upon the length of haul. The brick maker is naturally anxious to reduce this charge as far as possible so as to be better able to meet competition and, of course, the purchaser wants to buy his brick at the lowest possible figure.

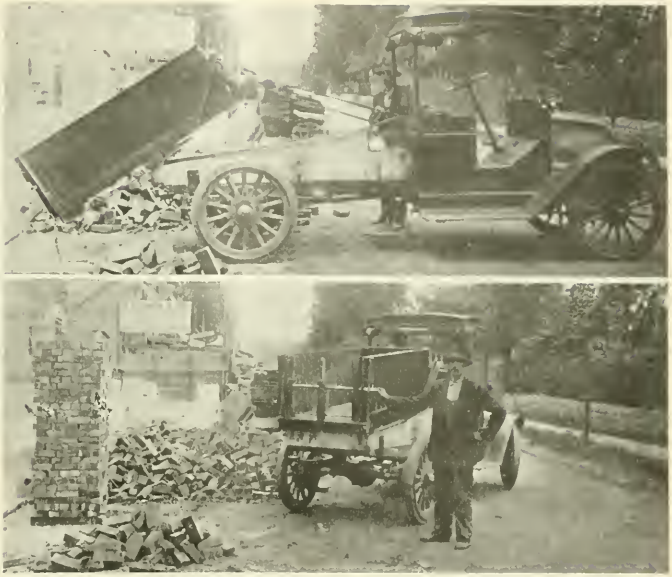
As the extra charge for delivery depends upon the length of haul, it is seen that the brick maker can compete outside of his own territory, other things being equal, only when he can reduce the cost of delivery by speeding up the loading and unloading operations. How trailers have accomplished this end is given herewith by citing the cases of the Salt Lake Pressed Brick Co., Salt Lake City, Utah, and the Washington Brick & Terra Cotta Co., Washington, D. C.

The Salt Lake Pressed Brick Co. has always made a fixed charge for bricks delivered to various points by teams or trucks. Prior to the installation of trucks and trailers this additional price for delivery by teams owned by the Salt Lake Pressed Brick Co. lacked yearly approximately $1,200 of paying the actual cost of the delivery and this difference had to be charged against or deducted from the manufacturing profit.

As a result of the installation of three Packard trucks, one of 4-ton capacity and two 6-tonners, and six 5-ton Troy trailers, that company not only took care of this deficit of $1,200, but showed a profit on the hauling end of $1,900 for the year. This was in 1916.

Not only was there a saving in transportation haulage costs, but a marked decrease in the number of horses required. The installation of motor equipment displaced forty horses. That company is now using only twenty horses. The use of trucks and trailers has enabled that company to give better service and handle a greater volume of business with less men.

By reason of the increased facilities of delivery, the business grew to the point where it was found necessary to purchase more trucks and five 5-ton Troy trailers. The latter are more than doubling the capacity of the trucks with only a slight increase in the cost of operation. Very frequently two of the trailers loaded to their capacity are hauled behind the trucks, also loaded. Most of the deliveries, however, are taken care of by one trailer and a truck.



A special brick body designed by Greer & Fontaine, Roanoke, Va. The body is tipped over to a vertical position and the tailboard pulled out so that the bricks remain in a vertical pile

Another instance of how motor-driven equipment cut delivery costs is the experience of the Washington Brick & Terra Cotta Co., Washington, D. C. That company has cut its hauling cost in two. Its three trucks and trailers are doing the work of from eight to twelve teams of horses each.

That concern put one truck into operation in September, 1915, and has since added the other two. The fleet now consists of two 5-ton and one 3½-ton trucks and two 5-ton and one 2½-ton trailers.

The 3½-ton truck with the smaller trailer has a capacity for common brick of 2600 bricks, the truck carrying 1600 and the trailer an even 1000. The 5-ton trucks and trailers have a total carrying capacity of 3400 bricks, the truck holding 1800 and the trailer 1600.

Though the company has three yards operating in the vicinity of Washington with a total daily capacity of 200,000 bricks, the trucks and trailers are used for the most part in making deliveries from the Potomac yard at Addison, Va., about 4 miles from the capital.

Each truck carries a crew consisting of the driver and four men for unloading the bricks. There is an ordinance in Washington against the dumping of brick, so that all of this class of goods has to be piled, except in special cases.

The teams have not been able to make more than two trips a day at any time. In contrast to this performance, the trucks make four and five trips a day. The large trucks carry 3400 brick, while the best a team can do is to carry a little less than 1600 brick each trip. The teams each cost $4 a day. The trucks and trailers cost in the neighborhood of $40 a day, but are an exceptional economy inasmuch as they do the work of from eight to twelve teams.

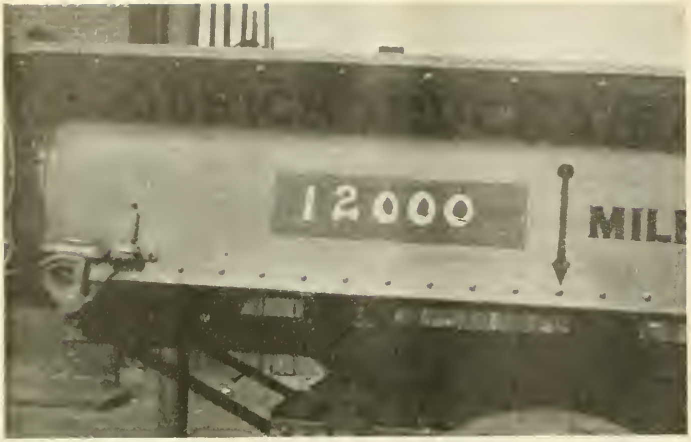
One of the Salt Lake Pressed Brick Co.'s trucks pulling two Troy trailers loaded to capacity with brick. The trailers are dropped off at jobs and unloaded while the truck carries its load to the most distant job, picking up the empty trailers on its return

TRANSFER CO. TO START BUS LINE

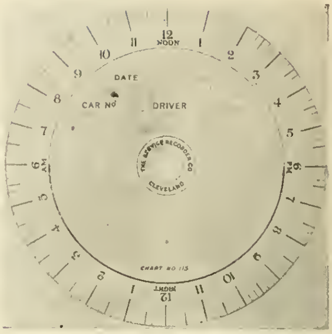
ST. LOUIS, MO., Aug. 2—The Progressive Transfer Co. of St. Louis has secured a franchise for the operation of a fleet of motor buses between Belleville and Scott Field, Ill. A branch line also will be operated between O'Fallen and Shiloh, Ill. The trucks will cover a distance of about 16 miles each trip, and the fare charged by the company will be 25 cents. Short rides between points within the city limits will be charged for at the rate of 5 cents.

The Progressive Transfer Company, with offices and freight depot at 620 South Seventh Street, St. Louis, operates a fleet of motor trucks for overland service, details of which were told in the July 15, 1919, issue of The Commercial Vehicle. The company had projected the operation of the motor bus line some months ago, but no plans have been made known before. It is planned by the company to have two buses in operation on the line by August 10, one truck to operate on the main line and the other to operate on the branch line.

When the company organized the transfer company, specialization was made on the White truck. The new buses will be White chassis upon which will be mounted bodies made especially for the company by the American Car Co. of St. Louis. Thirty-two additional White trucks have been ordered by the company for the extension of the bus service now operating on the Olive Street Road, St. Louis County. Eighteen White trucks of various capacities of from ¾ ton to 5 tons are now in operation on the St. Louis County line.



A close-up of Barber's unique advertisement on the side of each of his 5-ton Pierce-Arrows. The figures painted in white refer to the mileage of the tire on that side of the truck as indicated by the arrow



A reproduction of a chart of a Service Recorder which Barber sells as a side line to his contracting business. The chart is changed on each truck every 24 hours

Contractor Uses Trucks to Help Sell Tires

Trucks Are Advertisements on Wheels — Tires and Recording Device Are Profitable Side Lines

By K. H. Lansing

> **"BARBER"-ISMS**
>
> *HERE'S a Philadelphia contractor whose range of business extends from big operations like helping to build a fort, or hauling material for thousands of houses, to acting as a tire distributer and agent for a truck recording device. His name is Barber.*
>
> *He keeps his trucks in such condition, despite overloading, that, at the end of a two-year period the truck manufacturer's official inspector has been able to report each truck in first-class shape.*
>
> *He is able to do this by having a special service foreman follow up each job in a service car, particularly well equipped to make IMMEDIATE adjustments.*

IF you happen to be a contractor in a big way, that is no valid reason why you should overlook any of the lesser ways to make money. That is the business philosophy of Elmer Barber, contractor, of 1127 Land Title Building, Philadelphia.

Primarily, Barber is engaged in large and costly operations requiring much heavy equipment. He has, for instance:

(1) A fleet of seven motor trucks, consisting of five 5-ton dump body Pierce-Arrows fitted with Pierce hydraulic hoists and two 5-ton Saurers with Wood hydraulic hoists. He also has a long list of responsible trucking concerns whose trucks he can hire.

(2) Kopple steam and Plymouth gasoline locomotives, many cars and miles of tracking and other essentials for a narrow gage railroad, which he jocosely terms his scenic railway.

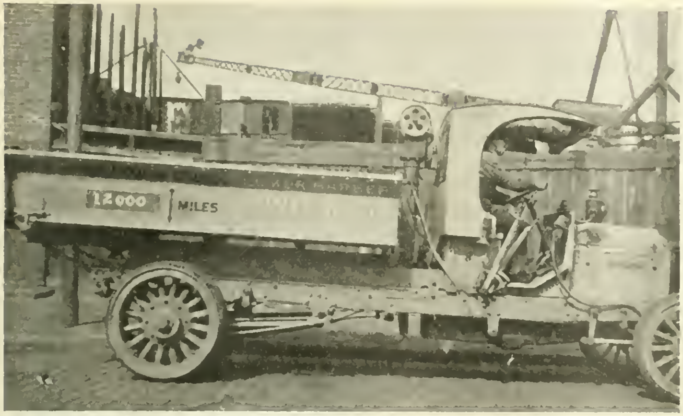
(3) Steam shovels, floating hoists and other road building machinery.

Notwithstanding the magnitude of operations entailing the use of an outfit like the foregoing, Barber, employing his business philosophy, finds pay dirt in minor engagements. That is why he is a distributer in Philadelphia for Goodrich De Luxe truck tires, and that, too, is why he is an agent for the Service Recorder, a device that records the travel of a truck and the actual time it has been working.

Barber isn't satisfied with just selling, in the case of his agencies, he's a natural born demonstrator. Take the case of tires, on which he admits he's somewhat of a bug. His trucks are a remarkably striking advertisement on sides and rear for the Goodrich truck tires—in fact, there's nothing else like them in Philadelphia and wherever they appear, if one watches carefully, he is likely to see some truck owner take out a pencil and notebook and jot down notes on what Barber has so neatly done.

Trucks Advertise Tires

On the side of each truck, over the rear wheels, with an arrow pointing at each tire, is a small blackboard on which are chalked in good-sized white lettering, figures showing the number of miles that particular tire has traveled since being put into use. These figures are changed at least once a week by the manager of the trucks and oftener if a remarkably long run has been made. The arrows pointing to the tires on each side are unfailing indicators of the tires' condition, so there can be no pretense if a tire isn't making good. As sometimes one tire may be put on later on one side, according to original requirement, or the order of their wearing out, it is not unusual, for instance, to see the chalked figures on one side varying widely from those on the other.



The tire mileage blackboard as it actually appears on the sides of each of Barber's 5-ton Pierce-Arrows

One arrow may point to a tire which on the blackboard on that side may register 12,000, while that on the other may indicate the tire has traveled only 10,500 miles.

Then, to make the advertisement complete, in addition to Barber's name and address on each side is the legend "Goodrich Truck Tires," with the word "Miles" centered alongside the arrow pointing to the tire.

Advertising That Pulls

Across the broad rear of each truck is the following wording, which, because of its bold lettering, everyone following in vehicle or on foot is compelled to read, "Elmer Barber, Distributor Goodrich Motor Truck Tires, 1127 Land Title Building." It would be hard to find a more conspicuous or convincing advertisement—and how that little blackboard stunt does attract attention! It's Barber's own idea. But he has many, especially with regard to the motor truck end of his business.

It was in 1908 that Barber, who is of the jolly, pink-faced New England type, blunt and incisive of speech and with a lurking sense of humor in nearly everything he says, started in the motor transportation business. He had two electric buses with headquarters in Johnstown, R. I., and had a lively passenger trade across the island. That gave him a taste of success with motor trucks that he never has lost. He has so much faith in his present fleet equipment that he uses it, as he says, with a chuckle, to transport his railroad. As a matter of fact the 7-ton locomotives and other construction mechanisms are loaded on his 5-ton trucks and hauled miles to the scene of a job. Notwithstanding this, such care does he have taken of his trucks that, although he purchased his Pierce-Arrows in 1916, the Foss-Hughes Co., of Philadelphia, local distributers, in April of the present year, on official inspection gave Barber a filled-in form blank showing the cars in first-class condition in all respects.

Service Foreman Big Asset

The secret? Well, for one thing, Barber insists on *proper care* being taken of his trucks from day to day, as they work along.

His service foreman, who does nothing else, every day follows up all jobs undertaken, being on the scene in his service car, a converted Packard passenger machine equipped with capacious tool box fitting into the body and forming a part of it. In the car are emergency articles, such as jacks, short crowbars, cables, towing chains, small parts and the like. If more than one job is going, the service car will go from one to the other.

Nothing that comes out of whack on a job stays that way longer than it takes to fix it up. This, Barber says, greatly expedites getting contract work done on time, in addition to keeping the trucks in condition.

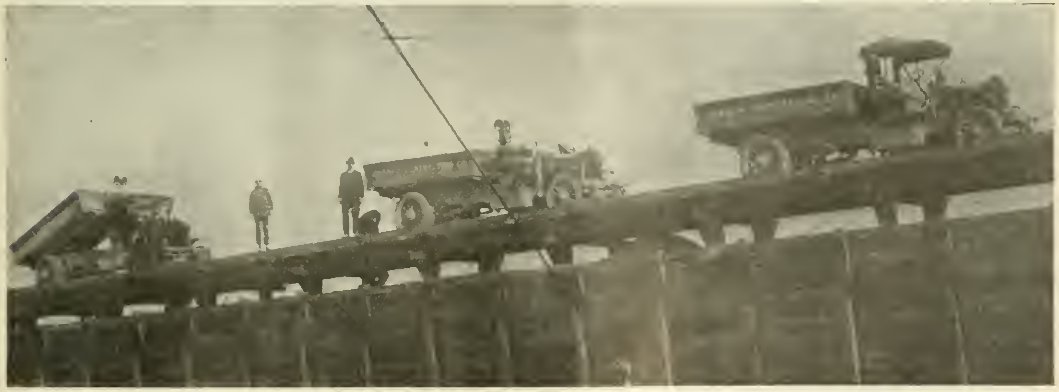
Proper Care Defined

Thus, Barber believes in service for himself, as well as for the other fellow, and profits by it.

Now by *proper care* it is not meant that Barber is finicky about how hard, or for what purposes his trucks are used; quite the contrary. He does overload his trucks. To haul for miles in a 5-ton truck a 7-ton locomotive and even, at times, an 11-ton hoisting engine isn't exactly underloading; but the point is, anything strained or loosened by such effort is corrected *immediately*. This policy has enabled the contractor to get away with feats that would decidedly slow up many other men in the hauling business who did not use the method of immediate correction and repair.

Nor does *proper care* entail taking superhuman precautions against accident in the ordinary procedure of work. Like many another contractor, occasionally one of Barber's trucks may skate provokingly down a trestle at an inopportune moment, and once, when the tide rose during a job down in Delaware, it enveloped one of his trucks, which remained under water for 5 days. That is the one occasion on record that immediate fixing was impossible. But as soon as was practicable, the engulfed truck

(*Continued on page* 73)



Elmer Barber's so-called scenic railway which he built during his haulage work in connection with the construction of Fort Saulsbury, Del., so that the materials carried in the trucks could be dumped exactly where they were to be used. The trestle cut the time of unloading to a minimum

Equipment Required for Upkeep of 54 Gasoline Trucks

A Good Department Store Maintenance Story

HERE IS THE EQUIPMENT

1—One 20-inch drill press.
2—One medium-sized draw-cut saw.
3—One emery wheel.
4—Two lathes—one 14-inch with a 6-foot bed and one 18-inch with a 12-foot bed.
5—One arbor press.
6—Two home-made engine stands, one with a means for running engine while in the stand.
7—One oil-filter for reclaiming crankcase oil.
8—One battery of tanks for new lubricating oils, together with a convenient means of emptying the barrels without manual lifting.
9—One workbench with vises, etc. The bench must have good light.
10—One home-made stand for washing parts in kerosene.
11—One well-arranged stockroom.
12—One toolboard for wrenches, clamps and special tools.
13—Two portable electric drills.
14—One small arbor press for pressing off small parts.
15—Good supply of tools, wrenches, etc.

George Heron, the Maintenance Superintendent

George Heron, who is responsible for the maintenance of the fifty-four gasoline trucks operated by the Boston Store, Chicago, one of the large department stores in that city

QUITE often the truck superintendent must answer the question of just what equipment in the way of tools and tool machinery is required to properly maintain a fleet of from five to fifty vehicles of either the gasoline or electric type.

This article is intended to answer that question by citing a particular case and telling the exact kind of maintenance work done and the name and addresses of the makers of the particular tools used so that this latter information may be of real value to other fleet owners desiring to install similar equipment.

The installation to be discussed herewith is that of the Boston Store, Chicago, which operates a total fleet of sixty-nine trucks, of which fifteen are electrics and fifty-four gasoline vehicles, in the delivery of ordinary department store goods and also food products. The maintenance and operation of these trucks are divided with the former work in the charge of George Heron, who has complete control and is held responsible for the proper maintenance of the vehicles.

Assembled Trucks Preferred

As a great majority of the company's trucks are of the gasoline type, this article will deal particularly with the gasoline trucks. The make-up of the gasoline fleet is important because it has a direct bearing on the maintenance problem. The particular feature of the make-up which has to do with the maintenance lies in the fact that all of the trucks employed are more or less what may be considered assembled rather than manufactured vehicles. This class of truck was purchased particularly because of the ease in obtaining spare parts and repair parts from more than one source and of getting these parts at a much lower cost than would be the case if similar parts had to be purchased for a so-called manufactured truck direct from that maker at his home plant.

The fleet is made up of eleven Fords, of which three have been converted into 1-ton trucks by the use of the Dearborn chain-driven adapter; twenty Diamond-Ts ranging in capacity from ¾-tonners to 2-ton trucks; ten Republics up to 2 tons in capacity; eight new and old style Macks; three Nashes and two old Grabowskys. At the present time more Diamond-T trucks, which are assembled in Chicago, are employed than any other make and it is intended to install still more Diamond-Ts as the present trucks wear out in order that the fleet may become more standardized and still further reduce the maintenance problem set up by having to carry a stock of parts for no less than six different makes of truck, as is at present the case.

Before discussing in detail the particular machinery and tools employed in the maintenance of the fleet just described, it will perhaps be best to discuss briefly the general fundamentals upon which the repair work is done so that the reason for the application of the tool machines and equipment may be more readily understood. In this respect, the department store industry is peculiar insofar as truck maintenance is concerned, in that it is a seasonal business and all of the trucks must be in such shape as to pass through the peak load work during the Christmas holidays without giving any mechanical trouble which might otherwise disarrange the entire delivery schedule just at a time when such disarrangement would seriously affect the store's business.

Mr. Heron has found that he must give more attention to the engines of the trucks than to any other part. The engine of the truck is really its heart as compared with the human body. Everyone knows that as soon as a person's heart begins to give trouble the remainder of the human body is more or less crippled even though the various parts of the body function properly. It is the same with the motor truck, for once the engine begins to give trouble delays and disruption of delivery schedules occur no matter in what good shape may be the propeller shaft, the gearset, rear axle, brakes or wheels and so forth.

Engines Tuned Up Every 6 Months

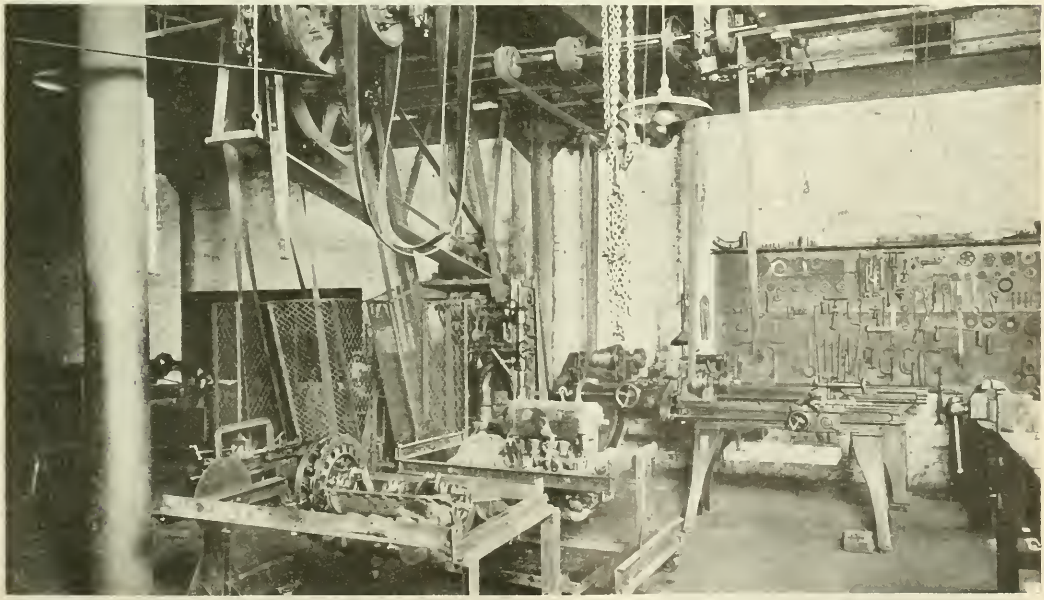
As a result, the engines of all of the Boston Store trucks are generally gone over once every 6 months. The trucks are brought in in rotation so that there are not more than two or three trucks in the shop at any one time. Most of this work is done during the summer months when business is slack as compared to the winter months of October, November, December and January. During the latter months as few of the vehicles are brought in as possible because all of them are required to handle the peak load work.

During the remainder of the year, the work is divided up as evenly as possible between the months so as to keep the working force of six mechanics who work under Mr. Heron's supervision as busy as possible. In addition to the six mechanics who work at the Boston Store garage, one mechanic is also stationed at the store to take care of the maintenance of the electrics which are charged in the basement instead of at the garage. The six gasoline truck mechanics take care of the entire fleet of fifty-four gasoline trucks. They are paid at the rate of 60 cents for an 8-hour day, although Mr. Heron's assistant is paid 75 cents an hour.

Getting back to the details of the attention paid to the engines of the trucks, it is a practice to thoroughly inspect each engine at least once every 6 months even though the

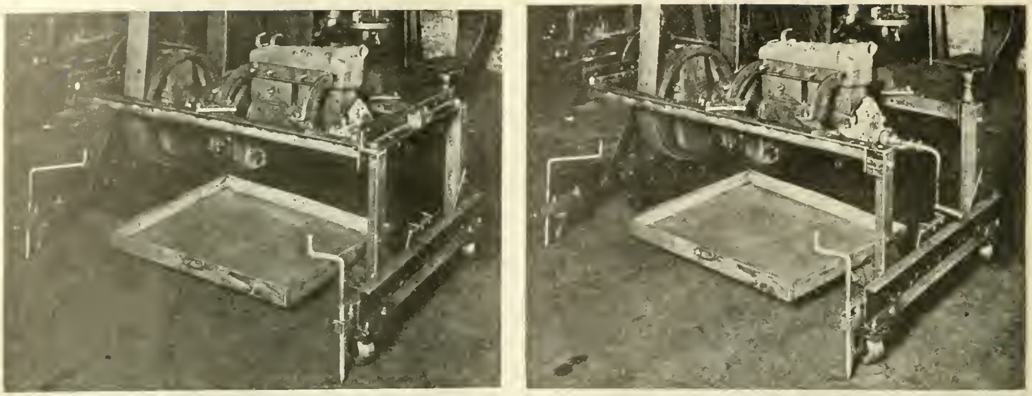
Filter for Oil Taken From Engine

This Bowser filter is used to reclaim the oil taken from the engine crankcases when the engines are torn down for general overhaul. Note the drip pan on which the oil measures are placed to prevent oil dripping to floor



The Machine Shop Is Well Arranged and Exceptionally Well Lighted

This view shows the general layout of the Boston Store's garage repair shop. Two of the engine stands are shown in the foreground, with two lathes in the background and a workbench along the front wall at the right. The workbench is lighted by several windows in the front wall



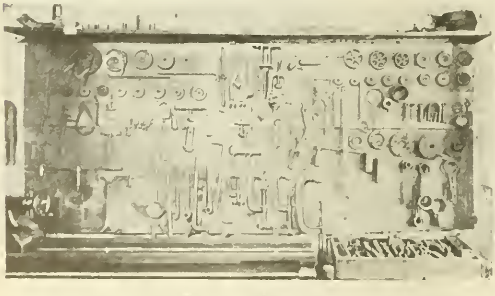
Engine Worked-In on Home-made Engine Stand

The home-made engine stand shown above has a top frame member supporting the engine which may be held rigidly in place or moved about its axis. The view at the left shows the stand pivoted at both ends. At the right, the upper end piece of the stand proper and the end piece of the swinging framework are removed so that a larger engine may be supported than the one shown. Note also how the engine is supported on two side arm brackets and how the stand is mounted on four casters. The stand is held rigid while the engine is being run in by means of the pointed bars screwed down into the floor. A drip pan is used to catch the lubricating oil

engine may not be torn down. For instance, the engine in one of the ¾-ton Diamond-Ts has been in service for over 5 years without the necessity of being torn down. The method of procedure in overhauling the engines is to first of all take it out of the truck chassis. Then it is placed in a special engine stand which is so designed that it may be used for any of the engines on the six types of trucks employed. The stand was devised by Mr. Heron and is shown in detail in the two illustrations at the top of this page.

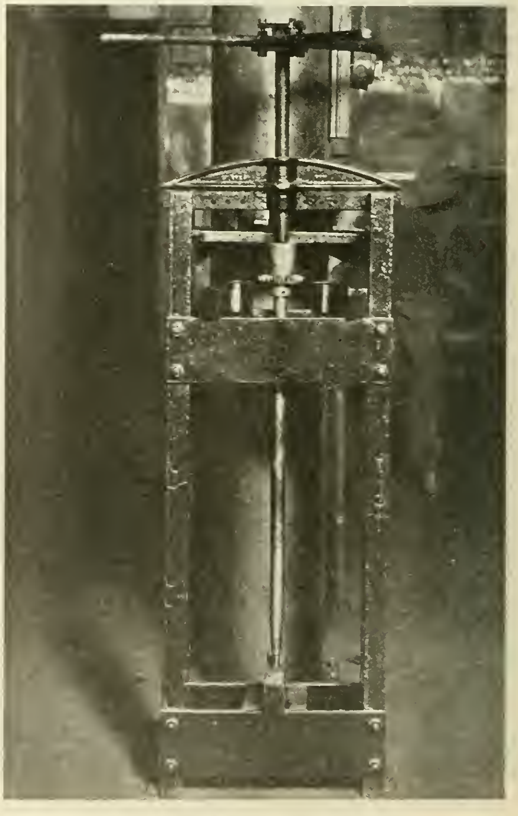
The next step in the engine overhaul is to grind in the valves, examine the pistons and piston rings, and refit new rings if necessary. Then the main bearings are inspected, followed by the connecting rod bearings and finally the oil system is gone over. After this work is done, the engine is then worked in by a belt and pulley receiving its power from overhead shafting as shown in the large illustration at the bottom of page 53. This running-in process is carried out while the engine still remains in its stand, as best shown in the two illustrations at the top of this page. The engine work is done on the second floor of the garage and is carried on simultaneously with the overhaul work on the other parts of the chassis, which is done on the first floor.

One extra Ford engine, or in reality a complete power plant, including clutch and gearset, is kept on hand as a



Toolboard Saves Mechanic's Time

On this special toolboard every tool has its place so that the mechanic saves the time otherwise used in hunting for tools to begin a job



Arbor Press Comes In Handy

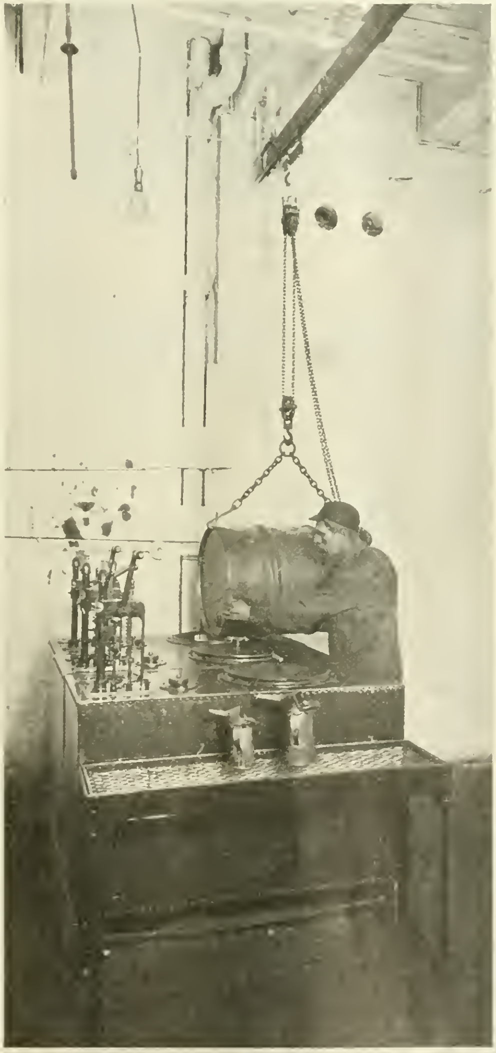
This arbor press comes in very handy for pressing off small gears as shown above, or of pressing out various kinds of bushings spare part for the eleven regular and converted Fords in use.

The advantage of using a fleet of assembled rather than manufactured trucks is readily understood as regards engines because the two complete Continental engines, one large and one small, which are carried in stock, may be used for replacement in either the large or small Republic trucks or Diamond-T trucks. Thus one make of engine in two sizes serves to keep the engine in two makes of trucks in good shape. Furthermore, there are six places in Chicago where parts can be obtained for the two sizes of Continental engines, and these parts can be had much cheaper than would be the case if it were necessary to send direct to the factory for an engine part used in a so-called manufactured truck.

While discussing the Ford engine repair method and the complete power plant carried on hand, it may also be of interest to other operators of Ford trucks to know that besides the motor, a complete Ford front and rear axle are carried in stock, together with other parts to the value of $500. The only parts not carried in stock are the frame and the steering gear, and with the exception of these, a complete Ford could be assembled from the parts carried on hand.

Mr. Heron found that his greatest trouble with a Ford was with the ignition system. As a result, all of the Ford engines are now fitted with a special Bosch magneto. The regular flywheel magneto is used only for the lights and the horn. The use of the Bosch magneto on the eleven Fords has resulted in a saving in gasoline of approximately $600 a year as will be told in greater detail in a subsequent article in THE COMMERCIAL VEHICLE.

The same reduction in the number of spare parts carried for the truck engines by reason of using trucks with a standard engine is carried out in other parts of the chassis. For instance, two complete Timken worm-driven axles may be used on either the Diamond-T trucks or the Macks. Other spare parts carried in stock include a front and rear spring for each model of trucks in use. Similarly, a complete radiator for each model of trucks is kept on hand with the exception of that on the Macks. Miscellaneous axle parts including a complete Torbenson axle with a complete differential, and a complete housing for the 1- and 2-ton Torbenson axles used on the Republic trucks are carried in stock, and the total value of the repair parts, exclusive of those for the Fords, is valued at between $8,000 and $10,000. At the $10,000 figure, the value of the spare parts is roughly 10 per cent of the total truck investment when new, figuring each of the fifty trucks as worth $2,000.



Easily-Filled Oil Tank

By means of the overhead track and differential block shown, it is an easy one-man job to fill the battery of Bowser tanks with lubricating oil. The two tanks in the foreground each hold 180 gallons and are used for light and medium oil. The tank at the rear is used for gearset oil and is provided underneath with a heater to make the oil run readily. The stand in front of the tank saves oil otherwise wasted through dripping. All of the walls of the room are whitewashed for cleanliness

While the detailed method of maintaining the fleet of fifty-four gasoline trucks are of great interest to all fleet owners as will be discussed in a subsequent issue of THE COMMERCIAL VEHICLE, it is interesting to note the equipment found necessary for the work. This equipment is listed under fifteen heads for ready reference on page 52.

In brief, it consists of a 20-inch drill press made by the Canedy-Otto Mfg. Co., Chicago Heights, Ill. This is used for all sorts of drilling work. Then there is a Marvel draw cut saw made by the Marvel Machinery Co., Minneapolis, Minn. An ordinary emery wheel is also included in the equipment for grinding operations.

Two lathes have been found necessary for carrying on the miscellaneous machine work. Both are made by the South Bend Lathe Works, South Bend, Ind. One is for work on large parts and has a 12-foot bed with an 18-inch width. The smaller lathe is of the 14-inch size with a 6-foot bed. An Atlas No. 202 arbor press for pressing off small gears, bushings and so forth, has been found very convenient. The Atlas press is made by the Atlas Press Co., Kalamazoo, Mich.

In addition to the above equipment, Mr. Heron has found it necessary to provide two homemade engine stands. As shown in the illustrations at the top of page 54, these stands are characterized by the fact that the engine may be operated while placed in them. To keep the stands rigid during this work, sharp pointed screw-down rods turned into the floor are provided. Each of these rods has a handle at the top so that it may be screwed out of the floor should the stand have to be moved to another location. Another particular feature of the engine stand is the fact that it may be used

(*Continued on page* 78)

OVERLAND HAULAGE

How One Company Is Making It Pay Between Cincinnati and Dayton

MINIMUM RATES AVERAGE 1 CENT PER MILE PER 100 POUNDS

THAT overland haulage can be made a paying business if conducted along modern business lines is proven by the case of the C. & D. Motor Delivery Co., Cincinnati, Ohio, which started in business on June 1, 1918, with two trucks and now operates six trucks, in addition to twenty-five horse wagons previously employed. The secret of the success of the C. & D. company has been due to three fundamentals, as follows:

1—Previous knowledge of the business as gained through experience in transfer work with horse wagons.

2—The determination of equitable rates with a minimum charge of 1 cent per 100 pounds per mile for shipments of 1000 pounds and over and higher rates for smaller shipments.

3—The conduct of the business on a thorough business-like basis.

The Route Covered

The route covered by the C. & D. trucks is between Cincinnati and Dayton and touches at the intermediate towns beginning at the Cincinnati end, of Hamilton, Middletown, Franklin, Miamisburg and West Carrollton. When the line was first started in June, 1918, a three-times-a-week service was offered, two trucks being employed, one leaving from each end of the line on Mondays, Wednesdays and Fridays. At the present time the service has proved so satisfactory that two additional trucks have been installed to permit of a daily service between Cincinnati and Dayton.

TRUCKS LEAVING		ARRIVE AT		Per Cwt.
Cincinnati	4:30 a. m.	Hamilton	7:00 a. m.	50c
"	"	Middletown	8:30 "	60c
"	"	Franklin	9:30 "	60c
"	"	Miamisburg	10:00 "	65c
"	"	West Carrollton	10:30 "	65c
"	"	Dayton	11:30 "	75c
Hamilton	7:30 a. m.	Dayton	11:30 a. m.	60c
"	"	Middletown	8:30 "	40c
"	4:30 p. m.	Cincinnati	6:30 p. m.	50c
Middletown	8:30 a. m.	Dayton	11:30 a. m.	50c
"	3:00 p. m.	Hamilton	4:00 p. m.	40c
"	3:00 "	Cincinnati	6:30 "	60c
Dayton	12:00 a. m.	West Carrollton	1:00 p. m.	35c
"	"	Miamisburg	1:30 "	35c
"	"	Franklin	2:00 "	40c
"	"	Middletown	3:00 "	50c
"	"	Hamilton	4:00 "	60c
"	"	Cincinnati	6:30 "	75c

SPECIAL PRICES ON LOAD SHIPMENTS

Rates based on 100 lb. min. weight, war tax 1c for each 20c or fraction thereof

The schedule of the trucks running between Cincinnati and Dayton, 55 miles apart, and showing the times of arrival and departure at the intermediate points

One of the C. & D. trucks with a miscellaneous load picked up in Cincinnati and to be delivered in Dayton, 55 miles away, or dropped off at the intermediate towns of Hamilton, Middletown, Franklin, Miamisburg or West Carrollton

At the beginning, two 3½-ton Schachts fitted with stake bodies were used. Now four Schachts are employed and a Reo ¾-tonner and a Ford have been purchased to handle the pick-up work at the Cincinnati end.

It is 55 miles by road from Cincinnati to Dayton. The rate for shipments of 1000 pounds or over is 55 cents per 100 pounds, or at the rate of 1 cent a mile per 100 pounds. For shipments from 500 pounds to 1000 pounds the rate is 65 cents and for shipments less than 500 pounds, 75 cents. The latter rate is thus approximately equivalent to 1½ cents per 100 pounds per mile. These rates apply only on heavy merchandise. Light or bulky goods are carried at a cubic foot rate varying from 3 cents to 8 cents, according to the comparative bulkiness and the distance moved. These bulk rates vary from 8 cents between Cincinnati and Dayton to 7 cents between Cincinnati and West Carrollton and Miamisburg. Between Dayton and Hamilton the rate is 6 cents and between Dayton and Middletown 5 cents. Between Middletown and Hamilton the rate is 3 cents. The minimum shipment is $1 plus the war tax, which also applies to the heavy merchandise shipments as well.

Rates to Intermediate Points

The rates to intermediate points are as follows:

Weight	Hamilton	Middletown Franklin	Miamisburg West Carrollton
Less than 500 lbs.	$0.50	$0.60	$0.65
500 to 1,000 lbs..	.40	.50	.55
Over 1,000 lbs....	.30	.40	.45

Another underlying reason for the success of the C. & D. company is to be found in the fact that reliable agents have been secured in Dayton, Middletown and Hamilton to handle the business of the company in those cities and to get new business. This work has been intrusted to transfermen already established in business in the cities named so that what business they secure for the

C. & D. company simply adds to their income.

The C. & D. company pays these agents for the delivery of goods handled over the C. & D. line at the rate of 35 cents a delivery on small weights of goods varying from 100 to 300 pounds. From 300 to 800 pounds the rate is 50 cents, and from 800 pounds to 1200 pounds, 75 cents. From 1200 pounds to 1600 pounds, the payment is $1. These rates apply equally as well for the pick-up of goods to be shipped over the C. & D. line.

When the line was first started in 1918, practically all of the goods were handled out of Cincinnati with very little material moving from Dayton to Cincinnati. The bulk of the loads from Cincinnati at that time were made up of machinery; ink; steel parts and materials for the National Cash Register Co. in Dayton; fresh strawberries in season; shoes and leather findings. From Cincinnati the main goods handled included washing machines and malt converted into medicinal products and beverages in Cincinnati. At that time the trucks were operated at little more than 50 per cent of their maximum load-carrying capacity.

Trucks 75 Per Cent Loaded

However, with the addition of more trucks and the establishment of a daily service, together with the efforts put forth by the C. & D. officials to increase the business, have resulted in a more nearly uniform distribution of the goods traveling in both directions. At the present time the trucks average between 75 and 80 per cent of their full-load capacity.

The war tax on every shipment is figured at 3 per cent of the cost of transportation when the shipment is over 1000 pounds total weight and carried as freight. When under 1000 pounds and carried as express the tax is 5 per cent.

The schedule of the trucks running between Cincinnati and Dayton and the times of arrival and departure at the intermediate cities are shown in the table on the opposite page. One of the trucks leaves Cincinnati at 4.30 in the morning, having been loaded during the night with goods picked up during the day previous. The truck arrives at Dayton at 11.30 a. m., making the 55-mile run in 7 hours, or at the rate of a little under 8 miles an hour. The actual running time with a full load is at the rate of about 10 miles an hour, the difference in the average speed during the trip being due to the stops made at Middletown, Franklin, Miamisburg and West Carrollton. When the truck arrives at Dayton its load has been already assembled so that it stays over in Dayton for one-half an hour, during which time the driver and his helper get their meals It leaves Dayton at noon and gets back to Cincinnati at 6.30 the same day, thus completing a 110-mile trip.

Old Transfer Men at Work

Much of the company's success in obtaining business has been due to the fact that the men at the head of the C. & D. company are old transfer men engaged in business in Cincinnati with horse vehicles for many years. Louis J. Hughes, one of the members of the C. & D. company, is also interested in the Peter Hughes Drayage Co., which specializes on transfers within the city of Cincinnati proper. It naturally diverts to the C. & D. company all of the shipments originating in Cincinnati which must be moved to any point along the route to Dayton. The horse wagons maintained by the C. & D. company for pick-up work in Cincinnati are also kept at the stable of the Peter Hughes Drayage Co.

One of the C. & D. 3½-ton Schacht trucks used for inter-city deliveries between Cincinnati and Dayton, 55 miles apart. Note the type of body fitted—canvas covers are used to protect the goods in stormy weather

Trucks Used for Pick-Ups

Until last year these horse wagons were used for all of the pick-up work, but the C. & D. company has since purchased a ¾-ton Reo truck mounted on pneumatic tires and a Ford 1-tonner to assist in the work. Their main advantage, of course, is in their greater speed as compared with the horse wagons and their ability to make quicker deliveries and pick-ups and cover a much wider territory to the end that the area from which business may be procured can be increased three or four times.

The roads along the route are good in some places and bad in others. The worst stretch was between Carthage and Glendale, although this road is rapidly being put into shape. Excellent roads exist between Hamilton and Middletown. Of the 14-mile stretch between these two cities, 6 miles is of macadam and 8 miles paved with either brick or bitulithic macadam.

The cost of operation of the truck between Cincinnati and Dayton is figured at $40.45 one way, including an overhead charge of $5. It further includes $6.75 for gasoline and oil; $11.60 for the driver and helper; $4.40 for tires at 4 cents per mile; $3.30 for repairs at 3 cents per mile; $1 for insurance; $1 for garage; $6.60 for depreciation at a truck life of 150,000 miles, and 80 cents for interest.

More About the Ton-Mile

(*Continued from page* 45)

for the Nebraska State Railway Commission has already put into effect as of July 1, 1919, a full schedule of truck rates for the haulage of goods between points not within the same city or village in the eastern part of Nebraska.

While the rates determined upon by the Nebraska commission seem to be fair as discussed elsewhere in this issue, it is almost impossible to believe, yet is actually the case, that they were determined upon the cost per ton-mile with the ton-mileage of any trip determined by multiplying the mileage of the trip by tonnage carried on the trip!

If the Nebraska authorities lay themselves open to such criticism because of an improper definition and use of the ton-mile, it is not to be expected that other states will not make the same mistake unless the definition of the commercial ton-mile as given in this article is thoroughly understood and widely applied.

Commercial Ton-Mile Best

When calculating costs, every truck owner should use the commercial ton-mile and obtain the commercial ton-mileage of any trip by multiplying the total tonnage carried on that trip by one-half the trip distance. When this is done all ton-mileage figures will be determined upon the same basis and will therefore be comparable. The commercial ton-mile is the best unit which can be employed and besides being used in all calculations published in The Commercial Vehicle, it is also employed to determine ton-mile costs in the nationwide efficiency contest now being conducted by the Packard company.

FAIR TRUCK RATES

Established by Nebraska

Wrong Definition of Ton-Mile Assumed

EXCELLENT DATA FOR EVERY TRUCK TRANSFER COMPANY

THE Nebraska Street Railway Commission has established motor trucking rates per 100 pounds of goods between points not within the same city or village. The rates seem fair and are based upon a charge of 1½ cents per mile for 100 pounds, plus a fixed charge of 15 cents per 100 pounds to include both the handling at the point of receipt and for distribution at destination. Thus the rate for first class goods per 100 pounds moved a distance of 1 mile is 16½ cents, and for 100 miles $1.65.

The rates apply only to truck owners who transport freight for hire upon the public highway between points located in the eastern portion of the State of Nebraska, as exactly outlined later in in this article. Following the method of railroad classification, goods which might be hauled by trucks are classified under four different heads and designated as first-, second-, third-, and fourth-class. The second-class matter is to be carried at 85 per cent of the first-class rate; third-class goods at 70 per cent of the first-class rate, and fourth-class goods at 60 per cent of the first-class rate.

The rates per 100 pounds were determined upon the basis of using a 2-ton truck, which is the size most generally used in the State of Nebraska due to the fact that the present roads and their condition during certain portions of the year will not permit of the uninterrupted use of 5-ton trucks such as are most usually employed for intercity traffic over the more improved highways in the East.

In comparing the rates with others in force with 3½- to 5-ton trucks in other sections of the country, the basic rate of 1½ cents per 100 pounds per mile seems fair and should enable motor truck companies engaged in overland haulage work to earn a fair profit on their investment provided their work is carried out along approved business methods. For example, the rate per 100 pounds between New York and Philadelphia, a distance of 104 miles, varies between 90 cents and $1, which is equivalent to about 1 cent a mile per 100 pounds, as compared with the 1½ cent basic charge as determined by the Nebraska commission.

Before assuming that the Nebraska rate is much higher than that between New York and Philadelphia, it must be borne in mind that, other things being equal, it is more economical to haul on a 5-ton truck than on a 2-ton truck, since the operating and fixed charges of a 5-tonner are not two and one-half times that of a 2-ton truck. Again, it costs more to haul goods in Nebraska than it does along the Atlantic seaboard, because as a general rule, the roads are much more highly developed in the eastern territory than they are in Nebraska.

At the Nebraska rate the total amount which could be collected for a full 5-ton load would be $165, as compared with the $90 or $100 which is collected at the existing rate.

The rates in Nebraska went into effect on July 1, 1919.

Other States May Follow

The fact that Nebraska has determined and established fixed rates is of the greatest importance to truck owners the country over, for it is entirely likely that if the Nebraska rates stabilize the industry of hauling goods overland by motor truck and prevent exorbitant charges as well as price cutting, other states will follow suit.

Further than this, the Nebraska State Railway Commission is also empowered to regulate all concerns or individuals who engage in handling goods for hire in certain parts of the state. Each truck carrier who handles goods for hire must report annually to the Commission during January of each year the business done by it during the preceding year. The first report must cover the period during the last 6 months of the year 1919 during which the carrier was in business.

This regulation is really more important than appears on the surface, for it is required that every truck owner carrying goods for hire shall keep a record of his business to show the following items:

1—Dates of all truck movements, and capacity of truck used.
2—Distances traversed by each truck daily, a—Under load; b—Empty.
3—Condition of roads traversed daily as to passability, whether good, medium or bad.
4—Miles of, a—Paved roads; b—Unpaved roads, traversed by each truck daily.
5—Description, weight, length of haul, and charge of each shipment.
6—Names and addresses of consignor and consignee of each shipment.
7—Condition of each shipment on delivery, if in bad order.

Every such truck operated must also keep books of account of the business according to double entry system in such manner as to show separately the following items:

1—Cost of property:
    a—Trucks.
    b—Real estate and buildings.
    c—Shop equipment.
    d—Office furniture and fixtures.
    e—Stationery and supplies.
    f—All other property.
2—Cost of Operation:
    a—Gasoline and oil.
    b—Drivers' wages.
    c—Drivers' traveling expenses.
    d—Freight house men's wages.
    e—Other operating expenses.
3—Cost of Maintenance:
    a—Tire repairs and renewals.
    b—Repair to trucks.
        1. Labor.
        2. Material.
    c—Truck renewals.
    d—Repair and renewals to buildings.
    e—Repairs and renewals to shop equipments.
4—General Costs:
    a—Salaries of manager and office force.
    b—Rent, heat, light, water, telephone and telegraph.
    c—Replenishing stationery supplies.
    d—Insurance.
    e—Loss and damage to freight.
    f—Taxes.

g—Incidentals.
5—Cash on hand.
6—Capital invested.
7—Operating revenues.
8—All other revenues.
9—Revenues set aside to reserve for truck depreciation on basis of 4 cents per capacity ton mile.
10—Dividends declared and paid.
11—Surplus revenues.

All accounts must be balanced monthly and a trial balance entered of record.

There is one good feature of the commission's ruling in that the rates as established by it are subject to review and change at any time upon complaint of any truck owner or other organizations deeming themselves aggrieved.

Wrong Ton-Mile

While the determination of the costs upon which the rates were based as shown in General Order No. 46 of the Nebraska State Railway Commission on Highways Trucking Rates were not conclusive and were based on the erroneous assumption that the ton-mileage of truck work is determined by multiplying the mileage covered during any period by the tonnage covered during that same period, the resultant rates as shown on this page seemed fair.

The rates apply to the use of trucks transporting freight for hire upon the pubilc highway between points located in the State of Nebraska easterly of a line beginning at the intersection of the westerly line of Webster County with the Nebraska-Kansas boundary; thence north on and along the westerly lines of Webster, Adams, Hall and Howard Counties, to the northwest corner of Howard County; thence easterly along the north line of Howard County and thence north on and along the westerly lines of Nance, Boone, Antilope and Knox Counties, to the Nebraska-South Dakota boundary, the points not being located within the same city or village. This territory includes practically all of the area in which trucks are now in use. It includes the Nebraska cities of Omaha, Lincoln, South Omaha, Grand Island, Hastings, Freemont and Beatrice.

Distances applicable shall be those of the commonly traveled routes between the terminals by way of intermediate stations, if any. Shipments originating or destinating between stations shall take the distance applying to the nearest stations.

Exceptions to Rates

There are certain exceptions to the rates including household goods, with a rate double that of the second-class rate, when the declared valuation is not to exceed $10 per 100 pounds. It is three times the second-class rate where the declared valuation exceeds $10 per 100 pounds.

All articles will be charged at actual gross weight and inserted in the bills of lading except that when an estimated weight is given in a classification, such estimated weight will apply unless the actual weight is greater.

Nebraska Trucking Rates Per 100 Lbs. Between Points Not Within the Same City or Village

Distance Miles	First Class 15 Cents Plus 1½ Cents Per Mile Rate	Second Class 85% of First Class Rate	Third Class 70% of First Class Rate	Fourth Class 60% of First Class Rate
1	$.165	$.1402	$.1155	$.099
2	.180	.1530	1260	.108
3	.195	.1657	.1365	.117
4	.210	.1785	.1470	.126
5	.225	.1912	.1575	.135
6	.240	.2040	1680	.144
7	.255	.2167	.1785	.153
8	270	.2295	1890	.462
9	.285	.2422	1995	.171
10	.300	.2550	.2100	.180
11	.315	.2677	.2205	.189
12	.330	.2805	.2310	.198
13	345	.2932	.2415	.207
14	.360	.3060	.2520	.216
15	.375	.3187	.2625	.225
16	.390	.3315	.2730	.234
17	.405	.3442	.2835	.243
18	.420	.3570	.2940	.252
19	.435	.3697	.3045	.261
20	.450	.3825	.3150	,270
21	.465	.3952	.3255	.279
22	.480	.4080	.3360	.288
23	.495	.4207	.3465	.297
24	.510	.4335	.3570	.306
25	.525	.4462	.3675	.315
26	.540	.4590	.3780	.324
27	.555	.4717	.3885	.333
28	.570	.4845	.3990	.342
29	.585	.4972	.4095	.351
30	.600	.5100	.4200	.360
31	.615	.5227	.4305	.369
32	.630	.5355	.4410	.378
33	.645	.5482	.4515	.387
34	.660	.5610	.4620	.396
35	.675	.5737	.4725	.405
36	.690	.5865	.4830	.414
37	.705	.5992	.4935	.423
38	.720	.6120	.5040	.432
39	.735	.6247	.5145	.441
40	.750	.6375	.5250	.450
41	.765	.6502	.5355	.459
42	.780	.6630	.5460	.468
43	.795	.6757	.5565	.477
44	.810	.6885	.5670	.486
45	.825	.7012	.5775	.495
46	.840	.7140	.5880	.504
47	.855	.7267	.5985	.513
48	.870	.7395	.6090	.522
49	.885	.7522	.6195	.531
50	.900	.7650	.6300	.540
51	.915	.7777	.6405	.549
52	.930	.7905	.6510	.558
53	.945	.8032	.6615	.567
54	.960	.8160	.6720	.576
55	.975	.8287	.6825	.585
56	.990	.8415	.6930	.594
57	1.005	.8542	.7035	.603
58	1.020	.8670	.7140	.612
59	1.035	8797	.7245	.621
60	1 050	.8925	.7350	.630
61	1.065	.9052	.7455	.639
62	1.080	.9180	.7560	.648
63	1.095	.9307	.7665	.657
64	1.110	.9435	.7770	.666
65	1.125	.9562	.7875	.675
66	1.140	.9690	.7980	.684
67	1.155	.9817	.8085	.693
68	1.170	.9945	.8190	.702
69	1.185	1.0072	.8295	.711
70	1.200	1.0200	.8400	.720
71	1.215	1.0327	.8505	.729
72	1.230	1.0455	.8610	.738
73	1.245	1.0582	.8715	.747
74	1.260	1.0710	.8820	.756
75	1.275	1.0837	.8925	.765
76	1.290	1.0965	.9030	.774
77	1.305	1.1092	.9135	.783
78	1.320	1.1220	.9240	.792
79	1.335	1.1347	.9345	.801
80	1.350	1.1475	.9450	.810
81	1.365	1.1602	.9555	.819
82	1.380	1.1730	.9660	.828
83	1.395	1.1857	.9765	.837
84	1.410	1.1985	.9870	.846
85	1.425	1.2112	.9975	.855
86	1.440	1.2240	1.0080	.864
87	1 455	1.2367	1.0185	.873
88	1.470	1.2495	1.0290	.882
89	1.485	1.2622	1.0395	.891
90	1.500	1.2750	1.0500	.900
91	1.515	1.2877	1.0605	.909
92	1.530	1.3005	1.0710	.918
93	1.545	1.3132	1.0815	.927
94	1.560	1.3260	1.0920	.936
95	1.575	1.3387	1.1025	.945
96	1.590	1.3515	1.1130	.954
97	1.605	1.3642	1.1235	.963
98	1.620	1.3770	1.1340	.972
99	1.635	1.3897	1.1445	.981
100	1.650	1.4025	1.1550	.990

POOR GARAGE LAYOUT

Causes Serious Truck Delays

8--GARAGES: One of the Big 8 in Truck Operation

A FEW POINTERS FOR THE TRUCK OWNER

1—Keep Columns at Least 20 Feet Apart.
2—Grade Floors ½ Inch to the Foot for Washing.
3—Provide All Natural Light Possible.
4—Do Not Handle Fuel in Open Vessels.
5—Keep Storage Space at 45 Degrees Temperature.
6—Ramps Are Sometimes Better Than Elevators.

TRUCK garages from the fleet owner's viewpoint may be looked at from two angles: 1—A garage converted from a horse stable or building erected for some other purpose, and 2—Garages built especially for the maintenance of trucks.

There are many more garages in the first classification than in the second, but the construction of new garages built particularly for the purpose are rapidly increasing as the number of trucks in use throughout the nation also increases. Many owners have to get along with old garages which they realize are not suited for the maintenance of trucks because of a lack of funds for building, inability to procure a satisfactory site near their places of business or for other causes. These inadequate facilities all tend to increase the cost of truck maintenance and operation in that they delay the entrance and exit of trucks both night and morning, make repairing difficult and generally lower the working spirit of the drivers.

These causes of the high cost of garaging are sometimes overlooked in that they are not direct items which appear upon the truck cost sheet. While the average cost of garaging a truck varies from 50 cents to $1 a day for storage alone, this sum is small as compared with the daily operating costs. For instance, suppose a truck costs $20 a day to operate, including all fixed charges. If the charge for garage is only $1 a day it is thus seen that this item is one-twentieth or approximately 5 per cent of the daily cost of operation. However, the use of a good or poor garage has far greater affects one way or the other on the operation of the truck when the garage influence is more closely studied. A garage implies more than a roof over the trucks. It includes facilities for supplying gasoline and oil, cleaning and washing the trucks and for repairing the vehicles and for carrying a stock of spare parts.

While it is true that the motor truck is not so sensitive a creature as the horse and is not so susceptible to the many diseases that beset the horse, yet it, too, made as it is of steel, wood and rubber, requires attention and develops ills that are often due to carelessness in garaging as well as carelessness in operation.

Some Fundamentals to Consider

Nothwithstanding these difficulties, the fleet owner who has to make use of a converted garage can lessen his troubles by observing a certain few fundamentals so far as the construction of a converted garage is concerned and by the adoption of certain methods inside the garage.

When an old building is to be converted into a garage, one of the first things to be considered is the column layout. It is difficult to give any hard and fast rule as to how garage pillars or columns should be placed. A rule which would fit the case of a one-story garage having a large floor space would not apply to the case of a multi-floor garage with each floor having a comparatively small area. The main points to be considered are that the arrangement of the pillars allows a free exit and entrance for each truck without interfering with the others and that the movement of trucks within the garage for washing and repair purposes does not necessitate the moving of other trucks.

THE BIG 8

Read Them All

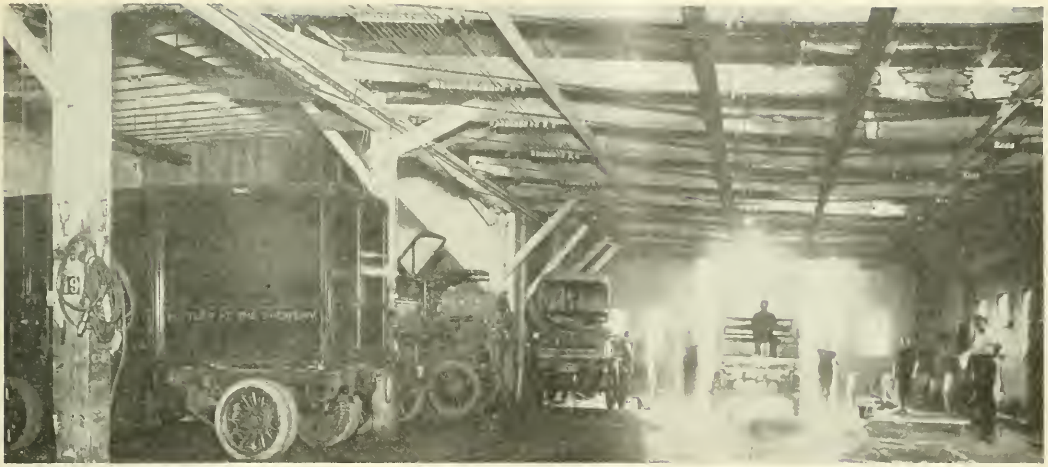
THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined......April 15
1—Driver ....May 1
2—Tires ....May 15
3—Gasoline ....June 1
4—Overhauling ....June 15
5—Depreciation ....July 1
6—Insurance ....July 15
7—Interest ....August 1
8—Garages ....August 15

While with a new garage, the column spacing or layout may be determined in advance and adhered to in the construction of the building, the problem becomes an entirely different one when an old building has to be made over for garage service. In this case it is not quite so easy to rearrange the columns because of the necessity for changes in the roof construction or in the floor beams above when the building is more than one story in height.

While the ideal garage should have no floor pillars or columns, this cannot be done in all cases since it would require beams of such great depth as to make their cost excessive. As a general rule, columns should be placed from 16 to 20 feet apart and even further when large trucks of 5- to 6-ton capacity are to be stored. In any event, the main consideration is to see that as little delay as is possible is caused the trucks by making them maneuver in and out of the building.

The location of the columns also affects the washing of the vehicles and the necessity for moving the vehicles inside of the garage for this work. A garage in which heavy trucks for hauling builder's material, such as sand, stone and cement, or trucks hauling coal, are maintained, do not, as a rule, re-



A good example of a typical truck garage converted from an old horse stable. There is a wide entranceway without columns, but the natural lighting is woefully inadequate, the electric light and battery charging wiring is poorly done, since it is not enclosed in metal conduits but is carried in close proximity to metal parts such as water pipes and column braces

quire a special portion of the floor set aside as a washstand because these types of trucks do not need to be washed as often as do vehicles fitted with highly-polished panel bodies. When the large trucks are garaged, they can be economically washed in their positions on the floor by means of short lengths of hose attached on every, or every other column, provided the floor of the garage is so constructed and drained that the water used in the washing will flow off to some central point or points from which it will be carried away to the sewer connections.

Washstands for Panel Bodies

When this course is followed, it is highly important that the floor be given a sufficient pitch. On a large floor, a pitch of ½ inch to the foot seems excessive, yet in actual practice has proved to be the best gradient to provide.

These conditions are somewhat different so far as washing is concerned when the trucks maintained are fitted with highly-polished panel bodies such as are used on department store vehicles. These trucks traveling through the city streets are a constant advertisement of the owner's business and if the best returns are to be obtained from such advertisement, they must be kept spotless. This means washing every night. When an attempt is made to wash such vehicles in the positions in which they are stored upon the garage floor, it is practicable provided the trucks are spaced far enough apart so that in washing one, the trucks adjacent are not spattered with the water used in washing the first one. To wash the trucks in this manner would require that they be placed from 4 to 6 feet apart, but this practice would take up too much of the valuable floor space of the garage. As a result, trucks of this type are not generally washed in their positions on the floor but are run to a specially provided washstand. As this type of truck is small in overall dimensions in comparison to the larger capacity type, the moving to the washstand may be done with less maneuvering so that the use of a washstand is preferable.

Another example of a converted truck garage, this time showing columns spaced less than 10 feet apart, thereby making it difficult to get trucks in and out. The lighting is poor and the floor dirty and greasy

Concrete Facing Best

In conjunction with the grading of the floor, the material with which it is surfaced is also of importance. Concrete has been found to be the best material to use, especially when the floor is to be employed solely for the storing of the trucks. In some cases where repair work must also be done on top of a concrete floor, it has been found desirable to lay down a portable flooring in the form of wood sleepers with 2 inch planks to serve as a platform on which the men work. This method is used by the Motor Haulage Co., New York City, in its Brooklyn, N. Y., garage, as described in greater detail on pages 16 to 19 of THE COMMERCIAL VEHICLE for June 1, 1919. It is to be borne in mind that the wood covering mentioned is not used in any part of the garage except that in which the repair work is done. The wood floor serves as a much better foundation on which to have the mechanics work since it does not get cold during the winter months and has much more spring than a permanent concrete facing. In cases where the trucks are washed at a special washstand there is no necessity for grading the floor.

In the case of the wood floor used in the shop of the Motor Haulage Co., the wood flooring is made flush with the concrete floor in the other part of the garage in which the trucks are stored. By this means it is an easy matter to drive the trucks from the storage space onto the wood flooring without the necessity of using an incline of some kind which would otherwise be necessary.

When an old horse stable or other building is transformed into a garage, every effort should be made to increase the natural lighting facilities. Most of us have recollections of how the old typical horse stable looked.. Entering through the main door one was struck with the low ceiling, made with a minimum clearance above the floor so that the maximum amount of hay and feed might be stored on the floor above.

Then there were the stalls, arranged in rows with an aisle between each two through which each horse entered its stall. The columns supporting the floor above were placed along the centerline of two adjoining rows of stalls and set as close together as possible to reduce the bending stresses of the floor girders. The stalls facing the exterior walls of the building each had one small, square window. If the structure was more than one story in height, these small windows, together with the entrance and exit doors, supplied all the natural light which the stable received.

More Light Necessary

When such buildings as the average type just pictured are to be converted into garages, the small stall windows should be enlarged as much as possible, for it is a well-known psychological fact that a workman will do more work and do it better in a light and well-ventilated room than he will in a dark, stuffy one.

In most cities, the garage regulations contain no requirements for the amount of light which a garage should have, so that this important factor is left entirely to the discretion of the garage builder or owner.

When sufficient natural light cannot be obtained without too expensive alterations in the building, a sufficient amount of artificial light should be provided. For the inspection of trucks, electric extension lights will be found convenient provided the sockets are so disposed around the exterior walls and columns that the extensions are not more than 15 feet in length and that their use does not interfere with the movement of other trucks about the floor.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

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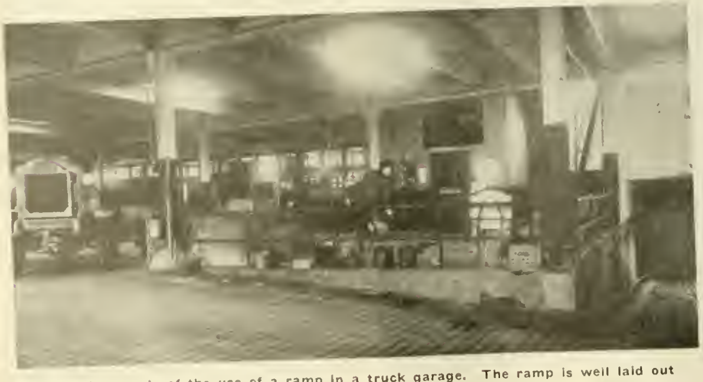
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garages	August 15

The artificial lighting problem should be considered after the general arrangement and column layout have been determined. Lights at the garage entrance should not be placed at the outside of the building where their glare might blind the truck driver while entering. Such lights should be located on the door jamb on the side of the door on the inside of the building and fitted with reflectors so that the light is radiated away from the door and toward the interior. They should not be placed above the door, for if so located, the top of the truck will throw everything about it in shadow.

Ceiling Lighting Important

The lights on the ceilings or those suspended therefrom should be so arranged in relation to the column layout and to the manner in which the trucks are to be positioned on the floor, that each truck receives the maximum amount of light on its sides and not on its top. This may be accomplished by arranging the lights in rows parallel to the lines of columns and between each two adjacent rows so that the light falls between any two adjacent trucks.



A good example of the use of a ramp in a truck garage. The ramp is well laid out so far as the gradient is concerned, but is poorly designed because it has a right-angled turn in it between the first and second floors

Such a system requires a large number of individual lights, but if they are provided with suitable reflectors the light obtained is more localized and therefore more efficient than that obtained by a fewer number of larger units. This is especially so in garages where the trucks are washed in their positions on the floor.

In cases where washstands are used several large units or several arc lights are preferable for the general interior lighting, using special reflectors on the washstand lights to focus the light on all four sides of the truck. Extension lights from sockets on the walls or columns may be used for the general inspection and minor repair work. All lights used on extension lines and others which are in exposed positions should be protected with wire guards to minimize breakage and the resultant danger from conflagration.

Wiring Should Be in Conduits

Aside from the location of the artificial lights the method of wiring is most important. In older buildings transformed for garage use, most of the lighting is by necessity of the exposed type. When this is done all the wires should be carried in metal conduits to prevent the danger of fire from short circuits. Great care should be taken to avoid carrying insulated but exposed wires over metal objects such as iron roof braces or column arms, even though the wires are carried on porcelain holders. A very good example of the dangerous practice of this nature is shown in one of the illustrations on page 61, in which it is seen that the lighting wiring is carried on the underside of the roof beams in close proximity to the beam truss rods and also how the charging wiring used for the electric trucks is of the exposed type.

Ramps Versus Elevators

Whenever a garage is of the multistory type, whether it be an old building or a new one, the problem of getting the trucks to and from the upper floors must be solved. There are two ways to do this, the first by the use of elevators and the second by the use of ramps. in cases where ramps can be used they have many advantages over elevators.

Before deciding upon ramps as against elevators there are several fundamentals which must be taken into account. As a rule, ramps are not practicable in garages which have a long but narrow floor area. Under such conditions ramps cannot be used because they take up too much of the floor space which could otherwise be utilized for the storage of trucks. In one or two cases this problem has been solved by placing the ramp entirely outside of the building proper in the alleyway between the garage and the next building. Of course, this method of solution can only be employed when a 10- to 15-foot alleyway exists between the garage and either of the adjacent buildings, and such alleys are not generally found in cities where real estate is expensive. Accordingly, for long, nar-

An exclusive truck garage, showing a good column layout and a good concrete floor kept free of oil and grease. The trucks are washed in their positions on the floor, the water being obtained from faucets on each column

row garages in cities the elevator is preferable in nine cases out of ten, even though its use requires the employment of an operator.

In garages which have a large floor area and in which the area given over to the ramps is small in comparison to the total floor area, ramps give excellent satisfaction because, once installed, they cost nothing to operate. Even under these conditions there are certain fundamentals which must be considered in order to make the ramps a success. The first of these is to prevent the ramp from being too steep or to have a grade of more than from 8 to 10 per cent. The second is to eliminate the necessity for sharp turns either on the ramp or when coming off the ramp to either the floor below or the floor above. When ramps are made too steep, the trucks have considerable difficulty in moving up or down upon them, and when sharp turns must be made either at the top or bottom, the vehicles are likely to be damaged as a result. This damage is sometimes due to the driver losing control of his truck or coming into collision with other trucks which he cannot see due to the sharp turns. If both of these conditions are met, the ramp has certain advantages over the elevator.

Garage Heating

Passing from the physical features of the garage itself, the question of heating should be taken up. In the southern and west coast sections of the country this problem is not one which the garageman has to solve, but in the northern states and especially in the northwest, it is quite a serious case. There are two or three things which can be said about heating the garage which are of very great importance and still have nothing to do with the heating plant. Yet if these features are neglected the result may mean a loss of thousands of dollars during the life of the garage.

The first of these fundamental principles in regard to heat is the distribution of heat to the various parts of the garage that need it and in the right proportions. The second is in the matter of leaks in the building proper which may permit of a great waste of heat which is not at first sight traceable, with a result that the heating system is blamed when the loss is in no wise due to any imperfection in the heating mechanism.

Heating Temperatures

The garage or storage room proper, which generally forms the bulk of the building, needs very little heat. A temperature of 45 deg. should be plenty warm enough at any time and there is no need for more than 35 deg. to 38 deg., although 40 deg. would leave a safer margin, so that there would be no danger of the water in the truck radiator freezing when the trucks were stored in the more exposed parts of the floor near the doors.

But while the garage proper may be kept fairly cool, the repair shop should be kept around 60 deg. If an office is provided in the garage this should be kept between 68 deg. and 70 deg.

With these varying temperatures necessary to obtain the best results, it is imperative that the heat radiation be proportioned to give the desired results. The heating plant itself will not give these results unless each of the three departments is separated or isolated to such an extent that they cannot rob one another of their due proportion of heat.

This can only be done by extending the dividing walls between the different departments clear to the roof or installing ceilings to prevent the air from other departments coming in to equalize the temperature. The method of locating such partitions or dividing walls is a problem of itself and will be treated in greater detail in a succeeding issue of THE COMMERCIAL VEHICLE.

Heat Leaks

In the matter of leaks of heat, it is generally found that mechanics are very apt to be careless in the construction of a garage. They think of the front door as being open all the time and that numerous small openings in the brickwork or the chimney or other apertures are of no consequence. As a fact, all the small openings act as chimneys to convey away heated air, the garage door supplying the draft.

Thus it will be seen that it is necessary to make all the windows tight; calk around all the window and door frames; see that all doors fit reasonably tight and stop up all openings that may be found

An example of a too-thin floor in which the facing has been broken through so that the cinder fill appears. As may be seen by the bases of the columns, these are too close together and necessitate considerable maneuvering by the trucks in getting in and out

A small elevating hand truck like that shown above is a great time and labor saver in a truck garage for moving about such heavy units as storage batteries, axles, gearset and the like

around the eaves where roof and side walls meet in frame buildings. In fact, every little opening will do its share towards cutting down the efficiency of the heating plant unless these openings are closed.

In frame buildings, building paper is very effective in stopping openings between boards and should be used freely. It has a disadvantage, however, of rotting after a few years and disintegrating. Probably tar paper is more desirable, as it will last considerably longer.

Fireproofing Important

Fireproofing is also of importance and has a direct bearing on the cost of insuring the trucks and so is of financial interest to the truck owner. The manner in which the supplies of gasoline and oil are kept has an important relation to the fire risk, as has also the character of the garage employees.

Aside from the mechanical features of the garage, even the best laid out garage may prove a failure if not properly operated. For instance, what does it avail a truck owner with a fine concrete floor if the floor is allowed to become coated with a film of grease and oil? No matter from what angle the presence of oil on a garage floor is viewed, it is at all times a tangible liability to the garage owner.

Aside from the possible loss of the building and the trucks should fire occur due to oil on the floor, it also results in increased cost of maintenance. Tires on motor trucks which are allowed to stand day after day upon a floor covered with oil and grease are naturally short lived. Tires are solvent in gasoline and also in lubricating oil and grease, though to a lesser degree, so that the effect on tires which are forced to remain in these substances is self-evident Perhaps this explains why many truck owners declare that their truck tires do not live up to the guaranteed mileage.

Oil on the floor is also conducive to other truck ills. It mixes with dirt brought into the garage on the truck after returning from the day's work and if any part of the truck which is undergoing repairs is laid on the floor it is liable to pick up some of this dirt with the result that future trouble may be experienced on this account.

Oil a Detriment

Oil is a detriment to the garage itself; furthermore, petroleum products being among the few substances to which concrete is vulnerable. Concrete will rapidly rot if continually covered with oil and its life be thereby reduced greatly.

Aside from these disadvantages of permitting oil and grease to remain on the floor, there is a decided psychological effect on the truck drivers and garage mechanics. Most men like to work in clean places and naturally do their best work under such conditions. Accordingly, if the garage floor is covered with oil, the workman is adverse to lying down upon his back to properly inspect the under parts of the truck and these are consequently slighted.

Find Why Oil Is on Floor

In attempting to prevent the formation of a grease or oil film on the floor one of the first questions which the garage owner must ask himself is how the oil got on the floor. If it has leaked from the crankcase, the gearbox, the jackshaft casing or the rear axle housing, the need of new gaskets for these parts is clearly indicated. If the oil has been spilled upon the floor it manifests carelessness on the part of the garage men and a loss to the owner. When there is a certain amount of drippings from the engine underpan, the use of metal drip pans which can be moved about the floor and placed under the trucks as desired pre-

A good example of proper column layout, skylight illumination and the proper use of a portable tank to carry the fuel from the pump station to each of the trucks. Also note the drip pans laid on the floor to prevent oil and grease from forming a coating over the cement floor surface

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vent such drippings from getting onto the floor.

In the matter of storing oil and grease one of the best plans is to provide a separate tank room to either side of the entrance or exit doors so that the trucks may receive their supplies of oil when coming in at night or going out in the morning. If these tank rooms must be passed on the way in or out of the garage, it is a simple matter to make the truck go to the tank room for its lubricant rather than carrying the lubricant from the tank room to the truck. The former method eliminates considerable wastage due to spillage. Drain shelves should also be provided in the tank room as shown in the illustration on page 55. These shelves serve to support the measuring cans so that any oil which runs down over the sides of such cans is saved and at the same time is not permitted to drop onto the floor.

Sunken Tanks for Gasoline

Gasoline storage in a garage is also of importance because the fuel is very dangerous when improperly stored due to the fire risk incurred and very costly if wasted in handling and in truck operation if the lighter constituents so essential to proper action in the truck engine are allowed to evaporate.

Gasoline storage systems are of several kinds, but are all alike in their intent, that of eliminating the risk due to fire, that of waste, evaporation or theft and of providing means of accurately measuring amounts taken from the supply and put into the vehicle tanks.

Sunken tanks are one of the cheapest means of gasoline storage insurance. There are three general methods employed to get the gasoline from the tanks to the point where it is to be put into the vehicle tanks. These three methods include the use of suction pumps, compressed air or hydraulic pressure. The suction pump is the most common form used because of its comparative simplicity.

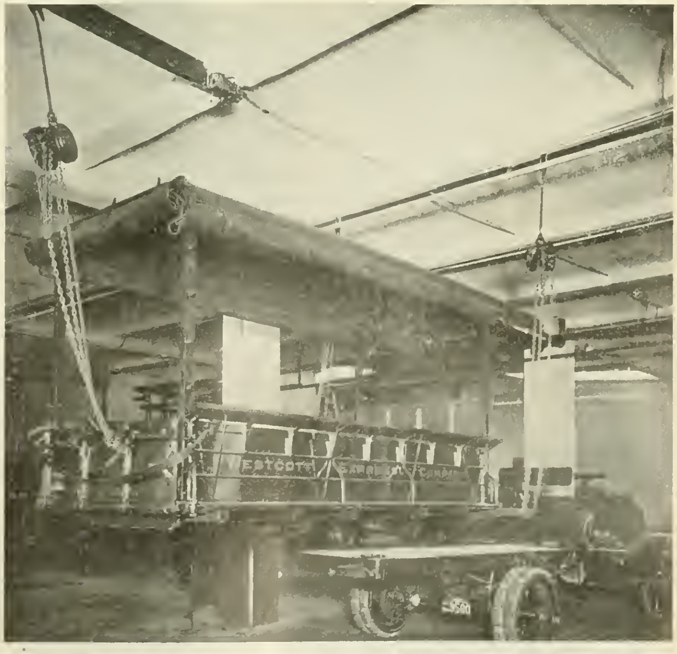
Location of Suction Pumps

When suction pumps are used the pump should be located at a convenient point, such as at the entrance to the elevator if the building is more than one story in height, or at the entrance door if only one story in height or if a ramp is employed. In large garages, separate draw-off stations should be provided on each floor. Where it is not convenient to run the trucks to the pump stations, portable tanks should be provided for getting the gasoline to the trucks. In no case should open pails be employed for moving the fuel from the pump to the truck tank, as this course is very dangerous and besides allows dust and dirt to get into the truck tank with a possible stoppage of the fuel line In locating the pump stations care should be taken to protect the pump from possible damage by being run into by the truck, although of course the matter of convenience is the first requisite.

Even when the garage is well laid out and is provided with all conveniences for handling fuel and oil and of permitting the trucks to be moved from point to point on the floor without excessive maneuvering, the garage owner has other problems to solve if he is to reduce the cost of truck maintenance. Cranes, telphers, body-removal devices, improved methods of transferring batteries in electric garages, special forms of engine repair work-benches and time-saving devices for the handling of tools and other equipment must be considered.

Before a truck can be torn down and the chassis gone over thoroughly, it is generally necessary to remove the body. This is somewhat of a task unless special provisions are made for the work. Overhead chain falls may be provided and mounted on overhead tracks so that the falls may be shifted to remove different sizes of bodies as required. Various forms of hand trucks save hundreds of dollars a year in moving such articles as vehicle batteries from the trucks to the charging room; of moving engines or other truck units from the trucks to the workbenches and of moving tools or special fixtures from the repair shop to the chassis. Engine stands mounted on rollers so that the units can be moved from point to point on the floor as desired are also time and money savers.

In some electric garages the removal of the truck batteries has been greatly simplified by the use of hydraulic platforms over which the trucks are run for removing or putting in new batteries. The use of such devices makes it unnecessary to hold the truck in the garage while the batteries are being transferred from the charging room to the vehicle. Small elevating hand trucks are also becoming more and more general in use since they eliminate the necessity for lifting the object carried, either to place it upon the truck at the point where picked up or to remove it at the place where it is taken off.



Before a chassis can be properly overhauled, the body must be removed. The picture above shows how one large fleet owner does the work by two differential blocks hung from overhead blocks so that the same equipment may be used to take off different sizes of bodies fitted on the company's trucks

All Power Starts Production with 3½-Ton Four-Wheel-Driven Model

ALL POWER SPECIFICATIONS

Capacity, tons	3½
Price	$4,800
Wheelbase in.	166
Tires, front	36 x 5
Tires, rear	36 x 10
Bore, in.	4½
Stroke, in.	5½
N. A. C. C., hp.	32.40
Speed, r.p.m.	2500
Speed, m.p.h.	45
Gear ratio in high gear	—
Final drive	Worm

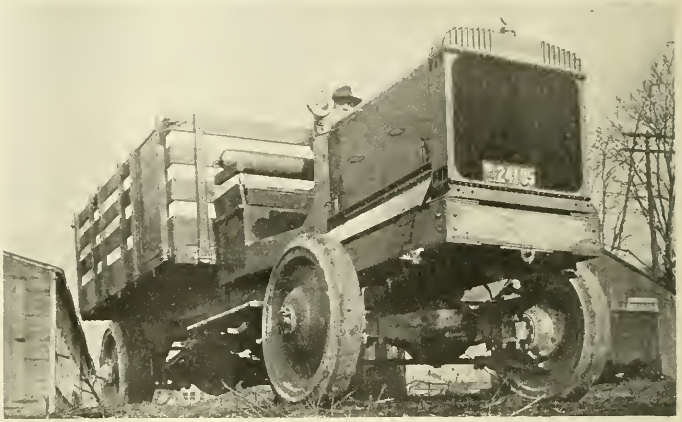
ACTIVE production of the All Power 3½-ton, worm-driven, four-wheel-driven truck has been started by the All Power Truck Co., Detroit, a concern formed during the war. This is the first model. It is an assembled product, being made up of standardized units such as Continental engine, Budd wheels, Zenith carbureter, Pharo governor, Parish frame, McCord radiator, Eisemann ignition, Timken axles, Detlaff clutch, Lavine steering gear, Spicer universal joints and Eveready battery.

The cylinders of the four-cylinder engine are cast in pairs with the valves at the left. The crankshaft is mounted on three bearings. A gear pump circulates the water through a cellular radiator, which is equipped with a detachable cast iron case. Ignition is taken care of by an Eisemann single high tension magneto and starting and lighting by an Eisemann generator and Eveready battery.

Fuel is fed to the carbureter by vacuum. The governor is driven from the engine. The clutch is of the multiple-dry-disc type. The five-speed, selective gearset is a unit with the engine.

Propulsion and driving torque are taken through the semi-elliptic springs. The foot and hand brakes are internal-expanding on the rear wheels. The frame is of pressed steel and of flexible construction. The pressed steel disc wheels are mounted with single solids all around.

Equipment includes two electric side lights and a rear light, driver's seat, moto-meter, and a stake body.



New All Power 3½-ton, worm-driven, four-wheel-driven model

Hawkeye 1½- and 2-Ton Internal-Gear-Driven Models Similar in Design

HAWKEYE SPECIFICATIONS

Capacity, tons	1½	2
Price	$1,900	$2,650
Wheelbase, in.	148½	148½
Tires, front	34 x 3½	36 x 4
Tires, rear	34 x 5	36 x 6
Bore, in.	3¾	4¼
Stroke, in.	5½	5½
N. A. C. C., hp.	22.5	29.0
Speed, r.p.m.	1070	1194
Speed, m.p.h.	16	16
Gear ratio in high gear	7 to 1	8 to 1
Final drive	Int.-Gear	Int.-Gear

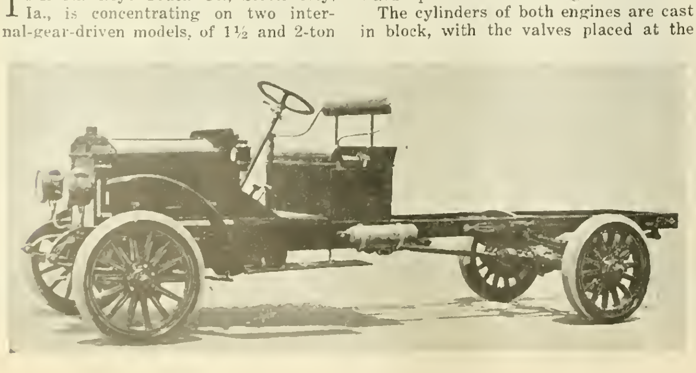
THE Hawkeye Truck Co., Sioux City, Ia., is concentrating on two internal-gear-driven models, of 1½ and 2-ton capacities. With the exception of the brakes, engine and wheel sizes and gearset speeds, these two models differ little. Both are assembled products, being made up of standard units, such as Buda engine, Bimel wheels, Ideal radiator, Eisemann magneto, Simplex governor, Fuller clutch and gearset, Columbia front axle and Clark rear axle, Detroit Steel Products springs, Zenith carbureter, Gemmer steering gear and Hartford universal joint. The smaller model has three forward speeds and the larger four.

The cylinders of both engines are cast in block, with the valves placed at the right. Water is circulated by a centrifugal pump through a zig-zag tube radiator, equipped with a detachable finned-cast iron case. Fuel is fed by gravity from a tank located under the seat. The centrifugal governor is driven from the engine. Ignition is by means of a single high tension magneto and spark control is by hand. Lubrication in the 1½-ton model is by means of a circulating splash system, while in the larger model it is by pressure.

The clutch is of the multiple dry-disc type with Raybestos facing. The selective, three and four speed gearsets are units with the engines. Drive is taken from the engine through the gearset to the two-piece driveshaft through the differential to the wheels. Propulsion and driving torque are taken through the half-elliptic springs.

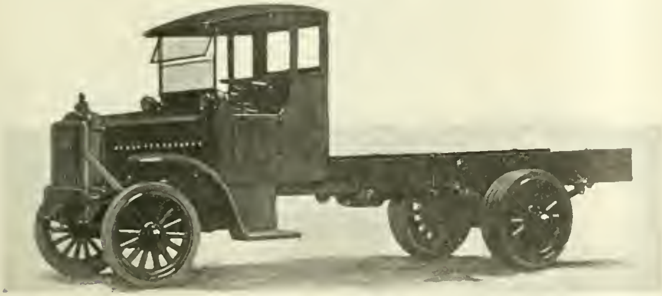
The service brake on the 2-ton model is mounted on the driveshaft near the center. It is of the external type. The hand brake, of the internal-expanding type, is located on the rear wheels. Both the service and hand brakes on the 1½-tonner operate on the rear wheels. The service brake is of the external type, while the hand brake is of the internal-expanding type.

The frame is of rolled channel material and semi-flexible construction. Both models are equipped with wood wheels of spare spoke construction. They are mounted with single solids all around or with pneumatics, this equipment being optional. Left steer and center control are employed.



The 1½-ton Hawkeye truck which is internal-gear-driven

Gramm-Bernstein Makes a Number of Important Changes in 2-Tonner



The 2-ton Gramm-Bernstein, worm-driven model

GRAMM-BERNSTEIN SPECIFICATIONS

Capacity, tons	2
Price	$2,700
Wheelbase, in.	144
Tires, front	36 x 3½
Tires, rear	36 x 7
Bore, in.	4⅛
Stroke, in.	5¼
N. A. C. C., hp.	27.2
Speed, r.p.m.	13.50
Speed, m.p.h.	18.6
Final drive	Worm

A NEW policy with reference to its truck equipment has been established by the Gramm-Bernstein Motor Truck Co., Lima, Ohio. All of its worm-driven models, including those of 2, 2½, 3½ and 5-ton capacities, are offered ready for the body, even to the extra sills that are required for some capacities and types of bodies. This equipment is included in the chassis price and includes: standard cab with storm curtains and ventilating windshield; radiator guard attached to frame independent of the radiator; radiator shutters controlled from the driver's seat; moto-meter; spring trailer drawbar with integral hook and locking device; pig tail towing hooks at front end; and front fenders and steps. Electric lighting is standard equipment on the 1½ and 2-ton models. The 1½-ton model is internal-gear-driven.

Rear shroud on Gramm-Bernstein radiator

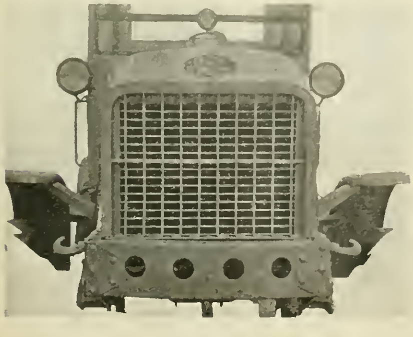
A number of important changes have been made in the 2-ton model. This model now uses a Continental engine instead of a Waukesha; larger tire sizes; North East ignition instead of Eisemann; Pierce governor instead of Waukesha; Stromberg carbureter instead of Zenith; Fuller clutch instead of its own make; and its own make of universal joints instead of Arvac.

The four-cylinder engine is equipped with block cast cylinders. The valves are placed at the right. Ignition is taken care of by an Exide battery, North East generator and coil. This includes electric lighting. Fuel is fed to the carbureter by gravity from a tank located in the dash. The centrifugal governor is driven from the engine. Engine lubrication is by means of a circulating splash system. Water is circulated through a vertical finned tube radiator by a centrifugal pump. The radiator case is of cast iron. A rear shroud concentrates and intensifies the flow of air drawn through the radiator by the fan.

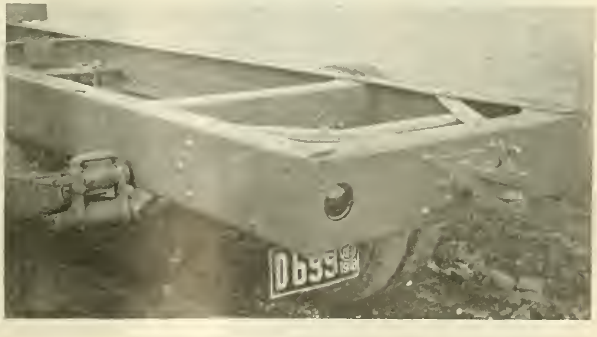
The clutch is of the multiple dry-disk type, being faced with fabric. The three-speed selective sliding dog gearset is of Gramm-Bernstein manufacture and is mounted amidships. The gears are always in mesh and engagement is made by means of dog clutches instead of sliding gears. The entire transmission is assembled in splined shafts without the use of bolts, studs, set screws, pins, keys, or anything else that can work loose. The gears are mounted on extra large ball bearings, and the gear case is suspended at three points. The three points are so trunnioned as to prevent twisting or torsional strains on the transmission unit.

The gearset is so designed that a power take-off can be attached to operate a dump body, winch, log-roller or for any other purpose.

Driving torque and propulsion are taken through the half-elliptic springs. The frame is of pressed steel and of semi-flexible construction. The Bimel wheels are of wood and of square spoke construction. They are mounted with single solids all-around. The steering gear is of Ross manufacture. Steering is on the left and brake and gearshift control in the center. The radiator guard is attached independently of the radiator. This is of Gramm-Bernstein design adopted for Liberty trucks.



Radiator shutter, pig-tail towing hooks and Moto-Meter on 2-ton Gramm-Bernstein



Showing spring drawbar on Gramm-Bernstein 2-tonner. Note tail light placed inside frame and protected by frame cross members

Giant Tires Quickly Demounted on Clark Wheel

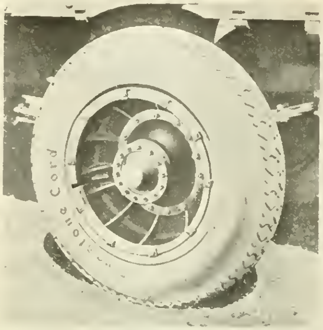
Foley Traction Rim—Christie Miracle Lock—Speedometer Lubricator—Buell Explosion Whistle—Arcadia Trailer

Clark Disk Wheel

THE rapid increase in the use of the pneumatic truck tire has brought with it several important changes in the truck transportation field. Because giant truck tires require an entirely different wheel for their use, the Clark Equipment Co., Buchanan, Mich., maker of disk steel wheels and axles for trucks, has designed a disk steel wheel especially suited for pneumatic truck tires.

A slot extending from the outer edge of this disk steel wheel to the center of the rim admits the valve stem of the inner tube. The wheel is designed so that two strong web braces come beneath the slot, one on each side, reinforcing the rim and making it even stronger at the slot opening. The wheels are made of cast electric furnace steel.

The ease of replacement with this slot arrangement is a feature of the wheel. Instead of lifting the tire, it is pushed on in place. Clark disk wheels are being offered for use with demountable rim or detachable type.



Clark disk wheel on which giant pneumatic tires are easily replaced

Foley Traction Rim

PROPER traction of truck wheels in sand and mud is not often possible, especially when the vehicles are heavily loaded. Fleet owners, whose trucks operate out in the country districts where road conditions are not always conducive to good traction, have often had their trucks delayed through miring. In order to overcome this trouble, a traction rim, or auxiliary wheel having traction lugs, has been designed for poor road conditions that can also remain on the wheels while being run in city streets. This rim is also designed to obviate any need of taking off or jacking up the wheel during its application. The price per set of four ranges from $35 to $100. The maker is the Foley Traction-Rim Co., Minneapolis, Minn.

The Foley traction rim is fitted on the inside and outside of the wheel, telescoping under the extended tire rim and fastening to the felly with machine bolts or into the rim lugs and between the spokes when used on shaft-driven trucks. When used on chain-driven trucks, a single traction rim is used on the outside of the truck wheel only. This rim is supported on the opposite side of the wheel with a blind rim to which machine bolts, supporting the rim proper, are attached, as on the two-rim equipment.

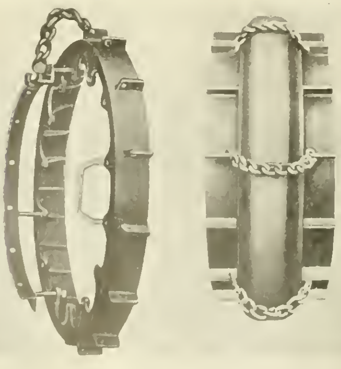
The rim used on the inside is split so that it can be applied without the need of taking off or jacking up the wheel. The inside rim may be used on sizes over 32 inches. The working of the rim is entirely automatic, as it does not come in contact on smooth or hard roads. As soon as soft sand or mud is encountered and the rubber tires sink into it a couple of inches or more, the traction rim comes into action and with its added surface bearing and traction lugs a firm grip is secured. Non-skid cross chains can also be secured.

The Foley non-skid cross chains with quick detachable end links range in price from $10 per set of two wheels to $15, according to the size of the wheel. The links are $2.75 per dozen.

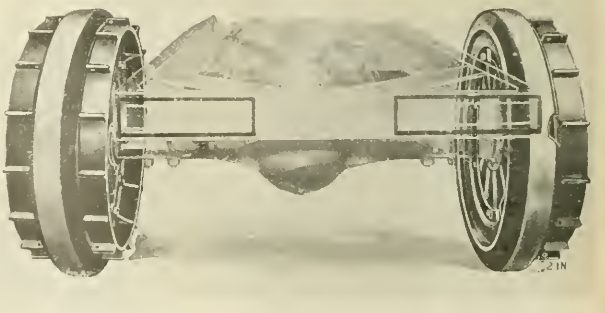
Christie Miracle Lock

THE continual use of the doors of a truck is bound to cause rattling, if not attended to. Doors will sag or get out of shape with constant use. Florists and other truck owners using expensive bodies, whose appearance is an important factor in the maintenance of these vehicles, frequently experience rear door trouble of this kind. A rear door fastener has been designed by the Bremmer-Terris Mfg. Co., Chicago, to eliminate rattling, sagging, etc. This device is styled the Christie Miracle lock and lists at $1.50.

It consists of a hinged bar with a handle, spring and catch. The spring and catch are applied to one door and the hinge to the opposite one. When the fastener is closed, the spring is pressed flat, fitting under and between the sides of the bar, which pressure prevents the doors from working up and



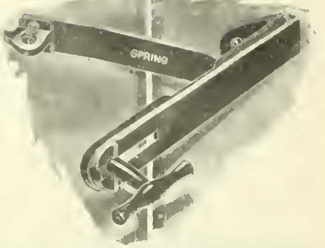
Left—Single Foley traction rim attachment with provision for chain connection. Right—Foley double rim attachment



The Foley rim, mounted singly or doubly and showing road clearance on paved city streets. The rim only comes into contact with the ground when the roadway is soft and muddy

Left The 1-ton Arcadia trailer which is used in farm or factory haulage

Right — The Christie lock is designed to eliminate door rattles



down. Closing the fastener also exerts a direct pressure, equally distributed on both doors, thus eliminating all rattle and sagging and preventing the doors from getting out of shape.

This fastener can be applied either right or left handed on single or double doors and either with or without binding strip. The catch is so constructed that when the fastener is closed a padlock can be used if desired.

It will hold doors 2 inches in thickness. Its length is 7½ inches and the width 1¼ inches. The handle and catch are made of malleable iron, the hinge and bar of 3/32-inch cold rolled steel and the spring of high carbon spring steel, oil tempered and hardened to shape. A template is furnished with each fastener which is useful in applying same, as all holes can be drilled in the doors before the fastener is attached. The device is finished in black japan.

Speedometer Lubricator

PARTICULAR attention should be paid to the lubrication of the speedometer shaft in order to get satisfactory service. Speedometer shafts are packed with grease when assembled and ordinarily will run a long time without attention. However, after a certain time the grease gets dry and hard. The result is a broken shaft, a stripped gear, or some other trouble. Fleet owners, who are keeping accurate mileage records and who have experienced this trouble, will be interested in the Happy Thought speedometer shaft lubricator. This device is nothing more or less than a grease cup which can be attached in a few minutes to the speedometer shaft. The price is 50 cents.

The lubricator consists of a clip extending part way around the housing and threaded to secure a grease cup with a pointed end. It is applied by drilling a ⅛-inch hole in the end fittings about ⅝ inch from the end which is slipped over the flexible housing. The maker is S. E. Norman, Franklin, Mass.

Buell Explosion Whistle

FLEET owners will be interested in a warning signal that operates under the full explosion pressure of the engine. This signal is screwed in place of one priming cup in the engine and is made in two models, the chime and single tone. It is made by the Buell Manufacturing Co., Chicago, and the sales price is $6 for the chime model and $4.25 for the single tone.

A small poppet valve of but ½-inch diameter, ground to a gas fit, carries the whistle. A slight side pull on a cord connected to a clamp on the steering column unseats a valve in the whistle and sounds it. The whistle is blown by the explosion direct, the pressure of which ranges from 250 to 300 pounds per square inch. It is claimed that the whistle will not clog or require cleaning. It is guaranteed for 10 years satisfactory operation.

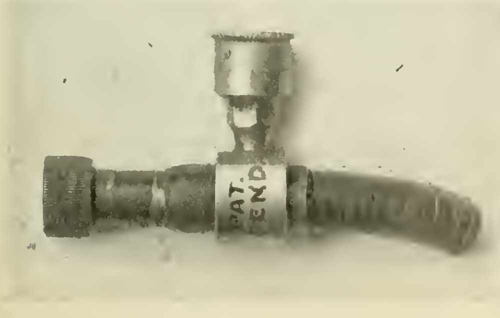
In blowing the whistle the valve is open only for an explosion or two and the power consumed is negligible. It takes but that portion of the charge which will pass through a ⅛-inch pipe. The engine can be primed through the whistle valve if desired.

On engines not equipped with priming cups the signal is installed through a special Splitdorf spark plug. The added cost is $1.25.

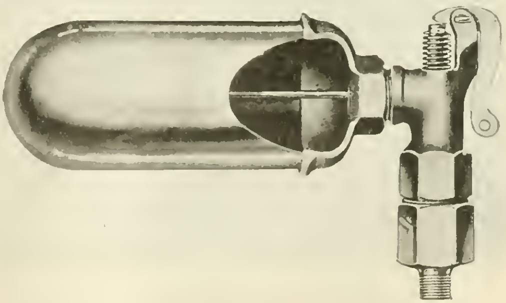
Arcadia Trailer

FARMERS owning passenger cars or trucks, or factories with motor vehicle equipment, often find practical use for a trailer. A farmer who owns a passenger car or truck can use it to advantage for hauling baled hay, fruit crates, etc., when combined with a trailer. The Arcadia Trailer Corp., Newark, N. J., is manufacturing a 1-ton trailer to go behind passenger cars or trucks. This trailer is built with a combination farm body. The side stakes can be dropped so as to carry crates or to form a body for carrying hay, or can be closed up, making a crate for carrying live stock or other material that would be easier handled if confined within the limits of the crate. The stakes are detachable. They are supported by eight pieces of angle iron, which are held in channels by turnscrews.

The body allowance is 400 pounds and the weight of the chassis is 900 pounds. The frame is 9½ feet long and 30½ inches wide. Roller bearings are used throughout. The track is 58 inches and the wheelbase 69 inches. Solid 2-inch tires are mounted all around.



Happy Thought speedometer lubricator, showing method of mounting on the shaft

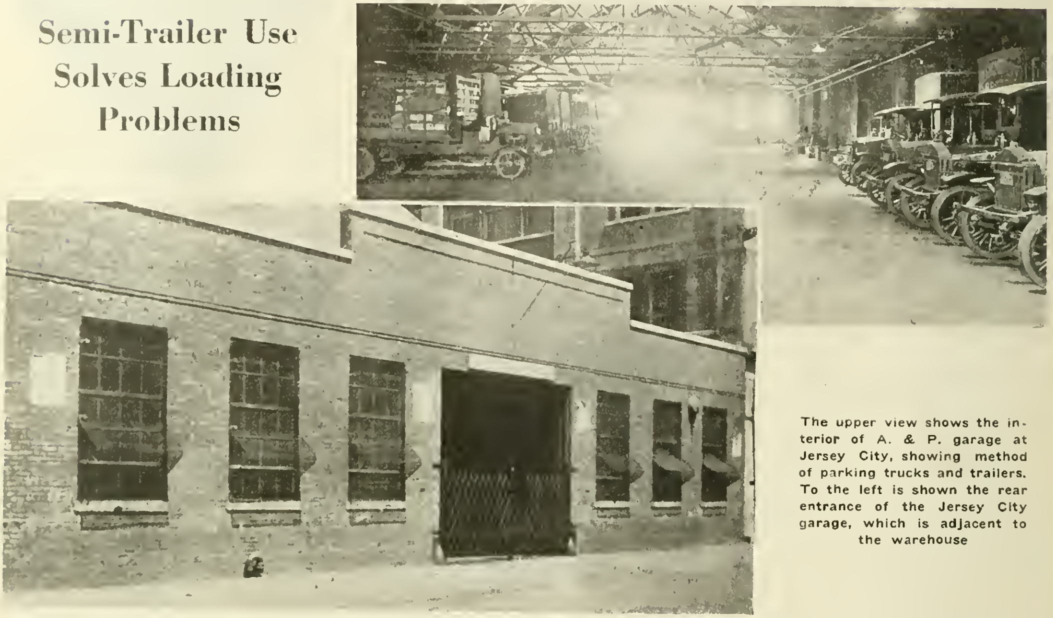


The Buell explosion whistle which works directly from the engine

Distributing Groceries by Trailers

(*Continued from page 43*)

Semi-Trailer Use Solves Loading Problems



The upper view shows the interior of A. & P. garage at Jersey City, showing method of parking trucks and trailers. To the left is shown the rear entrance of the Jersey City garage, which is adjacent to the warehouse

be realized when it is considered that the fleet of trucks owned and operated by the company are scattered in ten different cities, with more than half of the vehicles anywhere from 250 to 1000 miles away from the main headquarters. Under such conditions it would be a most difficult matter to keep an accurate record of the operation and maintenance of the vehicles without some centralized supervision such as the Transportation Department affords.

The Transportation Department is under the direct control and supervision of C. W. Waddington, Transportation Superintendent. He is responsible for the successful operation of the truck fleet. He decides what size and type of trucks are to be purchased and how they are to be placed in the various territories. He also determines the general principles of loading and routing, leaving the details of operation to the head of the Operating Department. He furthermore receives daily reports from the operating heads of each district as to the work done by the trucks, the tonnage of goods handled and the cost of upkeep.

Keeping Cost Records

Within the last 2 years these data have been made up into monthly forms on an accounting system which takes in the entire fleet. This system gives all the necessary data for ascertaining the maintenance and operating costs and has resulted in the company's preparing a large chart to show the cost of carrying 100 pounds of goods from 1 to 100

The floor of the A. & P. garage is raised 1 foot along the side wall to act as a protecting bumper. The bread trucks are backed against this bumper, which extends out 8 feet from the wall, so that the rear ends of the bodies and the heating coils and pipes are not damaged by careless backing up

An A. & P. trailer in process of being loaded at the loading platform inside of the Jersey City garage, which is integral with the warehouse

miles by means of motor trucks in different localities. While this chart is not available at this writing, the editor hopes to receive permission to publish it at a later date.

In its work, the Transportation Department soon discovered three most important fundamentals. These are:

1—That a standarized fleet of one make and capacity is far preferable and, in fact, almost necessary for the most economical handling of the goods.

2—That conventional trucks are not suitable for handling groceries between warehouse and retail stores for the reason that they take about 2 hours to load due to the many small packages of which the full load is composed. As a result, tractors hauling two-wheeled semi-trailers have been substituted because they can be loaded while the tractors are out on their routes delivering goods in other semi-trailers. More semi-trailers are used than tractors, so that some trailers are always available for loading while all of the tractors are out on their routes. As compared to the 2-hour loading time required with the conventional truck, a 6-ton empty semi-trailer can be disconnected from the tractor and a loaded trailer attached in its place in 8 minutes.

3—That with a large fleet of 108 vehicles, the work of routing, scheduling and loading the trucks is sufficient to engage the entire time of a competent man and that the maintenance of the vehicles must be given over to another man who does nothing but see that the trucks are kept in good mechanical condition.

The Transportation Work

Under the first heading of the standarized truck fleet, the A. & P. company has followed its own advice by installing only Pierce-Arrow trucks used as tractors with large 6-ton semi-trailers for the handling of all groceries. The only exception to this rule is in the case of vehicles used for the delivery of bread. These are also of Pierce-Arrow manufacture, but are of the conventional type with the entire load carried on the four wheels of the standard truck. This exception was made because of the great difference in the work, the bread trucks being loaded during the day and working during the night along specified routes and depositing a certain number of loaves of bread at certain stores along each route.

The second case, treating of the use of semi-trailers instead of conventional trucks, is almost self-explanatory, but will be explained in greater detail further on in this article.

Of the fleet of 108 trucks, forty-six are operated in conjunction with the Jersey City or main warehouse. Of these forty-six trucks, twenty are of the tractor, semi-trailer type for grocery deliveries, and twenty-six of the conventional type for bread deliveries. Of the remainder of the fleet, ten trucks are operated in Brooklyn, N. Y.; eight in Boston; nineteen in Chicago; four in Philadelphia; twelve in Pittsburgh; three in Detroit; three in Washington, D. C.; two in Providence, R. I., and one in Baltimore.

All of the above trucks are owned and operated by the A. & P. company, although vehicles are hired from private owners in other cities. This is the case in Bronx Borough, New York City; Buffalo and Albany, N. Y., and in several other cities where the company has found it more economical to rent trucks. In the latter cities, there are a large number of private truck owners, who, now that the war is over and the need for carrying munitions has vanished, are ready to take on haulage work at prices low enough to make it more economical than to install a fleet under the company's management.

During 1918, the 108 company-owned trucks traveled over 1,000,000 miles and carried approximately 200,000 tons of groceries in addition to between 30,000,000 and 35,000,000 loaves of bread. In averages, this means 9800 miles and 1960 tons per truck per year. The vehicles distribute both groceries and bread within a radius of approximately 40 miles of the warehouse from which they operate.

Under these conditions it is readily seen that it would be utterly impossible for one superintendent to supervise the operation and the maintenance of the vehicles. It was for this reason that the work was divided into two parts, the first covering the supervision and operation of the trucks, which is in charge of H. B. Anderson, and the second, including the maintenance of the trucks, in charge of J. L. Black, formerly superintendent of the motor truck equipment for C. Feigenspan, Inc., one of the large brewing companies in Newark, N. J.

Centralized Repair Station

By the distribution of the trucks given above, it is seen that forty-six, or almost one-half of the vehicles, are operated from the Jersey City warehouse. This set up new conditions, particularly as regards the maintenance of the vehicles. While each warehouse has its truck operating superintendent, the small number of trucks at all of the warehouses except those in Jersey City and Chicago made it advisable to centralize all of the

The trailers are also loaded in the street in front of the warehouse. They are supported at the front by wooden horses and are raised by a large jack when the tractors are backed in to take them on the routes major truck repair work and overhauling of main units at Jersey City and at Chicago. Minor repair work in all of the warehouse districts, with the exception of Chicago and Jersey City, is done at outside garages, so that no maintenance superintendents are employed except at Chicago and Jersey City. The maintenance and operation of the two fleets at Chicago and Jersey City are similar with the exception that all of the major repair work for all of the other warehouse districts except Chicago is done at Jersey City.

J. L. Black has complete charge of all the maintenance work of the Jersey City trucks, as well as for the vehicles of all the other branches with the single exception of Chicago. His particular work is to visit these various warehouse districts to determine the running conditions of the trucks and to make arrangements for their overhaul and the repair of the main units. The latter are shipped to Jersey City, where the work is done by a crew of trained experts, as will be told in a separate maintenance article to be published in a subsequent issue of THE COMMERCIAL VEHICLE.

Although this method of shipping such units of engines from distances as far away from Jersey City as Detroit and Pittsburgh is expensive, it is more economical in the long run than having the work done at more or less unreliable garages situated near to the cities in which the trucks are operated. When the work is done at Jersey City it is done correctly, so that when the unit is sent back, it invariably gives satisfactory service. It is the intention of the A. & P. company to extend this same centralized maintenance idea to each city as soon as the trucks in each of these cities warrant the installation of the necessary equipment.

To give a more detailed description of the work the Jersey City warehouse may be taken as a leader in the A. & P. transportation system on account of its size and the territory taken care of. That warehouse takes care of the state of New Jersey, its trucks averaging 30 to 40 miles a day. The whole motor truck delivery plan is based on the use of trucks and tractors and semi-trailers. The trucks are used for the delivery of bread and the trailers with the 5-ton Pierce-Arrow tractors for the delivery of groceries. As planned and worked out, each type of delivery has its own distinct advantages.

37 Semi-trailers to 20 Tractors

It would be impossible for that company to maintain its present deliveries of groceries during the day were trucks alone used. Semi-trailers have enabled the company to reduce the loading time of its vehicles from 2 hours to 8 minutes. Trucks proved a failure because they were held idle 2 hours in loading. Semi-trailers, loaded in advance, and coupled onto the tractors in eight minutes have solved the problem. The A. & P. company uses thirty-seven semi-trailers and twenty tractors. From eight to ten of these semi-trailers are usually in process of being loaded during the day, awaiting the return of the tractors from their first trips. The first deliveries start around 8 a. m. and the trucks return around noon time, ready to pick up another load. Each trip averages about 40 miles with about 40 stores visited.

Though the use of tractors and semi-trailers has been responsible for a large saving in loading time and a corresponding increase in the running time of the tractors, the layout of the loading platforms has also been responsible for the elimination of lost time due to interruptions.

Wagon Loading Segregated

The Atlantic & Pacific warehouse at Jersey City is a ten-story building, one city block deep and nearly half a block wide. The loading of the vehicles has been arranged so that the horse trucks will be on one side of the building and the semi-trailers on the side directly opposite and in the garage. The fourth side is used for loading the freight cars, the tracks running alongside the platform.

THE BIG 8

Read Them All

THOSE PUBLISHED AND STILL TO APPEAR

The Big 8 Defined	April 15
1—Driver	May 1
2—Tires	May 15
3—Gasoline	June 1
4—Overhauling	June 15
5—Depreciation	July 1
6—Insurance	July 15
7—Interest	August 1
8—Garage	August 15

The first floor of the warehouse is used entirely for routing the groceries which are sent down from the six upper storage floors by means of elevators. The two top floors are used entirely for the offices. Small four-wheeled hand-trucks are pulled from place to place on the routing floor and the required goods loaded on them, after which they are taken to the loading platform and the goods are placed in the semi-trailers.

The groceries are taken through four large sliding doors to the loading platform inside the garage, which is integral with the warehouse. The garage is used entirely for the storage of the trucks and trailers and is separate from the repair station, where the vehicles are maintained. The routing, loading, storage and drivers are under the direct supervision of the garage superintendent.

In the early days, when that company employed horse vehicles only, the present garage space was used entirely for loading, the horses being housed in a stable further up the street. This loading space is sometimes used for the horse vehicles when conditions on the street are such as to make them necessary. Therefore in order to offset the wear and tear of the horses' hoofs on the floor, Belgian block has been used in the center of the garage, where the horses stand. The space on both sides of the Belgian block pavement is coated with cement.

In order to prevent the trucks from damaging the heating pipes on the side walls, a concrete bumper or raised floor has been installed. This extends 8 feet out from the wall opposite the loading platform and is about 1 foot high. The rear ends of the trucks extend over the raised floor for about 5 feet. The trailers are parked along the loading platforms in the garage and in the street. All washing is done in a small building which is adjacent to the garage.

Trailers Jacked Up

The semi-trailers stand during the loading period on wooden horses. They are lifted onto the tractors by means of a single jack which raises the trailer off the horse and lowers it to the tractor. The jack is put into position under the center line of the trailer at a point approximating the center of gravity of the trailer and the load. This method of lifting the semi-trailer, though satisfactory as far as the time element is concerned, can be bettered. The A. & P. company is planning to install overhead lifting devices, which will permit a much quicker fitting of the trailer onto the tractor because only one motion instead of two will be needed.

The delivery of that company's Grandmother bread is entirely separate from the grocery end of the business. The bread is baked in a separate building a block below the railroad loading platform. Two loading platforms are used. All bread deliveries are made at night. The twenty-six trucks start out on their routes at midnight and return in the late hours of the next morning. In order to protect the bread, which is wrapped with paper and stored in boxes, from rain and dirt, the bodies are completely enclosed.

Each truck can carry over 5000 loaves of bread, sufficient to take care of the demand of forty or fifty stores. Deliveries are made only once a day. As a result, there is no need for the use of trailers for saving time during loading. Loading of the bread starts in the early part of the afternoon and is finished around midnight, just before the trucks get under way.

As the trucks arrive at the stores after closing hours, it has been arranged so that there will be no need of opening the stores when the bread is unloaded. This has been accomplished by the use of a box fitted with a lock. This box is placed in front of the store every night by one of the clerks. The lid is left open, so that all the driver has to do is to empty the bread into the box, snap the lock and start out for the next store. Shipments of bread are also made daily by express. Such points as Albany, etc., which are out of reach of truck service, are thus taken care of.

12 Principles in Using Coal Trucks

(*Continued from page 47*)

Location of Garage

9—A coal dealer must consider the storing of his trucks. Provision must be made for cutting down wasted mileage to and from the garage. Centralization of the garage location is most important in the case of a coal dealer who has more than one yard. The garage must be so designed that little time will be wasted in the morning when the trucks go out on their deliveries. In many cases coal dealers will find that they can convert one of their horse stables into a garage. Attention should be paid to the lighting conditions and the elimination of the excessive number of roof columns frequently found in stables. Both have an important bearing on the entrance and exit of the trucks, as well as their parking. Provision must also be made for the storage of fuel and oil and a stockroom provided.

Maintenance

10—Maintenance of trucks is dependent on the size of the fleet. The establishment of a service station is the result of a process of development in the size of the fleet. From an economical point of view an owner of five or six trucks may not find it worth while to maintain his own trucks. There might not be enough work to keep a mechanic or two busy all of the time. In a case of that kind it would be better for him to have this work done in a local repair shop or service station. On the other hand, as the fleet grows to eight or ten trucks, he must consider taking care of such work as engine repairs, tires, etc. This is the experience of Mr. Stephens.

When his fleet reached seventeen trucks in 1911 he established a maintenance station. As the fleet grew from that year on, the size of the machine shop equipment was proportionate. At first only such work as grinding valves and small repairs were done. As the fleet grew to ten or more trucks a lathe, an arbor press and hack saw were installed, as well as block and pulley for removing bodies. This equipment, together with a complete set of parts, was sufficient to take care of the complete overhauling of the trucks each year. This overhauling is practically a rebuilding, every part being inspected and new ones fitted if necessary. Though this overhauling takes from 2 to 3 weeks and keeps the truck out of service for that period of time, it is economical in the long run because it has been found that the trucks very seldom break down during the rush periods when a truck out of commission often disarranges the entire delivery scheme. Overhauling starts in May.

Type of Drivers

11—Mr. Stephens has found that the best drivers of motor trucks in the coal field are men who formerly drove his horse vehicles. Outside drivers proved a failure because they were not familiar with the conditions peculiar to coal delivery. The first essential quality needed in a driver in coal delivery is that he be accustomed to the hard work and be familiar with the peculiarities of the coal business. He must be diplomatic with customers, as many disputes arise each day when coal is unloaded.

Weighing Facilities

12—The last and one of the most important points to be considered by a coal dealer who contemplates the purchase of motor trucks is the weighing facilities. To check up the weight of the coal delivered with the weight specified by the coal company each vehicle must be weighed on the platform scales before leaving the yard and sometimes before depositing its load in the coal bunker of the purchaser. As a result new and larger scales may be necessary to accommodate the extra weight of a truck with its load. In the case of a dealer who does a wholesale business he must consider the scales of the other coal dealers he may deliver to. Though his scales may be enlarged to accommodate his trucks he may find that his customers' scales are not large enough. In that case it would be impossible for the buyer to determine the exact amount of coal received.

Contractor Uses Trucks to Sell Tires

(*Continued from page 51*)

was attached by cable to another truck on high and dry land and yanked out of the water and ooze, the water and oil drained out and the vehicle put back into commission within a few hours after its rescue and readjustment.

Accidents will happen with the best regulated drivers, but Barber takes special pains to have the drivers as well regulated as possible. To that end, he will accept no man without knowing accurately of his driving qualities. He must demonstrate before one or more of his expert drivers that he can drive a truck along without snubbing its nose into passing vehicles or performing other amateurish stunts. If Mr. Applicant doesn't make good on his first trial trip, it is his last one. No truck and its contents ever are risked by the Barber outfit on the mere sayso of an applicant that he can drive. Every man in the Barber employ can do what he professes to be able to do. This applies to his seven drivers, two mechanics, street foreman and service foreman.

Barber maintains two service stations, one at 4232 Ludlow Street and the other at 2516 East Cumberland Street, far apart and convenient to construction jobs in each respective growing section of the city. The main service station, the one on East Cumberland Street, is the firm's garage. At both stations are conveniences for the Goodrich tire patrons. Barber's solid tire truck presses are of the 200-ton Wellman-Seaver-Morgan Co. type. The press consists of an upper and lower platen held in a frame of I beams. The lower platen is moved by a ram working in a cylinder controlled by a hydraulic pump. The press has a pressure gage, a relief valve and a control valve. It can be driven either by a line shaft or a separate motor. When a tire is to be mounted, the ram is lowered, the wheel placed on the lower platen and the tire put in position above it.

Power is next applied, either by throwing the belt on the tight pulley or by starting the motor. The control valve then is closed and the tire is pressed on the wheel. To demount, a ring is placed on the lower platen, just large enough to clear the wheel, which is placed on it. Either a second ring, or a set of blocks is placed on the wheel's circumference, the control valve is closed and the tire is pressed down onto the rim of the wheel.

Calculating Tire Costs

In the matter of tires, Barber is an expert, keeping close tab on mileage costs. By way of proof of his estimating abilities, he set aside 2 years ago an appropriation of $3,545 to be used for tires during the coming 2-year period. His actual tire expense amounted to $3,548.06. Only $2.94 out of the way!

In the matter of operating costs, Barber also has showed that he has kept his accounts carefully. Barber's average operating cost for each 5-ton dump body motor truck engaged in hauling amounted for the year 1918 to just $26.80 a day, including the usual items of interest, depreciation, repair, labor, gasoline, oil and grease, tires and so on, for a 265-day year.

Working, of course, independently, the committee on costs of the Motor Truck Owners' Assn. of Philadelphia, at a meeting on the evening of April 8, 1919, announced that after visiting more than fifty individual owners operating in the

(*Continued on page 77*)

Efficient Truck Supervision

MORE attention and thought should be given by large fleet owners to the executive responsibility for the truck driver and the transportation system in general. Many large transportation firms make a serious mistake by not giving this subject due consideration. It is of the utmost importance to see that the man in charge of the truck transportation has the knowledge and ability to efficiently carry on this special branch of transportation.

In most cases, the superintendent has the proper ability to lay out the delivery system and get the best results from the routing of the trucks, but when it comes to supervising or directing the operation and maintenance, he is at a loss because of his lack of experience and knowledge of the mechanical construction of motor trucks and their operation.

The supervision of the transportation system may be classified as follows: Dispatching, operation and maintenance. It is very essential that one works in unison with the other, and the best results will only be obtained by having a superintendent who is specially trained to assume a position of this kind.

At the present time this problem of getting the right man is a difficult one, because of its being a new vocation, and any assistance rendered to the truck owner by the truck manufacturer to solve this problem will result in a lower operation and maintenance cost, longer truck life and a higher truck efficiency in general.

The average fleet owner may think that he cannot afford to hire an efficient man to take charge of the supervision of his trucks, but the better results obtained will repay him many times.

Keep the Engine Hood Closed

NOW that we are having some hot weather, the drivers of many trucks are keeping the sides of their engine hoods up or removing them altogether under the assumption that such a course prevents engine overheating. This is a bad practice and should be discontinued.

A hood costs money and no maker would go to the expense of putting one over the engine if it was not necessary. Its main purpose is to keep the engine clean, both inside and out. With the hood sides up or removed, the engine cannot be kept clean.

Dust and dirt get in around the valve stems and render their lubrication less efficient. It also gets into the magneto, if one is used, and generally dirties up all exposed parts. Furthermore, the dirt will get inside the cylinders, either through the carbureter or the crankcase breather pipe, and dirt inside of a cylinder causes all kinds of avoidable troubles.

When Cabs Get Too Warm

THE built-in cab for all motor trucks is coming just as surely as the closed-in front and rear platforms of the trolley car. With this added protection for the driver, he has been able to do more and better work.

Some of the cabs are of the convertible type which may be completely inclosed in the winter and opened up in the summer. Others are of the permanently built-in type, with fixed sides at the ends of the driver's seat and with curtains over the doors. It is such cabs which may become excessively hot during the summer months.

Instead of taking off the engine hood to lessen the temperature in such a design of cab, it is much preferable to take off the cab doors, for this will permit a stream of air to pass clear through the cab from one side to the other. Some makes of cabs are designed so that this may be done by simply removing the door pintles. In some of the other types, it may be necessary to file or cut off the hinge rivets before the doors can be removed, but even this is a small matter when the convenience afforded the driver is considered.

When the doors are removed, it is important that they are put away properly in the garage where they will not be lost or liable to damage. It is easy enough to put them back in place around Christmas time if they are in the same condition as when taken off, but to have to make new ones is an unnecessary expense.

The Readers' Forum

PRICES CHARGED FOR TRUCK RENT

To the Editor, COMMERCIAL VEHICLE:

The French group which I am representing here in the United States would like to get as much information as possible on the organization and operation of garages in the United States. Will you please send me whatever pamphlets, booklets or other information you may have on this subject and give me the names of books or other reviews where additional details can be secured. I am particularly interested in the system of renting space in garages and the cost of such space to the vehicle owner.—C. P. CAPART, Bureau D'Organisation Economique, Agence Generale des Etats-Unis, Bureau de New York.

The Automotive Equipment Assn., Chicago, Ill., some time ago published a booklet on the operation of a garage. No doubt you can obtain a copy of that booklet by writing direct to William M. Webster, Commissioner, Automotive Equipment Assn., City Hall Square Bldg., Chicago, Ill.

The Motor World Publishing Co., 239 West Thirty-ninth street, New York City, publishes the Motor World Simplified System of Accounting, which is intended to provide a means for keeping a record of the business activities of any garage owner. The system sells at $17.50.

In the small towns and cities in the rural sections of the United States, cars and motor trucks can be garaged for $3, $4 and $5 a month. These figures do not include any service, such as cleaning and washing, compressed air for tires, greasing, etc. In larger cities with better garages vehicles are generally stored for a certain monthly sum, including service, in some instances a wash and polish every day and in others once or twice a week. The size of the truck has something to do with the monthly rate charge since the number of trucks which can be maintained in any garage is dependent upon the space available and the size of the truck which can be placed within that space. Larger trucks take up more room than smaller ones and accordingly have to pay a larger rate. To determine a rate for the storage charge the owner should calculate his garage rent, or that portion of it which is charged to the storage department. To this sum should be added all of the other overhead expenses and the profit which he desires to make. If this total is divided by the number of spaces available for rent, the cost per truck space will be found.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

The highest rates are generally charged for large limousines and in some garages on Manhattan Island, in the high-rent districts, the charge for limousines is as high as $50 a month. The highest rate in the more sparsely settled sections, as in Brooklyn, is from $35 all the way down to $10 a month without service. An average rate in cities throughout the United States is somewhere between $20 and $30 a month.

POSSIBLE SALE OF SPARK PLUGS

Estimate That 9,760,000 Plugs May Be Sold During 1919

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us some information regarding the use of spark plugs on trucks, tractors, etc.?—R. S. SUESS, Pittsburgh Visible Spark-Plug & Mfg. Co., Pittsburgh, Pa.

According to the data which we have on hand regarding spark plug use on motor trucks, on Jan. 1, 1919, there were approximately 480,000 motor trucks in use in the United States. This figure covers the possible field for the sale of spark plugs to motor truck manufacturers and users.

On an average each truck uses about three sets of spark plugs a year or with the average four-cylinder motor, a total of twelve plugs a year. For the 480,000 trucks in use at the beginning of this year there would therefore be a possible field for the sale of 5,760,000 spark plugs for the trucks which were already in use at that time.

Although the estimated production for motor trucks for 1919 was set at the beginning of the year at 290,000, it is probable that about 250,000 will be manufactured this year. To equip these with an average of twelve plugs each during the year, would give an additional sales opportunity for 3,000,000 plugs.

Therefore during the year 1919 there is a possible sales market for 6,760,000 plugs for the motor trucks already in use at the beginning of the year and 3,000,000 additional plugs for the use of trucks made and sold this year, giving a grand total of 9,760,000 plugs.

SIZE TRUCKS NEEDED ON FARMS

Reader Desires Information Regarding Use of Trucks by Farmers

To the Editor, COMMERCIAL VEHICLE:

This company is considering the manufacture of a motor truck and since our line of products will be sold principally to the farmer, we would appreciate it if you would advise us if you do not think that 1-, 1½- and 2-ton capacity trucks will best meet the needs of farmers. We would also appreciate it if you would point out any articles which have been published lately on the use of motor trucks by farmers.—W. H. PETERSON, Minneapolis Steel & Machinery Co., Minneapolis, Minn.

We agree with you that at the present time trucks of 1-, 1½- and 2-ton capacity will best meet the needs of the average farmer throughout the United States.

The question of size is not so much limited to the loads which the farmer has to carry as the condition of the roads over which his trucks must run. We believe that at the present time perhaps the 1½-ton truck, which could be fitted with wider rear tires and heavier rear springs to carry an additional ½-ton load to give a maximum capacity of two tons would best meet all conditions. As the roads in the rural communities are improved, the farmers will begin buying larger and larger trucks, since it is more economical to haul loads in large units than it is in small ones.

THE COMMERCIAL VEHICLE has published a great volume of data in its recent issues regarding the use of trucks by farmers and by haulage concerns in the rural territories. Some of the articles published in the various issues are as follows:

July 15, 1919, pages 24 and 25, tell how motor trucks haul milk to Milwaukee from the surrounding territory within a radius of 25 miles, and of the savings which they have effected for the farmers.

July 1, 1919, page 9, is a short story in which the advantages of hauling livestock by truck are pointed out.

May 15, 1919, pages 5 to 9, tell of the use of trucks in the Sacramento Valley hauling foodstuffs.

May 1, 1919, pages 21 to 23, point out how trucks have been used economically on farms for all kinds of work.

April 15, 1919, pages 5 to 11, treat of the use of trucks in hauling livestock to the Kansas City stockyards and of certain suggestions made by the editor of The Commercial Vehicle to provide better facilities at the stockyards so that more trucks could be used in hauling livestock to that and other markets throughout the United States which may adopt the same suggestions.

April 15, 1919, pages 19 to 21, tell of the introduction of the ship-by-truck-movement in the South with data on the first fleet of four trains of trucks running out of Macon, Ga., to nearby cities within a 50-mile radius.

April 15, 1919, pages 36 and 37, tell how a small town general store owner increased his business by a fleet of five light delivery trucks.

April 1, 1919, pages 16 to 18, tell of the great development of rural motor truck express business in the State of Iowa and gives details as to the size of trucks used and the types of bodies employed.

STANDARD PARTS USED ON MOTOR TRUCKS

The "Commercial Vehicle" Has Published Tables Which Give Such Data

To the Editor, Commercial Vehicle:

Will you kindly give me some information based on the percentage of models used by the manufacturers in frames, axles, springs, radiators, steering gears, universal joints, transmissions and wheels on 2-ton trucks? If you have not such figures will you kindly give me information as to where I can get them?—W. R. Morgan, Buffalo, N. Y.

The names of the makers of frames, axles, springs, radiators, steering gears, universal joints and gearsets as used on the 2-ton trucks offered on the 1919 market were included in the complete detail technical specifications of gasoline motor trucks as published on pages 24 to 39 of The Commercial Vehicle for November 1, 1918.

In addition, the average construction used on all 2-ton trucks offered on the market for this year was shown in the illustration at the top of page 9 in the same issue of November 1, 1918. Furthermore, you will find a separate list of the 2-ton trucks offered on the 1919 market on pages 21 and 22 in the same issue of this magazine.

The article entitled "Parts Industry Responsible for Great Increase in Truck Production," as appearing on pages 5 to 19 of The Commercial Vehicle for November 15, 1918, will undoubtedly prove of value to you, since it gives the number of truck makers using any particular make of engine, clutch, gearset, rear axle, steering gear, radiator, type of wheel, governor, spring, ignition system, self-starter, universal joint, frame or carburetor as used on all models of trucks listed in our specification tables as published in our issue of November 1, 1918, together with the number of models supplied by the various makers of parts and the percentage of the number of models using any particular part.

CHART TO DETERMINE CHARGE FOR CARRYING GOODS

Reader Desires to Know Actual Cost Per Day for 5-Ton Truck

To the Editor, Commercial Vehicle:

On page 31 of The Commercial Vehicle for July 1, 1919, there appeared a 5-ton rate chart as developed by the Progressive Transfer Co., St. Louis, Mo., to determine upon the rates to be charged for carrying goods by that company. The table states that the total operating costs of the 5-ton truck, making 60 miles a day, is $13.14.

This seems extremely low and we should like to know what the actual cost per day of the truck is, including overhead charges, such as garage, maintenance, administrative salaries, telephone, light, etc.—Detroit Transportation Assn., Detroit.

The total cost per day of $13.14 for the 5-ton truck covering 60 miles a day as mentioned in your inquiry does not include any overhead charges, but is the actual cost of truck operation according to the Progressive Transfer Co., which prepared the table. The Progressive Transfer Co. further advises us that the total cost per day of the truck in question, including all overhead charges such as garage maintenance, administrative salaries, advertising, office help and supervision, etc., is $26 a day.

This figure of $26 a day bears out the experience of The Commercial Vehicle in that it is almost exactly double the actual operating cost of the truck. The Commercial Vehicle has pointed out on many occasions that on any overland haulage work the truck owner should first of all determine the actual cost of truck operation and then double this figure in order to determine the rate to be charged per unit moved. If the actual cost of operation is doubled it will in most cases produce a clear profit of from 10 to 15 per cent on the investment after all deductions of the cost of doing business have been made.

MOTOR VEHICLE PERIODICALS

A List of Automobile Journals and Two Booklets on Vulcanizing

To the Editor, Commercial Vehicle:

We would appreciate it if you could send us a list of periodicals and printed matter on anything pertaining to automobiles. Do you know of any special magazine which has to do with vulcanizing?—F. J. Nicosia, Acme Vulcanizing & Sales Co., Wilmington, N. C.

We are glad to give you below a list of periodicals pertaining to motor vehicles, and two special booklets applying entirely to the subject of tire vulcanizing:

1—The Commercial Vehicle is a magazine devoted entirely to the subject of motor trucks from the owner's angle. It is published twice a month and the subscription rate is $2 a year. It contains only articles affecting truck use and maintenance, together with descriptions of new vehicles, parts and accessories used on trucks, specifications, etc.

2—*Automotive Industries* is a magazine devoted to the manufacture of automobiles, motor trucks, motor cycles, airplanes and other products which are operated by gasoline engines. It is published weekly and the subscription rate is $3 a year.

3—*Motor World* is the automotive dealers' merchandising paper, telling how dealers handling all forms of automotive equipment can best sell their product. It is published once a week and the subscription rate is $3 a year.

4—*Motor Age* is a dealers' magazine treating particularly of the maintenance rather than the sale of all forms of automotive equipment. It too is published once a week and has a subscription price of $3 a year.

The two following booklets apply directly to tire repairing and vulcanizing:

1—"Tire Repairing and Vulcanizing," prepared by Henry H. Tufford, and published by the William Hood Dunwoody Industrial Institute, Minneapolis, Minn. This book contains 98 pages and treats fully of the entire subject of tire vulcanizing and repairing, including tire construction, the various forms of tire injuries, how to repair these injuries and the tools to use. It also treats of business methods in tire repairing and gives sample costs of tire repair work.

2—The Haywood Tire & Equipment Co., Indianapolis, Ind., publishes a course in tire repairing which is divided into several booklets so that the information can be secured by the correspondence method rather than by the personal method of teaching.

BUILDERS OF 2-TON ATTACHMENTS

Adapters Which May Be Mounted on Any Make of Passenger Car

To the Editor, Commercial Vehicle:

We have a customer who has a Velie Model M automobile and wishes to equip this with a 2-ton attachment. We have informed him that we would suggest using a worm-driven unit in preference to any other form of drive. Will you give us a list of companies which manufacture a universal 2-ton attachment and what your idea of the worm drive is as compared to the other forms?—L. T. Heitz, L. H. Heitz Garage, Muscatine, Iowa.

The followinig companies manufacture universal adapters, or those which can be fitted to Velie or practically any other make of passenger car:

All-Car—Hudford Philadelphia Sales Co., Philadelphia, Pa.

Truxton—Commercial Car Unit Co., Philadelphia, Pa.

Dearborn—Dearborn Truck Sales Co., Inc., New York City.

E & W—E & W Mfg. Co., Milwaukee, Wis.

Graham—Graham Bros., Evansville, Ind.

Guaranty—Guaranty Motors Co., Cambridge, Mass.

Marvel—Mulford, Haas Co., Inc., Brooklyn, N. Y.

The question of the type of final drive is merely one of choice, as either a bevel, internal-gear or worm-driven axle will do the work satisfactorily.

Contractor Uses Trucks to Sell Tires

(*Continued from page 73*)

Even the tailgate of each of Elmer Barber's trucks is utilized to advertise the fact that he sells a certain make of truck tires in addition to carrying on his contracting work

neighborhood of 300 trucks, it had found that, on compiling statistics from eight owners, operating 114 trucks, all being of 5-ton capacity and most of them dump body machines, the total daily cost amounted to $26.09, divided as follows:

Depreciation	$5.29
Interest	.76
Insurance	1.25
Garage	.74
License	.11
Overhead	1.74
Driver	4.96
Tires	2.29
Gasoline	3.42
Oil and grease	.42
Repairs	5.11
Total cost	$26.09

Thus Barber, who by the way is not a member of the Motor Truck Owners' Assn. of Philadelphia, arrived at an amount within 71 cents of the association's average daily cost per truck.

Uses Service Recorders Himself

Of course, Barber demonstrates the Service Recorder device on his own trucks. The Recorder usually is placed either on the dash, or below the seat under the cab. The Recorder is a round, compact, mechanical metal device operating on the principle of a side-sway in a moving vehicle, this movement being distinct from vibration, and the device records this side-sway movement when it occurs. There are two elements, a pendulum mass which will swing from side to side in response to the side-sway of the truck, and a circular chart of blue paper thinly coated with white wax, the chart rotating by clockwork and the pendulum marking on its sensitive surface the record indicating the side-sway, or, in other words, the *travel* that has been going on. Lack of any marking, of course, shows that the truck has been standing still. The oscillations of the pendulum are directly recorded on the chart by the medium of a delicate stylus set in it near the point of suspension. As the stylus scratches the coat of wax on the paper, the darker surface of the paper shows through.

The instrument is enclosed and locked with a tiny padlock and can be attached to the truck where desired by means of bolts. The case of aluminum with a rubber gasket between the sections keeps it dust and water proof. The clock is strong and accurate and the only care necessary is changing the chart every 24 hours and turning the winding disk at the time.

The charts, which are numbered as to series, are 4¾ in. in diameter, which gives a good idea of the small size of the Recorder record, which is reproduced at the top of page 50.

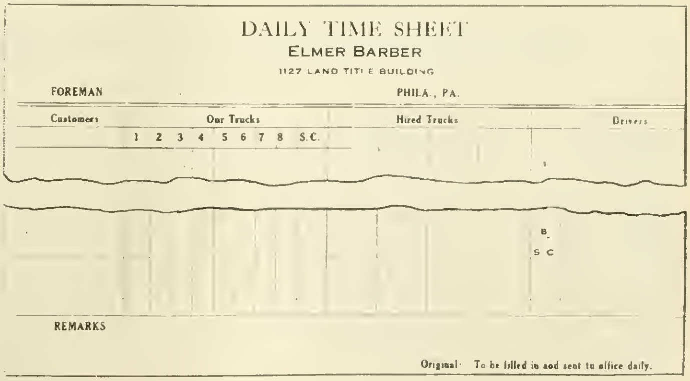
In connection with the Service Recorders, Barber uses a Daily Time Sheet, a white original with a yellow duplicate, the original to be filled in by the foreman and sent to Barber's office daily, and the duplicate to be retained by the foreman.

The Daily Time Sheet has spaces for date; foreman's name; customer's name; a number for each of the Barber-owned fleet and spaces for hired trucks; spaces for name of driver for each truck by number; time of sending truck, and remarks. A card index system of the usual type also is maintained in Barber's executive office in the Land Title Building, for checking and following up and keeping track of details of the various types of business done.

The range of business, as indicated, is a wide one. The biggest job Barber has tackled was the hauling contract for Fort Saulsbury, the new government defense work—little known, because of war secrecy, until it had been virtually finished—at a point 7 miles below Milford, Delaware. This job included the hauling of 100,000 tons of concrete, some of it by truck and some by narrow-gage train. In fact, Barber had the contract for hauling all the foundation material for the fort.

Another big job was hauling all the material for the 2,000 dwellings recently erected at Yorkship Village, necessitated by influx of thousands of shipbuilders to the surrounding territory. On this operation Barber's fleet, augmented by thirteen hired trucks, worked for 3 months.

Nevertheless any comparatively small job, such as hauling sand or gravel, that can be made to pay, will be readily undertaken. Whether it's an operation like building a big fort, thousands of houses, or constructing a road, or whether it is selling or repairing tires, or distributing Service Recorders, Barber is sure to do it in his own way, instead of following the beaten path.


DAILY TIME SHEET
ELMER BARBER
1127 LAND TITLE BUILDING

FOREMAN PHILA., PA.

Customers | Our Trucks | Hired Trucks | Drivers

1 2 3 4 5 6 7 8 S.C.

B
S C

REMARKS

Original · To be filled in and sent to office daily.

Reproduction of the daily time sheet used by Elmer Barber to keep a record of the truck work in addition to that furnished by the Service Recorder fitted on each truck

Over $300,000,000 For 1919 Road Work

California, Iowa and Texas Appropriations Are the Largest This Year

WASHINGTON, D. C., Aug. 12—The United States is in the midst of the greatest highway building campaign in the history of the world. The aggregate amount to be expended this year on the roads and lanes of the country would build and duplicate another Panama Canal. According to figures collected by the B. F. Goodrich Rubber Co., combined forces of the federal government, states and counties will spend $352,216,016 in new construction and maintenance of the nation's network of highways. This is the first complete survey of 1919 good roads expenditures. The amounts to be spent in each state in the Union are as follows:

Alabama, $1,000,000; Arizona, $6,250,000; Arkansas, $4,297,398; California, $20,000,000; Colorado, $4,742,000; Connecticut, $8,000,000; Delaware, $8 528,000; Florida, $8,000,000; Georgia, $7,911,000; Idaho, $2,100,000; Illinois, $6,013,304; Indiana, $12,000,000; Iowa, $20,498,534; Kansas, $8,000,000; Kentucky, $3,500,000; Louisiana, $2,000,000; Maine, $1,630,000; Maryland, $6,750,000; Massachusetts, $6,000,000; Michigan, $15,000,000; Minnesota, $11,127,986; Mississippi, $7,000,000; Missouri, $5.413,079; Montana, $6,300,000; Nebraska, $2,005,000; Nevada, $1,377,499; New Hampshire, $1,630,000; New Jersey, $6,500 000; New Mexico, $4,000,000; New York, $2,000,000; North Carolina, $5,000,000; North Dakota, $1.082,000; Ohio, $13.321,500; Oklahoma $3.600,000; Oregon, $8,000,000, Pennsylvania, $8,780,000; Rhode Island, $1,470,000; South Carolina, $7,000,000; South Dakota, $6,767,276; Tennessee, $3,650,996; Texas, $60,480,000; Utah, $10,092,794; Vermont, $1.797,650; Virginia, $3,400,000; Washington, $6 500,000; West Virginia, $2,000,000; Wisconsin, $3,200,000; Wyoming, $6,500,000.

The era of good roads talk has at last been succeeded by the era of good roads construction. Public sentiment is solidly behind extensive highway building programs now, but the enthusiasm must not wane. The millions being spent will be spent in vain unless states undertake to repair roads as quickly as they build.

While the amount available for expenditure this year seems staggering it will not be enough to make up for deferred war construction, for normally the amount spent on roads in the United States is well above $250,000,000 and the war restriction brakes applied brought road building almost to a stop in many localities.

Three great factors have been largely responsible for this year's amazing highway expenditures. First, the incentive for states to match Federal-aid appropriations; second, the passage of enormous bond issues for good roads in many states; and third, the attention given to the urgent need of good roads during the war.

MASS. TRUCK LEGISLATION

BOSTON, MASS., Aug. 9—There were 3,762 more commercial vehicles registered in Massachusetts for the first 7 months of this year than for the entire 12 months of 1918, according to the returns just made public by the Highway Commission. Last year there were 33,058 trucks registered. Up to Aug. 1 there were 36,820 or a gain of more than 10 per cent, which is very good considering the handicaps following the armistice, with canceled contracts. Below are the figures for the three periods:

	Trucks
Jan. 1 to Aug. 1, 1918	30,081
Jan. 1 to Aug. 1, 1919	36,820
Jan. 1 to Dec. 31, 1918	33,058
Gain over Jan. 1 to Aug. 1, 1918	6,729
Gain over entire 12 months; 1918	3,762

TRUCK TAX TO STAND

NEW YORK CITY, Aug. 5—General Manager Alfred Reeves and other officials of the National Automobile Chamber of Commerce, who conferred in Washington last week with Senators and Representatives, were convinced that there was little hope of bringing about a withdrawal of the revenue tax on trucks. To speak plainly, Reeves said, the Government needs the money, and officials do not listen sympathetically to arguments for tax elimination.

Massachusetts Truck Club Is Formed

Will Take Members from All Parts of the State—Its Office in Boston

BOSTON, MASS., Aug. 2—The Motor Truck Club of Massachusetts has just been formed at Boston as an aftermath of the hard fight which all those identified with the industry had to make this year to prevent the heavier trucks from being ruled off the highways. It will take in members from all parts of the state, and in the fall work will be started to educate the drivers against accidents through lectures and frequent inspections of trucks. As a result of the steps taken already, one insurance company has offered a reduction of 30 per cent in policies for accident and theft. When the course is inauguarated owners who may wish to become familiar with the mechanism of their trucks will be invited to attend. When the next legislature meets the club will be in good shape to take an active part in any fight against increased fees. With members in all the cities and many of the towns, effective work can be done. This year the burden of making the fight fell upon a few individuals, and not until the last few weeks was there much cooperation on the part of many owners.

It is well known now that the aim of the men opposed to the trucks is to have everything above 5 tons, if possible, and 4 tons, if convenient, legislated off the highways. This program is considered by some an easier one than to build roads strong enough to hold heavy traffic.

SILVEX BUYERS' GUIDE

SOUTH BETHLEHEM, PA., Aug. 9—A Buyers' Guide, listing the spark plug sizes for trucks, tractors, passenger cars and motorcycles has been published by the Silvex Co.

Equipment Needed to Maintain 54 Trucks

(*Continued from page* 55)

for the engines of any of the six makes of trucks employed, including the Ford. This is made possible by a special end support in which the engine may be held stationary in the stand or held over on its side to any angle to suit the convenience of the mechanic. This dual purpose of the stand has been worked out by an ingenious method of supporting the top frame of the stand. The latter may be pivoted to the end members of the stand when it is desired to turn the engine about its axis. When this is not required, the end members of the stand supporting the engine on side arms may be removed and the stand proper supported directly from the legs by inserting two small blocks of wood between the tops of the legs and the stand, as shown in the illustrations in the upper right corner of page 54. That illustration also shows how the stand is mounted on four rollers and how a drip pan is used under the stand to prevent the oil from dripping onto the floor.

A Bowser oil filter for reclaiming the oil taken from the engine crankcase when the engine is torn down is also employed and is shown at the top of page 53. A Bowser three-part lubricating tank equipment with an overhead barrel dumping arrangement is also employed and is illustrated on page 55.

The Bowser equipment is made by the S. F. Bowser Co., Fort Wayne, Ind. Two electric drills made by the Cincinnati Electric Tool Co. are also used for jobs which cannot be placed in the lathe. The special engine stand for washing parts and the features of the stockroom will be treated of separately in individual articles to appear in later issues of THE COMMERCIAL VEHICLE.

Tests to Be Made On German Trucks

Will Study Teuton Vehicles for Their Construction and Performance

NEW YORK, Aug. 6—Forty-seven makes of German trucks brought to this country as captured war material will be objects of a research investigation to be conducted jointly by the Society of Automotive Engineers, the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers' Assn. The construction and performance characteristics of the Teuton vehicles will be made available to American truck users through a report analyzing them. Possibly some of the parts will be sent to factories for more minute study, and reports of them made to the Motor Transport Corps and to the industry in general.

The investigation will be in charge of L. P. Kalb of the Standard Parts Co., chairman of the truck standards division of the S. A. E. standards committee, and a major in the Motor Transport Corps during the war. In the latter capacity Kalb took a leading part in standardizing the American army truck.

Kalb went to Washington last week to lay the plans for the investigation, conferring with Motor Transport officials and looking over the trucks, which were assembled by Lieut. Col. A. J. Slade of the Armistice Commission from 1250 vehicles turned over to the United States by Germany under the armistice terms. Slade shipped them here as being the best available specimens of German truck construction.

MUNCIE BACK ON TRUCK WHEELS

MUNCIE, IND., Aug. 5—The Muncie Wheel Co., of this city, has been manufacturing heavy artillery wheels for the Government for the past 18 months, but from now on will confine its efforts to automotive wood wheels for trucks and passenger cars.

LIVE STOCK DEALERS PROTEST

ST. LOUIS, MO., Aug. 6—Live stock dealers of the National Stock Yards, East St. Louis, Ill., have filed objections to the proposed East St. Louis city ordinance that would prohibit the transportation of hogs, sheep and cattle through the city in motor trucks.

GOODYEAR TRUCK RUNS 82,000 MILES

NEW ORLEANS, LA., Aug. 2—A mud-bespattered 3-ton truck belonging to the Goodyear Rubber Co. finished the 82,000 miles of its nation-wide demonstrating tour on July 29, when it rolled into New Orleans. This truck is one of a fleet of ten which has been in service between Akron and Boston, hauling freight, in demonstration of the ship-by-truck idea. After making several trips over this route, this truck was driven from Boston to San Francisco and Los Angeles and return and has been in service some 18 months, though apparently as ready for a short or a long haul as when it was first put into service.

On the present trip, the truck left Akron, going through Cincinnati, Louisville, Nashville, Atlanta, Jacksonville, Miami, Tampa, Montgomery, Mobile and thence to New Orleans by way of Hattiesburg, Miss., and Baton Rouge.

TO BUILD DUMP BODIES

MILWAUKEE, WIS., Aug. 4.—The Heil Co. of this city is now specializing in the production of dump bodies of all kinds, with hydraulic hoisting equipment, for application to motor trucks.

MOVING BY INTERCITY TRUCK

NEW YORK CITY, Aug. 2—The "X" Laboratories are now located in New York. They moved the entire offices overnight by truck from Boston. The personnel followed by train and at 9 o'clock the next morning business was resumed with hardly any interruption.

NEW TRANSPORT COMMITTEE IS APPOINTED

WASHINGTON, D. C., Aug. 11—A new Highways Transport Committee of the Council of National Defense has been appointed to help develop and maintain the highways of the country and to increase transportation resources. Clifford Shoomaker has been named to represent the Bureau or Public Roads on this committee to succeed J. M. Goodell, who resigned. John W. Halowell, assistant to the Secretary of the Interior, will represent that department, and Lieut.-Col. J. M. Ritchie, of the Motor Transport Corps, is representative of the War Department. Other members of the committee are: Hon James I. Blakeslee, Fourth Assistant Postmaster General, Post Office Department; James H. Collins, Investigator in Market Survey, Bureau of Markets; Dr. R. S. MacElwee, Assistant Director of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

MOTOR TRUCK TRAIN STILL GOING

KIMBALL, NEB., Aug. 11—The Motor Transport Transcontinental Train now in its fifth week, has accomplished more than half of its trip. It has been held up slightly by heavy rains and bad dirt roads, but does not report any maintenance trouble of importance and operating has been practically free from accident. During the past week it has been traveling through Nebraska. On Aug. 9 the train reached Cheyenne, Wyo., where it was met by the Governor and his party. The convoy found the highways chiefly of sand and gravel, but well crowned and compact in that part of the country.

WHEAT BEING MOVED BY TRUCKS

MEXICO, MO., July 26—The wheat crop of Audrain county is being rushed to the mills in trucks and every truck owner nearby is operating. A charge of one cent a bushel a mile is being made.

Start on Motor Truck Development Tour

Twenty Trucks Start on 3000 Mile Trip on August 4 to Be Gone 60 Days

CHICAGO, Aug. 9—The National Motor Truck Development Tour, the first of its kind in this country, left Grant Park, Chicago, Monday, August 4, on a 3000-mile trip through Illinois, Iowa, North and South Dakota, Minnesota and Wisconsin.

Nearly twenty trucks on pneumatic tires have been entered by leading manufacturers to make up the caravan, which is making an extended tour of 60 days, which will end in Milwaukee on October 4. Demonstrations of farm efficiency comprising every test of speed and performance imposed on them by agriculturists are being made on the road to impress the farmers with the practicability of the motor truck in agriculture.

The caravan left the city amid great celebration. Maj. Gen. Leonard Wood started the caravan on its way with an address in Grant Park, sounding the keynote of preparedness on the farm. The United States Naval band, consisting of twenty-five musicians under the command of Lieut. F. M. Willson, which is to accompany the trucks during the entire tour, staged a concert as a farewell.

Great preparations have been made to insure the success of the undertaking. Farmers throughout the eighty or more towns and cities through which the trucks are passing have been notified in advance to be ready with questions and tests, and lectures are being given to the farmers at various points along the line. Sufficient cots, bedding and tents are being carried to handle the personnel of seventy men at places where hotel accommodations are not available.

The convoy is under the direction of M. D. Scott, who has had much experience in motor tours. A. R. Kroh is in charge of the demonstration hauling.

Each factory is limited to one entry, and a driver and factory sales representative form the crew of each truck. The following factories are represented: Atterbury Motor Car Co., Buffalo, N. Y.; Bethlehem Motor Corp., Allentown, Pa.; the Clyde Cars Co., Clyde, Ohio; Diamond-T Motor Truck Co., Chicago; the Gramm-Bernstein Motor Truck Co., Lima, Ohio; Martin Truck & Body Corp., York, Pa.; Master Trucks, Inc., Chicago; Sterling Motor Truck Co, Milwaukee, Wis.; Selden Truck Sales Co., Rochester, N. Y.; Signal Motor Truck Co., Detroit; Service Motor Truck Co., Wabash, Ind.; Republic Motor Truck Co., Alma, Mich.; Winther Motor Truck Co., Kenosha, Wis.

In addition to these there are also in the caravan a service truck, a Standard Oil gasoline truck, an official touring car, an Excelsior motorcycle and side car for scout duty and several passenger cars.

Operate Big Chicago Trucking Line

Main Line Between Milwaukee and Chicago—Will Start Feeder Lines Later

CHICAGO, Aug. 9—On Aug. 1, the United Motor Transport Lines started an intercity transportation service between Chicago and Milwaukee. There will be daily service between the two cities for the present and a little later feeder lines with the necessary terminals will be established. The company will maintain additional warehouses at Waukegan, Kenosha and Racine which will be equipped with cold storage facilities in order that perishable foods of any description may be properly taken care of.

Starting from Milwaukee, the route follows the shore of Lake Michigan through Allis, Cudahy, South Milwaukee, Racine, Racine Junction, Kenosha, Winthrop Harbor, Zion City, and Beach to Waukegan.

Between Waukegan and Chicago there are two trunk lines. The route that follows along the shore of the lake passes through Great Lakes, Lake Bluff, Lake Forest, Sheridan, Highwood, Highland Park, Glenco, Hubbards Woods, Winnetka, Kenilworth, Wilmette and Evanston. The other route passes through Libertyville, Half Day, Wheeling, Northfield, Shermanville, Techny, Glenview, Gross Point, Morton Point, Niles Center, Niles, Forest Glen and Jefferson Park.

The company will operate Winther-Marwin pneumatic-tired trucks and trailers between the two cities. The officers of the company are L. C. Honn, president; F. M. Foster, vice-president; E. H. Lowe, secretary, and William Martinson, treasurer.

RURAL EXPRESS COMMITTEE NAMED

NEW YORK CITY, Aug. 10—The possibilities of improving facilities for marketing farm products—the handling of city to country and vice versa transportation problems—has been taken into serious consideration by the National Automobile Chamber of Commerce. President Charles Clifton of the Chamber has appointed a committee of successful and forceful executives from the motor truck field to be known as the Rural Motor Express Committee. Coming at a time when the High Cost of Living is a national issue, which demands close attention and co-operation, the work of this committee is looked upon as being very important—through it plans can be devised and propaganda started that would make the entire country a network of rural express routes, thereby materially cutting down prices, getting the farmer better prices for his product and cutting out that much discussed middleman, jobber and what-not before the farm produce reaches the consumer through his local dealer.

The men selected for this committee by President Clifton are James L. Geddes, chairman, President of the Kelly-Springfield Motor Truck Co., Springfield, Ohio; G. D. Wilcox, Director of Sales and Advertising of Commerce Motor Car Co., Detroit; E. A. Williams, Jr., President and General Manager of The Garford Motor Truck Co., Lima, Ohio; O. H. Browning, Truck Sales Manager of the International Harvester Corp., Chicago; A. T. Murray, President and General Manager of the Bethlehem Motors Corp., Allentown, Pa., and F. W. Fenn (secretary), N. A. C. C.

GLOVER WITH AXLE COMPANY

DETROIT, Aug. 6—Col. Fred Glover has been made assistant general manager of the Timken-Detroit Axle Co. He was formerly vice-president of the Emerson Brantingham Co., of Minneapolis. During the war he was chief of the motors division of the War Department.

SEWELL SUPPLIED 28,000 WHEELS

DETROIT, Aug. 10—At the present time 28,000 Sewell cushion wheels are in operation on all makes and sizes of trucks throughout the Untied States.

Coming Events

1919

Aug. 15......	Sedalia, Mo., Good Roads and Ship-by-Truck Day, Missouri State Fair.
Aug. 23 to Oct 6.....	Toronto, Can., Shows of Cars, Trucks, Tractors, Airplanes and Motor Boats, in conjunction with Canadian National Exhibition.
Aug. 26-29...	Madison, Wis., State Fair.
Aug. 31 to Sept. 5.....	Lincoln, Neb., State Fair.
Sept. 1.......	Hartford, Conn., State Fair, Charter Oak Park.
Sept. 1-5.....	Wheeling, W. Va., State Fair.
Sept. 1-6.....	Spokane, Wash., State Fair.
Sept. 3.......	New York City, Meeting of Automotive Service Assn. of New York, at 8 o'clock.
Sept. 8-13....	Topeka, Kan., State Fair, Motor Hall and Machinery Field.
Sept. 8-13....	Huron, S. D., State Fair.
Sept. 8-13....	Helena, Mont., State Fair.
Sept. 8-13....	Syracuse, N. Y., State Fair.
Sept. 9-13....	Douglas, Wyo., State Fair.
Sept. 12-20...	Peoria, Ill., State Fair.
Sept. 13-20...	Hutchinson, Kan., State Fair.
Sept. 14-20...	Sioux City, Ia., State Fair.
Sept. 15-20...	Yakima, Wash., State Fair.
Sept. 15-20...	Springfield, Mass., State Fair.
Sept. 16-19...	Billings, Mont., State Fair.
Sept. 20-27...	Memphis, Tenn , State Fair.
Sept. 20-27...	Oklahoma City, Okla., State Fair.
Sept. 22-24...	Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel
Sept. 22-27...	Pueblo, Colo., State Fair.
Sept. 22-27...	Salem, Ore., State Fair.
Sept. 24 to Oct. 3......	New York City, N. Y., Electrical Exposition, Grand Central Palace.
Sept 24 to Oct.4......	Kansas City, Kan., State Fair.
Sept. 29 to Oct. 4......	Muskogee, Okla., State Fair.
Oct. 6-19....	Dallas, Tex., State Fair.
Oct. 20-25....	Raleigh, N. C., State Fair.
Oct. 22-27....	Shreveport, La., State Fair.

1920

Jan. 3-10....	New York City, Motor Truck Show, Twenty-second Regiment Armory, 168th St and Broadway.
Jan. 21-31....	Chicago, Ill., Motor Truck Show, Drexel Pavilion
Feb. 9-14....	Louisville, Ky., American Good Roads Congress.

Autocar Will Create a Legal Office

Form New Department to Fight Unjust Legislation When It Is Introduced

ARDMORE, PA., Aug. 11—Officials of the Autocar Co., realizing the great tendency to put restrictive legislation on commercial vehicles through state and municipal legislation, have decided to set aside a department which will be known as a legal office to combat such matters in the future.

The plans are not fully matured just yet, but the officials have noted the trend of the times and through its own organizations it has the nucleus of a working association which will be able to do a lot of good. It is realized that it is easier to stop legislation than to repeal laws once they are put in force, and this is what the department will seek to do.

By keeping in touch through newspapers and other sources of what is contemplated and then notifying the branch managers, who in turn will notify the owners, a chain will be formed which will be able to notify the N. A. C. C. and other motor bodies to join hands to fight for what is right. Letters will be sent to other motor companies advising them of this work, and it may lead to a general line in many truck factories.

NEW PACKARD PRICES

DETROIT, July 29—Packard Motor Car Co. has announced price increases on all its models. The increases, which range from $200 to $300, take effect immediately. The new prices are as follows:

Capacity, Tons	New Price	Old Price
1½..................	$3,200	$3,000
2..................	3,600	3,400
3..................	4,350	4,100
4..................	4,550	4,450
5..................	5,450	5,150
6..................	5,700	5,400

PRICE OF TEXAS TRUCKS

FORT WORTH, TEX., Aug. 10—The Texas Motor Car Assn., manufacturers of the Texan truck, which was described in THE COMMERCIAL VEHICLE in the February 15, 1919, issue, is selling its trucks at $1200 for the ¾-tonner and $1425 for the 1½-tonner.

WHITE VICE-PRESIDENT HONORED

CLEVELAND, OHIO, Aug. 4—Walter C. White, vice-president of the White Co., has been made a chevalier of the Legion of Honor by the French Republic.

TRUCKS AT ELECTRIC EXHIBIT

NEW YORK CITY, Aug. 10—At the New York Electrical Exposition which will be held from Sept. 24 to Oct. 3 at the Grand Central Palace in this city, the following electric truck companies will exhibit: Ward Motor Vehicle Co., Mt. Vernon, N. Y.; Commercial Truck Co. of America, Philadelphia, Pa.; Walker Electric Vehicle Co., Chicago, Ill.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher.
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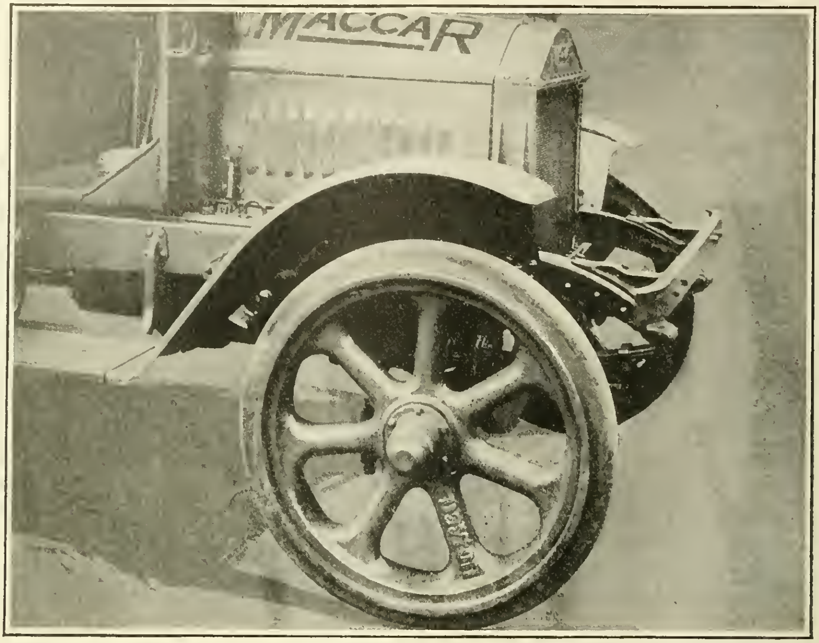

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Perfect Wheel Performance

Before truck buyers began to know about wheels they accepted loose spokes, wobbles, flats and other wheel troubles as inevitable.

Now all this is changed. National advertising in the Saturday Evening Post has taught the observant truck buyer that Dayton Steel Wheels are protection against all of these faults.

A recent investigation among 80 representative truck manufacturers and dealers showed that truck owners are specifying steel wheels.

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The Dayton Steel Foundry Co.
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DETROIT
1008 Chamber of Commerce

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416 First National Bank Bldg.

CHICAGO
975 Old Colony Bldg.

NEW YORK
416 World Bldg.

Dayton
Steel Truck Wheels
Patented.

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Sept. 1, 1919 No. 3

Getting Business *for the* Truck Transferman

Trucks as Feeders May Save Electric Lines and Railroads and Develop Workable Store Door Delivery

STUDY, PLANNING, ACTION AND MODERN METHODS MUST SUPERSEDE HAPHAZARD SYSTEM

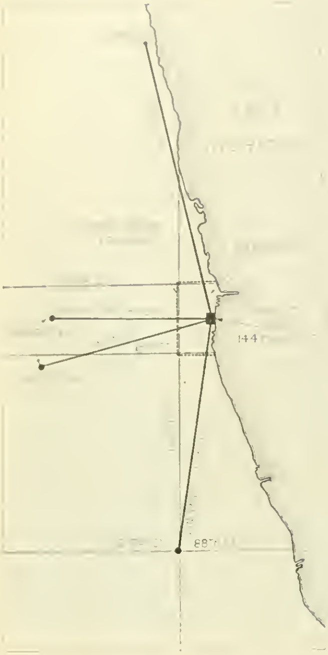
THE transferman operating a fleet of motor trucks can only get business on a large scale by the employment of a force of business-getting solicitors. They must be high-class men to produce results. Money is no object when it begets more money. As an example, a good business getter may earn $100 a week and yet is an excellent investment if he turns in $1,000 worth of business.

Truck owners picking up and delivering other peoples' goods for hire cannot expect business to come to them. They must go out and get it. In the days of the war-time railroad embargoes, short-haul business came to the truckmen. But those days are gone. The successful truck transferman of to-day must employ a corps of business-getters if he expects to be still in the field 5 years hence.

This is the opinion of Joseph D. Porter, general manager of the Interurban Motor Despatch, which handles 600,000 pounds of goods a week in Chicago and the surrounding territory. He employs four business solicitors to obtain the 600,000 pounds of goods handled weekly. Two of the men operate in Chicago, one in Elgin, Ill., and the other in Milwaukee, Wis. Two of the men are former railroad freight solicitors, and these two men have been the biggest producers.

Mr. Porter has found that the commission basis of paying such men is not satisfactory in that a large volume of the business secured cannot be directly traced to the efforts of any one of the men. As a result, all four solicitors are all paid on a salary basis, the lowest receiving $35 a week and the highest $65.

In his work with the Interurban



Map of Chicago, showing where the Interurban company gives express service in the Loop district, indicated by the area within the dotted line. The electric freight stations of the four trunk lines are shown by the small black circles

Motor Despatch, Mr. Porter has gone a step farther than the average transferman operating trucks, in that he has entered into contracts with four main trunk electric trolley lines to haul their goods from the outside freight stations into Chicago and to obtain and deliver other goods being shipped out of Chicago. The only difference between this arrangement and that of the average transferman hauling package goods to the various railway terminals lies in the fact that the Interurban Motor Despatch and the four trunk electric lines haul in conjunction with each other.

This means that the Interurban Motor Despatch can pick up a package in Chicago and route it to the door of the consignee in Milwaukee or Elgin at a certain rate per hundred pounds. Furthermore, it may collect the complete charges on the package from origin to destination, notwithstanding that the first part of the haul is in one of its own trucks; the second part on one of the electric interurban lines, and the third part on the vehicle of one of its agents in the destination city.

This work of a truckman in co-operation with a series of electric interurban lines marks a step forward in the great economic problems now facing both the electric railway lines and the steam railroad systems, but particularly the former. The electric railway industry has been in bad shape financially for the last several years, due to the great falling off in the tonnage carried. Similarly, the Government ownership of the steam railroads has shown conclusively that short-haul shipments do not pay, even though the rate is excessively high.

May Save Electrics

The work of the trucks of the Interurban Motor Despatch shows how the commercial vehicle can be used as a feeder to the electric lines in order to increase their tonnage of business and thus permit them to take over the unprofitable short-haul shipments of the steam lines.

It is but another indication of the proper spheres of activity of the motor truck, the electric interurban and the steam railroad, the truck handling the close-in shipments, the electric-interurban those moved to intermediate distances between the sphere of the truck and the long-haul sphere of the steam railroad. To indicate how the use of the motor truck as a feeder to the electric railway line can prove successful in so far as the business of the individual truck company is concerned, as well as increase the tonnage of the electric line, the business handled by the Interurban Motor Despatch has grown from 165,000 pounds a week on January 1, 1918, to 600,000 pounds a week on July 1, 1919. This increased business has brought beneficial results to both the truck company and to the four trunk lines over which the Interurban company routes its goods.

The service rendered by the Interurban trucks is also of great importance aside from its indication of the manner in which trucks may act as feeders to electric lines, in that it is in reality the first successful store-door delivery to be put into effect in any of the large cities of the United States. The shipper in Chicago can route his goods direct from his own doorstep to that of the consignee in any one of the 100 towns which are served by the electric lines with which the Interurban company co-operates. Similarly, the merchant in any of the outside towns can ship direct to the consignee in Chicago and pay but one charge for the service, instead of having to bill it through his local transferman first; then through the electric line and finally through another transferman at the other end of the route.

The successful co-operation between the Interurban company and the four trunk lines of electrics clearly indicates the great importance of the motor truck in such work. It also points out how eventually the railroad lines and trolley systems may employ their own trucks for the work and in this manner become the largest users of motor trucks as a class in the United States.

Conditions in Chicago

While discussing the Chicago situation it must not be forgotten that conditions are different there than in most cities in that an Illinois law does not permit the electric lines to bring freight into the city proper over their

Joseph D. Porter, general manager of the Interurban Motor Despatch, which operates a fleet of twelve trucks and four trailers in Chicago own lines. This law was passed to prevent congestion within the Loop district, which is already so burdened that Chicago has its underground freight-handling tunnel system. While in other cities the electric lines may bring the goods to terminals within the business section proper, it in no wise affects the operation of the trucks, since they could be employed to haul between terminals and to and from terminals to consignees and consignors even though the hauls were shorter.

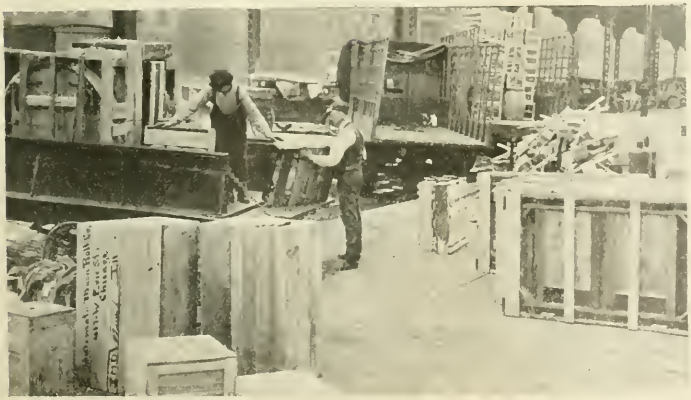
Transferring a bulky crate from one of the pickup trucks to one of the four-wheeled trailers which will be hauled later from the Interurban station to one of the electric line terminals in Chicago

Works with Other Companies

The Interurban Motor Despatch is operated under the laws of the Illinois Public Utilities Commission and works in conjunction with eight electric lines operating four main trunk systems. The first of these trunk systems is made up of the Aurora, Elgin & Chicago Railroad Co.; the Chicago, Aurora & De Kalb Railroad and the Rockford & Interurban Railroad Co. The second trunk system is composed of the Aurora, Plainfield & Joliet Railway Co., the Chicago & Joliet Electric Railway Co., and the Elgin & Belvedere Electric Co. The third trunk line is the Chicago, Northshore & Milwaukee Railroad, which rebills to Evanston, Ill. The fourth trunk line is the Chicago & Interurban Traction Co. The Interurban Co. has contracts with each of these trunk lines to handle all of the business between terminals in Chicago as well as to collect goods to be shipped out over any of the lines. These contracts provide for a division of the charges according to the length of haul in the city and the distance moved over the electric lines.

But the employment of business-getters is not the only essential to the success of the truck transportation company. The truckman must first provide a central station for the pickup and delivery of goods; systematize the records which must be kept of the volume of business done and keep the trucks in such condition as to enable them to render an adequate and dependable service.

How Porter has done this is told by word and picture in the accompanying article. He maintains one central distributing station at 144 Market Street. The Interurban Despatch station is the only terminal inside the Loop district. It was formerly the old Erie Railroad freight station. By this central location in the main business district of the city, the hauls from the large shippers are lessened. The station also serves as a means for gathering all of the outgoing goods and of assembling them into loads for each of the electric trunk lines so that the trucks may run with full capacity loads.



Scene in front of the distributing station of the Interurban company, showing one of the pickup trucks being unloaded and some of the outgoing goods on the sidewalk ready to be hauled to the trolley terminals

The establishment of such a central distributing station is necessary for the success of such an organization as the Interurban Motor Despatch, because it enables it to employ light delivery trucks for picking up and delivering goods and large trucks for the hauls between its station and the terminals of the four trunk lines. One of these terminals is located at Evanston, which is 14 miles from the Interurban station on Market street. The second terminal is at Laramie Avenue, eight miles away; the third at the Archer Avenue limits, nine miles distant, and the fourth at Eighty-eighth Street and Vincennes, approximately nine miles away.

A Standardized Fleet

In its work, the Interurban company maintains a standardized fleet of twelve trucks. All of the vehicles are Gramm-Bernsteins with the exception of one Ford used for special deliveries and pickups. Four 1½-ton Gramm-Bernsteins are also used in the pickup work. Three 3½-tonners, two 5-tonners; two 8-ton tractor and semi-

(Continued on page 112)

FIVE WAYS

This Story Is of Interest To the Character of Work Done

1—By Reputation
2—By Recommendation
3—By Analysis
4—By Performance
5—By Simple Tests

NO matter what size or make of truck the fleet owner operates, he is always confronted with the problem of buying lubricating oils. While the proper lubrication of the truck engine has more to do with its life and the subsequent cost of truck upkeep than any other one thing, it is not given the consideration which it should have. The reason for this is that the average fleet owner does not buy lubricating oil on any systematic basis.

It is the purpose of this article to point out the five ways in which engine oil may be purchased. Generally speaking, these are as follows: 1—By reputation. 2—By recommendation. 3—By analysis, 4—By performance. 5—By simple tests. Each of these methods has its advantages and disadvantages, as will be indicated in this article.

Before attempting to solve a problem it is always best to state the problem in a concise manner. Doing this in the case of truck engine oil, a correct oil should have three fundamental characteristics, as follows: 1—Be of the highest lubricating efficiency. 2—Have sufficient body to form a film to separate the friction surfaces and prevent the escape of gases past the piston ring and not burn up due to the high temperatures in the combustion chamber at the moment of the gas explosion; and 3—Have sufficient fluidity in winter weather to lubricate properly, no matter what the feed system.

If an oil does not have sufficient lubricating qualities its use may result in scored cylinder walls. This means cylinder reboring or new rings, and eventually loss of compression and power. On the other hand, the oil must not be so light as to work past the piston rings into the combustion chamber where it will form carbon deposits.

At this point it is well to bear in mind that all lubricating oils of the petroleum base are chemical combinations of hydrogen and carbon. In a high-grade oil, the objectionable free carbon and other impurities are removed by filtration. However, it is impossible to remove the carbon because it is in combination with the other chemical elements making up the oil, and to remove it would destroy the oil itself.

Other things being equal, the best or most desirable kind of oil for any make of truck engine is that which provides adequate lubrication at the lowest cost per mile run. This clearly indicates that the highest priced oil may be the most desirable and the cheapest if a smaller amount of it is required to run any given distance than some other oil at a lower price.

Taking up the five methods of buying oil in the order given, that of buying by reputation is more or less guesswork. One motor truck owner says that he gets best results from a certain kind of oil in a certain size and make of truck. He tells another of his truck owner friends about it and the latter in turn tries it for several months. His trucks, while of the same make and capacity, may show a wide variation in the oil consumption as compared with the first truck owner, since it must be remembered that oil consumption does not vary with the mileage but more nearly with the revolutions of the engine, with the gear in which the truck is run, and with the road conditions.

In other lines of industries, certain grades of oil are recommended by the oil producers for certain types of machinery, the producers having tested out their various grades of oil for different machines and having determined upon the grade which gives the best results under each set of conditions. If this can be done in other lines of industry, the basic principles should also hold good for motor truck lubricating oil. Several of the oil producers have actually tested the engines of representative makes of trucks and have determined for those engines the grades of oil which give the best results under summer and winter conditions. The truck owner cannot go far wrong in buying an oil as recommended by any of the large producers to give the most desirable results in their own particular types of engines.

Analysis of lubricating oil means little to the motor truck operator. Such tests as those for impurities and water; gravity; flash; fire; cloud; pour; cook; viscosity; shake, and color being of greater value during the manufacture of the oil to determine its uniformity than to indicate its lubricating efficiency. Besides, the average truck owner has not the equipment required to carry out such tests nor the men with sufficient scientific training to make the results worth anything.

TO BUY OIL

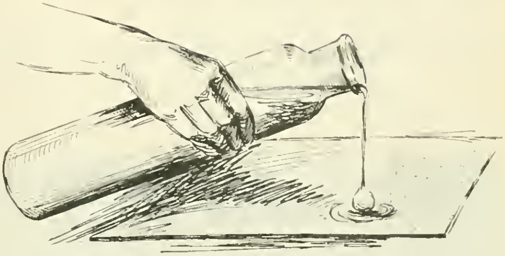
Every Fleet Owner, Irrespective of or the Size of Truck Employed

Buying oil by performance in an actual truck motor operating on the road under the actual conditions met with in the delivery of the owner's goods is a good one, but may be robbed of most of its accuracy if the tests on any two competing oils are not conducted under exactly the same conditions of load, speed, roads, and weather temperature. Too often, 5 gallons of one oil are tested in this manner with the second 5 gallons of another make tried out under different conditions. Obviously, no fair comparison can be made.

The performance test helps to satisfy the truck owner, since he does not have to take any other person's word as to the worth of the oil he is using. It should be borne in mind, however, that if tests of this kind are to be of any value, they must be run for at least 500 to 1000 miles and that the conditions under which the truck is run when testing one oil are as nearly identical as possible when another oil is tested. This method of test claims many adherents because the oil as used by the truck owner must produce results in the actual work of his vehicles, and these results are liable to be different than when the oil is tested under the same make of engine under a more or less constant load in the engine laboratory.

There are several simple tests which the truck owner can make for himself to guide him in the selection of his oil. These tests are not scientifically accurate, but are simply guides to discover readily some of the principal characteristics of the oil.

Theodore D. Pratt, formerly chief engineer in charge of the fleet of trucks of the Central Stamping Co., Newark, N. J., and now executive secretary of the Motor Truck Assn. of America, used two simple tests to determine the free carbon in an oil and its fluidity in cold weather. The first of these is known as the blotter test. A drop of the oil is put on a clean white blotter. If the drop disappears overnight and does not leave a dark-colored stain, it indicates to a certain degree that there is little free carbon in the oil. If, however, a stain is left, it indicates that there is a certain amount of free carbon in the oil which would later be deposited in the engine.

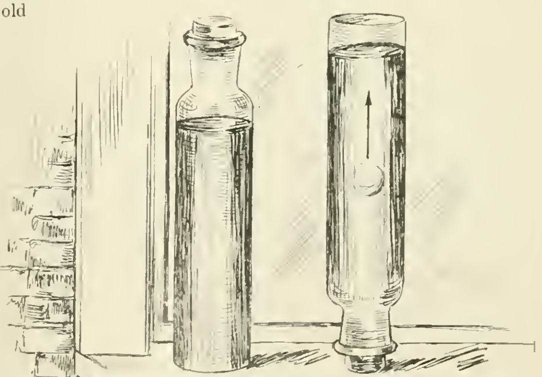


If a drop of oil on a clean blotter leaves no stain after being left overnight it is a guide to indicate the absence of any great amount of free carbon

It is important to know the fluidity of an oil in cold weather, because an oil which congeals readily in cold weather may make it necessary to run the engine for several minutes without any oil at all until the engine heats up. This is particularly the case with trucks stored in unheated garages and fitted with engines lubricated

(Continued on page 98)

This is the emulsion test, showing a good oil in the center, an average oil at the left and a poor oil at the right



A simple test to show the fluidity of oil in cold weather. The bottles are placed out in the cold on the window sill and how the air bubble moves to the top is noted

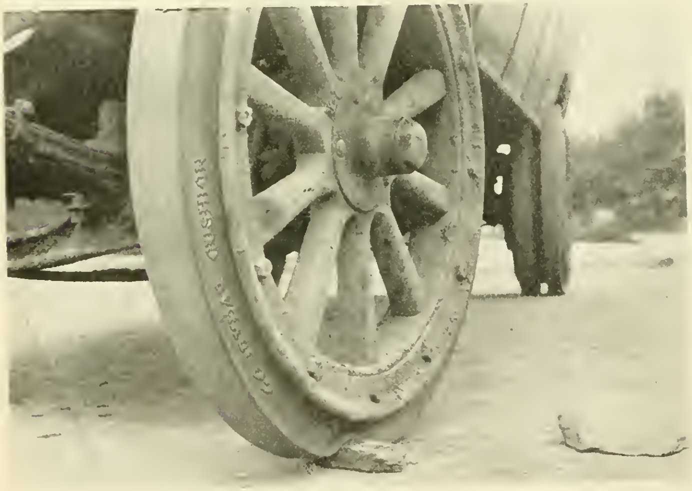
If You Operate ¾- to 2-Ton Trucks, Read This Story

It May Save You Hundreds of Dollars on Your Tire Bills

How One Fleet Owner Gets

20,000 MILES FROM TRUCK TIRES

New Cushion Tires All Around for ¾- to 1-Ton Trucks and Suitable for Front Wheels of 1½- and 2-Tonners



View of a Goodyear cushion tire fitted on a front wheel and showing how it absorbs a good-sized stone

ABOUT 2 months ago, the editor of THE COMMERCIAL VEHICLE was talking with George Heron, maintenance superintendent of the fleet of the Boston Store, one of the large department stores of Chicago, as to the methods he follows in keeping that company's fleet of sixty-nine motor trucks up to snuff. In asking about tire mileage, he was astounded when Heron said: "We get on an average of between 18,000 and 20,000 miles on the front tires of all of our trucks except the Fords, which use pneumatics. Our trucks range from ¾ to 2 tons in capacity."

Astonished at this exceptional mileage obtained on Chicago streets, which are none too good, the next question was: "What kind of tires gives this exceptional mileage?"

To this Heron replied: "Goodyear cushion tires. They look like ordinary solids, but are not. They are hollow on the inside."

Later the author found that, according to H. G. Hart, manager of the Boston Store, three sets of the same kind of tires, fitted 2 years ago to three of the company's trucks, one of them a 2-ton Mack, had averaged 30,114 miles, where formerly 10,000 miles had been secured from the ordinary solid tire.

It was this interview which led to the preparation of the accompanying short article, telling just what the Goodyear cushion tire is; for what size of trucks it may be used; how much it costs, and what changes have to be made to install it—all to the end that other fleet owners operating trucks of similar size and under similar conditions to those of the Boston Store may know of this comparatively new type of tire and investigate its possibilities for saving them money in the operation of their vehicles by cutting down tire cost through increased mileage.

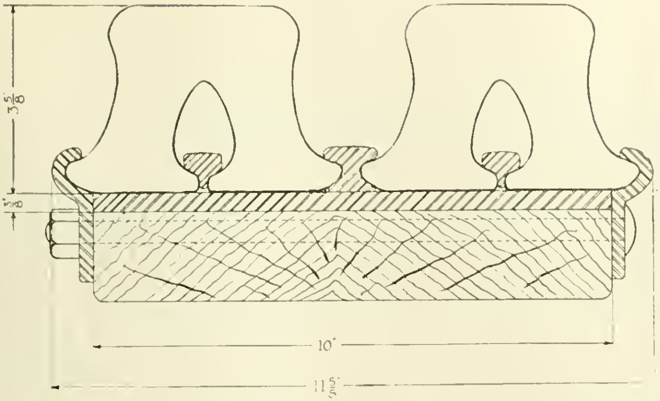
Hollow Center Is Feature

The outstanding characteristic of the tire is its hollow center, which provides space for the distortion of the rubber and causes the two side or supporting sections to act as hinges when under load. It is best adapted for use on all the wheels of ¾-ton and 1-ton trucks and on the front wheels of 1½ and up to 2-ton trucks operating at a speed not to exceed 25 miles an hour. Dual cushion tires are built for service on the rear wheels of all trucks up to 2 tons in capacity.

The type of tire, which is clearly shown in the illustrations on this and the opposite page, was designed with characteristics between those of the solid and those of the pneumatic. It was found that solid tires run at speeds of 20 to 25 miles over rough roads were not advisable because of the excessive vibration of the truck and its load and because such speeds could not be maintained without injury to the tires themselves. Pneumatics, while furnishing the necessary resiliency, did not wear as long as solids and were liable to blow-out trouble, particularly if glass, nails, etc., were encountered.

Tire Has High Profile

The tread of the Goodyear cushion tires is considerably higher than that of a solid tire in order that the maximum cushioning effect can be delivered. The illustration on this page shows how the tire absorbs a



How dual cushion tires are mounted, showing the additional center ring between the two tires. The carrying capacity of a set of duals is double that of a single cushion tire

Cross section of a Goodyear cushion tire, showing hollow center with core ring inside at the base and the two channel fillers, one on each side of the wheel felloe

good-sized stone over which it passes.

Owing to the fact that the tire is hollowed out, it obviously cannot carry the same load as the ordinary solid tire, size for size. Besides being under strain due to constant flexing, the side wall is the thinnest part of the tire and will fail through the side wall if the tire is overloaded. Because overloading would prove disastrous to the cushion tire, the latter must be oversized when used to replace an ordinary solid. For instance, when trucks equipped with 3-inch solids are fitted with cushion tires, they should take a 3½-inch size, similarly 3½-inch solids should be replaced by 4-inch cushion tires and 4-inch solids with 5-inch cushions, since the cushion tire is not manufactured in a 4½-inch width.

Channel Fillers Employed

Ordinarily, this oversizing of solid tires would mean that the wheel to which the Goodyear cushion tire is applied would have to be built out. To eliminate work of this kind, channel fillers have been designed and are sold with a cushion tire, so that the complete change over can be made by one purchase. These channel fillers are in effect steel flanges of ½-inch cross section and are drilled with holes corresponding exactly to the holes in the S. A. E. wheel and also the holes in the side flanges. By using one channel filler, the wheel may be widened ½ inch or by using two, a full 1 inch.

It was found necessary to split the base of the tire for mechanical reasons. Each half of the base next to the wheel is provided with layers of strong fabric so that the tire may slip on easily and will not chafe in service. Because the base of the tire is split at the center, it can be seen that when the flanges are drawn up the two inside halves would have a tendency to buckle, thereby causing a probable failure. To guard against this, an endless steel ring, called a core ring, is placed inside the tire at the center. Its function is to prevent any buckling tendency and also to hold the center of the tire down to the felloe band of the wheel. The shape and position of the core ring are clearly shown in the two core sections of the single and dual tires given at the top of this page.

The rear wheels of trucks over 1-ton capacity must be equipped with dual cushion tires, as singles are not large enough to withstand the weight generally carried on trucks of more than 1-ton capacity. The carrying capacity of two cushion tires is double that of a single tire of the same size. The dual tire is simply two singles applied with an additional center ring, as shown at the top of this page to the left.

The three main advantages claimed for the tire are its cushioning properties, the consistently long mileages secured, and the increased speed which it makes possible as compared with solids.

Effect of Hollow Center

The cushioning properties of the tire are, of course, due to the hollowed-out center, which permits of the deformation of the tire structure without the same degree of molecular movement in the rubber which occurs in the ordinary solid. By reason of the hollowed-out center, the cushion tire is able to absorb in itself road shocks caused by passing over obstructions and which would be transmitted through the springs to the truck.

The long mileages, with averages as high as 20,000 miles per set, of course mean reduced tire costs both as to the wear of the tire itself and the smaller amount of labor required in changing or renewing the tire less often.

The third principal advantage is the increased speed which enables trucks to run at about 25 miles an hour.

Goodyear Cushion Tires

CUSHION TIRES			FASTENINGS					Goodyear Pressed-on Tires *in sizes which cushion tires can replace*	
Size	Carrying Capacity, Pounds	Price, Tires	Flanges, Per Pair	Bolts and Nuts, Per Set	Complete Fastenings	Channel Fillers at $1.20 Each	Total Cost Tire, Complete Set	Price	Size
34 x 3½	1000	$38.05	$6.25	$0.95	$7.20	$1.20	$46.45	$27.70	34 x 3
36 x 3½	1000	40.20	6.25	.95	7.20	1.20	48.60	29.20	36 x 3
32 x 4	1500	43.95	6.25	.95	7.20	1.20	52.35	30.75	32 x 3½
34 x 4	1500	47.40	6.25	.95	7.20	1.20	55.80	32.60	34 x 3½
36 x 4	1500	50.65	6.25	.95	7.20	1.20	59.05	34.25	36 x 3½
34 x 5	2000	61.15	6.25	.95	7.20	2.40	70.75	37.50	34 x 4
36 x 5	2000	64.45	6.25	.95	7.20	2.40	74.05	39.65	36 x 4

Installing Trucks in PACKAGE DELIVERIES

THE UNDERLYING PRINCIPLES ON WHICH THE SIZE OF TRUCK AND METHOD OF ROUTING ARE DETERMINED

A Good Story for the Department Store Delivery Superintendent

THE installation of package delivery trucks in any kind of business employing horse vehicles requires at the outset a thorough study of the peculiarities of that business and an analysis of the territory served. The motor truck's greatest advantage over the horse wagon is its ability to cover ground more rapidly. It is almost suicidal to attempt to install a fleet of trucks in any business and to operate them on the same basis as horse wagons.

Trucks cost more to operate than horse wagons and if they do no more work they are more expensive than animal transportation. If, however, the delivery conditions are modified so that the greatest use may be made of the ability of the motor truck to cover greater distances or the same distances more rapidly, there can be no question as to its greater ultimate efficiency.

The peculiarities of a certain business often determine just what changes must be made in the old horse wagon method of delivery when motors are introduced. For instance, some trucks deliver goods which are merely signed for when received. Other trucks, such as those in department store service, deliver a large percentage of C. O. D. goods. These are two different conditions which may greatly affect the operation of the trucks, even though the deliveries are made with the same size and make of vehicle and in the same territory.

Effect of C. O. D.'s

Some department stores which do a large C. O. D. business have found that in some localities it takes twice as long to deliver a package as it does in other localities, all the same distance from the store. Then there are the physical conditions at the points of delivery. In the suburban territory individual houses are in predominance. The driver must make a separate stop for each delivery or for each two or three deliveries, whereas in the cities the drivers may make several deliveries in the same house with the truck stopping only once.

It is apparent that there is a vast difference in the delivery of department store packages, bottles of milk, loaves of bread and cases or kegs of beer. Each of these classes of goods requires a separate study insofar as the delivery conditions are concerned. One underlying principle which must be considered in every case, however, is the physical capacity of the driver. In the department store delivery one driver may deliver 200 packages a day under normal conditions, or even as high as 350 packages a day in the time of peak loads, as during the holiday season. On the other hand, the delivery of cases of beer sets up entirely different conditions, both as to the weight of the package and what must be done with it after it is removed from the truck body.

Body Design Important

Body design has a great deal to do with the delivery of goods in package delivery work. Here again there is one underlying principle which must be considered in all cases. This principle is to enable the driver to deliver each package with a minimum amount of effort on his part. In bread delivery this may be accomplished by side doors in the body, as told of elsewhere in this issue. Such a door permits the driver to unload the body from both ends, working toward the center. In department store work it is usual to load the packages in such a manner that those which are to be delivered last are placed in the front end of the body and those which are delivered first in the rear end of the body. In some cases this order is reversed by reason of providing a sliding door in the body directly in back of the driver's seat.

Another method designed to accomplish the same end is to provide shelves inside the body and extending from one side to the other; although shelves do not work out very satisfactorily when any large number of bulky packages of greater height than the distance between the shelves are handled.

Street and road conditions must also be investigated before any final decision is made as to the type of truck or body to be purchased. As a general thing, trucks engaged in package delivery work do not have to back up to the curb while making deliveries, although this course may have to be followed in the congested business sections. When a truck body is provided with both a rear end door and a side or front end door, the driver has the greatest opportunity to make deliveries in the least possible time.

Using a Map

After these various peculiarities of a business have been thoroughly analyzed, the next two steps are to lay out the size of the territory which must be covered and determine the average number of packages which must be delivered per day in that territory. This work can be best carried on by means of a map. The location of the company's store or plant should first of all be indicated and then the territory served outlined by drawing in the limits.

The number of deliveries to be made in any section of the territory can then be determined from a record of the deliveries over any desired period. One of the best ways to combine this data with the map, so that the whole may be visualized in one glance, is to stick pins into the map in the areas in which the most deliveries are made. This enables the delivery superintendent to get a concrete picture of just where his goods are going. With this picture before him he is able to divide up the territory into routes which can be covered by any particular size of trucks.

Imagine for a moment that such a map has been prepared with pins having different colored heads, to indicate a different number of deliveries, stuck into it in small sections in which these deliveries are made. The next step is to estimate the length of haul from the store to the point where the first delivery is made by doubling the time required to cover this distance, when the delivery superintendent will have a point at which to begin. Then by averaging the time per package delivered, he can obtain the amount of time required to deliver 100 or 200 packages. If this falls within the speed possibilities of the truck and the work possibilities of the man, it indicates that the size of the truck required to carry 200 packages per load will be required to properly serve that section and such a truck will be put on the route. Other routes can be determined by a similar method.

When the distance of the area of any proposed route is too far from the main store to enable the truck put on that route to deliver at least 200 packages a day, it has been found economical to establish sub-stations, provided the volume of business in the outlying territory is sufficient to warrant such an expenditure.

No doubt this theoretical outlining of the routes will have to be changed slightly to meet actual operating conditions, since experience in dry goods delivery has shown that the number of packages delivered in any one section varies considerably according to the class of customers served and the season of the year.

Even when routes have been outlined to meet average conditions changes will have to be made when peak loads must be delivered. Although this subject has many problems of its own and will be treated of in an exclusive article in one of the coming issues of The Commercial Vehicle, there are several fundamental principles involved which can be treated of at this time, particularly as affecting the dry goods trade.

Surplus Trucks

In order to maintain delivery schedules, it is necessary to purchase more trucks than are actually needed under average conditions. Just how many more trucks are required depends upon the particular conditions under which they are operated and their method of maintenance. In general, however, sufficient trucks are bought to meet the peak load conditions. This supplies a surplus of vehicles during the non-rush or average delivery periods of the year. This method is followed because it enables each of the trucks to be brought into the shop at least once a year for general overhauling and repairing and for the painting of the body. In most cases the overhauling of the truck takes from 3 to 4 weeks and the painting of the body about the same length of time. This work is done during the slack periods of the year so that all of the trucks are ready for continuous service during the rush season.

The use of only a portion of the fleet in actual delivery during the greater part of the year in turn sets up other problems, including the method of procuring extra drivers and helpers and of re-routing the trucks during peak-load conditions. In cases where trucks are provided with helpers during the average season of the year, one of the best plans is to coach these helpers to become efficient drivers and to teach them how to operate trucks so that they can obtain their drivers' licenses.

Getting Extra Drivers

When this is done the company always has a reserve force of potential drivers which it can use to replace the regular drivers when they are sick or on their vacations. Such a course also provides for the extra drivers required during the rush periods. When the helpers are moved up to operate trucks during the holiday season, other helpers are hired to take their places. This method has worked out very satisfactorily because it is much easier to hire helpers than to hire trained drivers who are well acquainted with the delivery conditions of any particular store.

Another very important consideration which must be taken into account when motors are introduced in place of horses in the department store industry is the question of loading. While many of the dry goods stores must needs cling to sidewalk loading because of the physical limitations of old buildings and the inability to construct new buildings on account of existing structures or the high price of land adjacent to their present stores, some means must be provided of speeding up loading to a higher pitch than was good enough with horse wagons.

Cut Loading Time

If a truck makes one trip per day on a certain delivery route requiring 9 hours to complete and takes 1 hour to load, one-ninth of its possible operating time is lost before it ever starts out from the store. Every attempt should be made to reduce this loading time to the shortest possible time.

In cases where sidewalk delivery has to be retained greater efficiency may be secured by increasing the facilities for bringing the packages from the delivery department to the sidewalk. This may be done by means of escalators or large-capacity elevators capable of carrying more than one of the usual hampers at the same time. It also may be had by increasing the force used to move the hampers, although in most cases this cannot be done because the driver is held responsible for the packages from the time he takes them out of the route bin. It may also be had by having the trucks arrive at the sidewalk in front of the store in groups at ½-hour intervals instead of all at the same time.

Separate Delivery Building

When none of these plans can be worked out satisfactorily, the department store may find it wise to construct a separate building for the handling and loading of the packages, even though this building be at some distance from the main store. This has already been done by several concerns and with good results. When such a delivery building is erected, the goods are generally moved from the main store by means of trucks and trailers. The packages are carried *en masse* without any attempt to route them at the main store. When this is done conveyor equipment, route bins, etc., must be provided in the new building.

Such a plan has many other advantages besides increasing the efficiency of the delivery equipment. In the first place, it enables the company to purchase the most modern type of conveyors, route bins, etc., and to thus handle the packages most economically. In the second place, it enables the company to turn its previous delivery department into a sales floor such as, for instance, a bargain basement, since most delivery departments are located on the underground floors.

Saving $15,600 Yearly

Under ordinary conditions, when the trucks are garaged in a separate building and the delivery department is in the main building, each of the trucks must run empty to the store in the morning and back again at night after any return packages have been turned in or the C. O. D. money collected on the trips handed over at the store. By the combination garage and delivery building this idle operation is eliminated because the goods can be transferred from the store during the night and made ready for loading into the trucks at the beginning of the next day's work. With ¼ hour required to run from the separate garage to the store and another ¼ hour to run back at night, each truck is thus able to save ½ hour a day. For a fleet of fifty trucks this is equivalent to 25 hours a day, which, at $2 an hour, is worth $50. For a 6-day week it is worth $300 and for a 52-week year $15,600, or really more than is apparent on the surface at first thought.

This Is a Story of Trucks in the Paper Products Industry — Read It!

GETTING RID
of a
Mixed Fleet of Horses and Trucks

Electrics Do Horses' Work Better and Cheaper by

1—Use of Demountable Bodies
2—Loading in Late Afternoon
3—Good System of Distributing Loads

GASOLINE TRUCKS FOR 21-MILE INTERPLANT HAULS

EIGHT years' experience with a mixed fleet of horse vehicles and motor trucks has convinced the Robert Gair Co., Brooklyn, that this system does not pay. Just recently the last five of the horse vehicles were disposed of, thus completely motorizing the delivery service. The elimination of the horse vehicles has been gradual since 1911, when the first truck was installed. That year that company had in operation over thirty horses. Since that time the additional trucks have supplanted the horse vehicles in the haulage work to such an extent that it was necessary from a point of economy to gradually drop the old system. Though that company kept the horse vehicles in service during the past 2 years, it was due only to the stress of war times rather than to preference.

Now that the conditions are a little more normal, the short-haul work formerly handled by the horse vehicles is being taken care of by the smaller gasoline trucks and electrics. The Gair company manufactures paper products, such as corrugated paper, paper food containers, printed window advertising signs, etc., in factories that occupy 35 acres of land between the Brooklyn and Manhattan bridges along the East River waterfront. It operates six 5-ton and one 1-ton Atlantic electrics; three 5-ton Whites; one 3½-ton Alco; one 6-ton Saurer and one 6-ton Locomobile; two 7½-ton Macks and two 2-ton Autocars.

William H Costigan, superintendent of transportation for the Gair company, giving instructions to one of his assistants in the delivery department

Trucks Increase Business 100%

Motor trucks have enabled the Gair company to increase its business at least 100 per cent. Its trucks are now carrying twice as many loads per day as the horse vehicles formerly did, or, in actual figures, four loads to two. The territory has been increased so that its paper products can be sent within the day to such points as the Bronx, New York City, Long Island City, Staten Island, Newark, N. J., and other points in New Jersey. Formerly a number of these places were taken care of by railroad service, which meant anywhere from 2 to 4 days before goods were actually delivered. Then, too, though the nearby places were served within the day, it meant that only one or two deliveries were made. Now any one of the sections can be reached within 1 or 2 hours.

The delivery system of the Robert Gair Co. may be divided into three sections:

1—Deliveries to the railroad and steamship lines. 2—Local or domestic deliveries, and 3—Conveyance of raw products.

The deliveries made to steamships are taken care of by the seven electrics, which are more economical in the short trip from the factory to the nearby wharves and railroad loading platforms.

The loading of these vehicles is taken care of between 4:30 and 5 p. m., so that they may get under way the next morning at 7 o'clock.

The reason for getting

these trucks under way so early is to enable them to reach the loading stations before the lines form. By getting there around 8 a. m., the drivers are able to unload without delay and to get back to the factory at an early hour for another load. Fleet owners whose trucks make the steamer and railroad deliveries are familiar with the long delays that occur each day when their trucks are caught in the well-known jams at these points. The lines usually form around 9 a. m. and trucks have been known to wait their turn until 2 p. m. before unloading.

While discussing the electrics, it might be stated that they are not loaded when their batteries are being flushed, as that work is taken care of only at night. Also, when loaded the bodies are jacked up so as to relieve the springs from the strain of the sustained weight overnight.

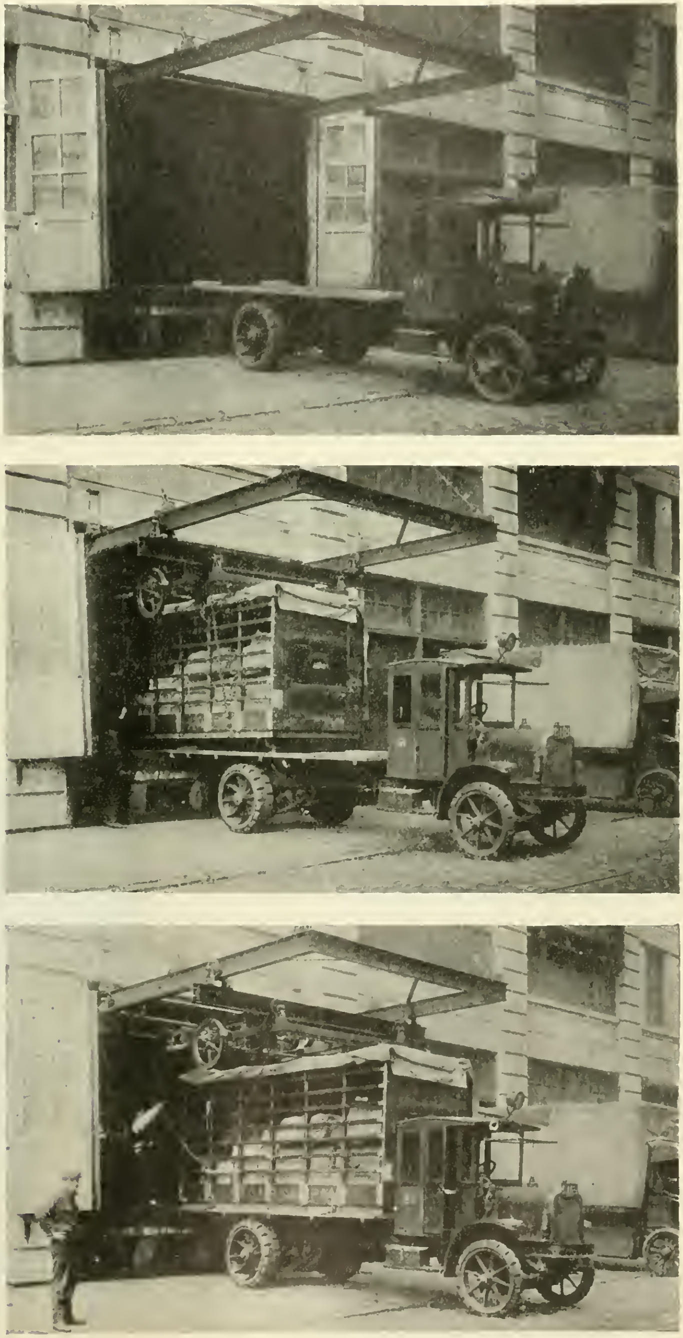
The local or domestic deliveries are taken care of by the smaller gasoline trucks. Loading starts in the morning, and takes from one-half to three-quarters of an hour for each truck. The number of trips made a day depends on the length of haul, the average being about four. It is expected, however, that this average will be greatly increased when the Gair company has finished the installation of a demountable body system.

May Better Body Layout

The present system is only an experiment, and is being used with only two trucks and four demountable bodies. However, the time saved in loading, which is 15 minutes to each truck, promises to more than offset the initial cost of a system that will cover all of the trucks, instead of the electrics only as at present. Figuring on the basis of four trips each day, the 15 minutes saved will add 1 hour to the delivery time per day. At $3 an hour, which is a fair average of the cost of hiring a truck of that size, the saving would mean $51 a day for the seventeen trucks or $15,300 for 300 working days per year.

The present demountable body system consists of an overhead trolley upon which is run an electrically operated lifting hoist, made by the Yale & Towne Mfg. Co., New York City. The tracks extend out over the sidewalk so that the body may be lifted off the truck after the latter is backed up. After the hooks on the hoist have been applied to the body, it is raised 2 or 3 inches by the electric motor and then moved manually by a chain pulley, operated by one of the loaders, to one of the two switch tracks inside the building. These run parallel to

(*Continued on page* 106)



The three steps in placing a demountable body on a truck of the Gair company. At the top is shown the truck with the body off. Note the hold-down blocks on the platform. The middle view shows the body about to be lowered and the lower view the body actually in place

Read This Article

To Determine Exact Steps in Repair Work

MAINTAINING COAL TRUCKS

Heavy Vehicles Used for Retail Deliveries Are Overhauled Every 8,000 to 10,000 Miles

FOREIGN TRUCKS SET UP NEW MAINTENANCE PROBLEMS

THIS is a story of a fleet owner who has profited through the purchase of second-hand trucks. With the aid of a well-equipped repair shop and an efficient personnel, he has been able to reclaim these vehicles, thereby saving the money difference between the initial cost of the truck and the second-hand cost plus the cost of putting the vehicle into first-class shape.

This policy is a dangerous one to follow unless the maintenance personnel is an expert one and sufficient repair shop equipment is provided and a large value of spare parts carried on hand.

The adoption of this policy by the fleet owner in question was due to the fact that his first truck was a foreign make, which gave eminently satisfactory service, but whose manufacture was discontinued while he was increasing the size of his fleet. The truck gave such good service that an attempt was made to standardize upon it, but since its manufacture was discontinued in the interim the only way he could add more of the same make was to buy them second-hand. The owner in this case is Olin J. Stephens, Inc., one of the largest retail coal dealers in New York City.

Seventeen Trucks of Foreign Make

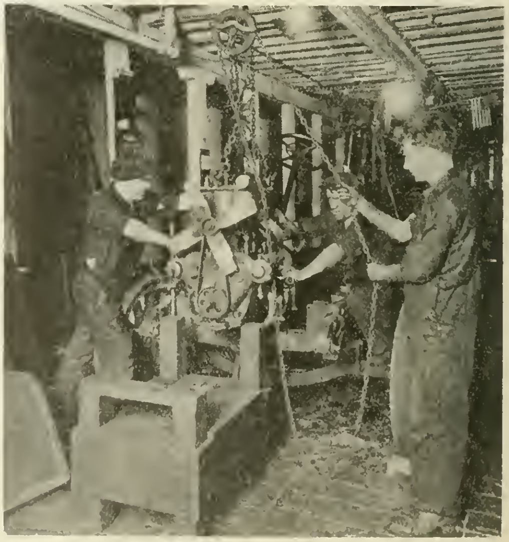
The Stephens company bought its first motor truck in 1910 and has built up its fleet since that time to twenty-two vehicles, including ten Saurers and one Mack of 6-ton capacity; two Saurers and one Garford of 5-ton capacity; four 4-ton and one 3-ton Saurers and three 2-ton Autocars. It is thus seen that seventeen of the twenty-two vehicles in the fleet are Saurers of foreign design.

Seven of the Saurers were bought when new, the other remaining ten being purchased second-hand. The latter trucks were purchased at prices ranging from $400 to $600, and each cost approximately $800 to put into first-class shape, thus costing the company from $1200 to $1400 net, which is on an average of between $3000 and $4000 less than the initial cost of the vehicles when new.

Two Big Accomplishments

The two big accomplishments in the maintenance of these foreign trucks by the Stephens company are the manner in which it overcame the difficulty of getting spare parts and the methods employed in cutting down the time consumed in replacement of worn parts.

All of the Saurers are eight or more years old, the first one having been bought around 1911. Two years ago the manufacture of the Saurer truck was discontinued at the plant of the International Motors Co. in this country. At that time the Stephens company installed a parts service of its own in order to put its maintenance on an efficient footing. Up to that time it had done all of its maintenance work at the present garage, buying spare parts from the manufacturer. Since then its experience has enabled it to accomplish a big saving in time and money by the change in design and elimination of certain parts. Close study of the reasons for certain break-



Taking Out Engines

This view shows how the engine of a truck in for repairs is taken out of the chassis and placed on a stand by means of a differential block hung from the girders of the floor above

The Machine Shop Is in a Separate Room in the Garage

At the left is shown part of the Stephens machine shop and its equipment. This room is well lighted and large enough to take care of all the repair work. The illustration at the right shows the room next to the machine shop where the truck chassis are brought in to be torn down. As each part is torn down, it is gone over for needed repairs and then conveyed to the machine shop

downs enabled the company to make a number of improvements which have considerably cut down the time consumed in replacement of parts.

Much time has been saved by the installation of a split gear in place of the solid gear operating the body hoist. Before that change was made, it was necessary to take down the driveshaft and the universal joints before that gear could be taken out for replacement. Now all that is necessary is to take out two bolts which hold the collar of the gear tight on the driveshaft. The details of this change are shown in the accompanying sketch.

Another change that has eliminated the necessity for reboring scored cylinders and repairing burnt bearings owing to improper lubrication has been made by straightening the curved scoops on the lower ends of the piston rod, thereby eliminating any chance of the engine not being properly lubricated on account of a low oil level in the crankcase. The scoops were lengthened sufficiently by being straightened out so that they dip deeper into the oil.

Gear Stripping Overcome

Stripping of gears caused much trouble until certain changes were made in the gears themselves. The timing gears which were formerly made of fiber and steel have been changed to the all-steel type. It was found that though the fiber-steel gears were less noisy than the all-steel gears, the wearing quality of the latter was at least three times as great. The fiber gears lasted about one year, when replacement would be necessary. With the use of the steel gears no replacement is necessary for three or four years.

Much trouble was also experienced in the spider gears in the differential. It was found that the spider shafts were too weak to stand up under the hard work of coal delivery. The solution of this trouble was the installation of oversize shafts.

Another change that resulted in a saving of maintenance costs is the method of replacement of worn clutch collars. Formerly, the clutch collar and cone were made in one piece, necessitating the installation of a new outfit each time the collar was worn. The cost of this unit was about $27. Now, instead of buying the complete outfit, the worn collar is cut off and a new one inserted, the installation costing about $18, a saving of $9. Just exactly how this is done is shown in the accompanying illustration.

By bushing the valve tappet guides, the Stephens company has eliminated the purchase of new guides. The Sauer guides are of cast iron and designed to carry two valve tappets. Before the bushings were put in at the lower end of the guides, it was necessary to purchase a complete new guide each time wear occurred in either of the two tappet holes. Now all that is necessary when wear occurs is to replace the bushings.

Overcoming Frozen Fuel Lines

The company has also replaced the old air pressure pump in the fuel system with a Stewart vacuum outfit. This has been done on account of the trouble experienced by clogging of the pump by coal dust. In winter much trouble has been experienced by ice in the gas line and carbureter, which stops the fuel flow. All of this trouble has now been overcome by the installation of the vacuum system, and the engines are also pulling better and giving better mileage.

While at first thought it might seem impossible to run the engine with water in the gasoline, water was found in the carbureter and fuel line, even though it was not in the gasoline when put into the truck tank. How this water got into the gasoline line and froze the fuel pumps may be explained by pointing out that in the pressure system of fuel feed, air is used to force the fuel from the tank to the carbureter. If there is any moisture in the air, it condenses in the fuel when put under pressure and freezes in the carbureter and gasoline line in extremely cold weather. In the same manner coal dust is taken into the fuel in the air used to put it under pressure.

Trucks Overhauled Every 10,000 Miles

The Stephens trucks are completely overhauled once a year in a small repair shop at the 138th Street yard. Each truck averages between 8,000 and 10,000 miles a year. They are torn down and thoroughly inspected for wear and tear. New parts are installed when needed, the vehicle being practically new when reassembled. The

Ross E. Brown, Maintenance Superintendent

Mr. Brown has under him seven repairmen who are thoroughly competent to take care of all the repairs and machine shop work at the Stephens garage

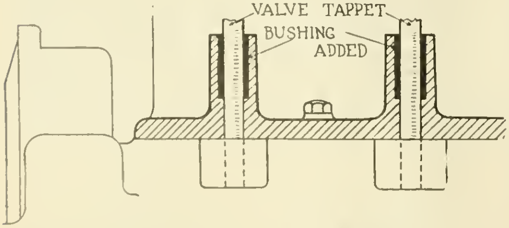
maintenance is under the supervision of Ross E. Brown, who has under him three mechanics, one machinist and three helpers who are thoroughly competent to take care of all of the repairs and machine shop work. Overhauling starts in May, each truck taking about eight days.

No time is wasted in getting parts that are needed, as a complete set is always kept on hand in metal lockers. These parts, which include those made in the company's own shop, as well as those bought from outside firms, are valued at $30,000. The machine shop equipment consists of a lathe, arbor press, grinder, hacksaw, handsaw, forge, sheet metal shears and emery wheel. All heating work is done in the blacksmith shop, which is equipped with a forge and anvil. This shop also does all of the repairs and construction of the bodies. Three or four bodies are made yearly.

The lathe is made by the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.; the arbor press by W. F. & John Barnes, Rockford, Ill.; the grinder by the United States Electric Tool Co., Cincinnati, Ohio; the hack saw by the W. Robertson Machine & Foundry Co., Buffalo, N. Y.; the forge by the Champion Blower & Forge Co., Lancaster, Pa.; the band saw by the Crescent Machine Co., Leetonia, Ohio; and the drill press by the Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.

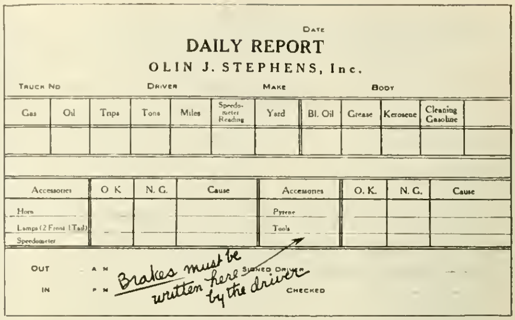
Method of Repairing

When a truck comes in for overhauling, the body is first taken off outside of the repair shop and the chassis cleaned. The body is put in charge of the blacksmith, who takes care of any needed repairs. The chassis is torn down under the supervision of two mechanics. The engine is lifted out of the chassis by means of a block and pulley and gone over by one man. The rest of the vehicle is taken care of by the other mechanic, whose duty is to ascertain any wear in the remaining units. As one extra engine is always on hand, the truck is not held up for engine repairs. The engine that has been taken out of the chassis for repair is usually finished in time to be installed in the next truck coming in for its overhauling.



Tappet Bushings Save Money

The insertion of bushings in the two tappet guides has eliminated scrapping of that part each time wear occurred in either one of the guide holes



DATE

DAILY REPORT

OLIN J. STEPHENS, Inc.

TRUCK NO DRIVER MAKE BODY

Gas	Oil	Trips	Tons	Miles	Speedometer Reading	Yard	Bl. Oil	Grease	Kerosene	Cleaning Gasoline	

Accessories	O. K.	N. G.	Cause	Accessories	O. K.	N. G.	Cause
Horn				Pyrene			
Lamps (2 Front 1 Tail)				Tools			
Speedometer							

OUT A. M. SIGNED DRIVER

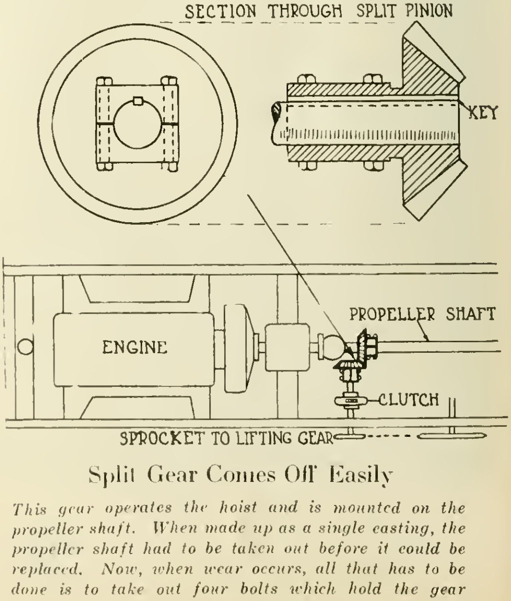
IN P. M. CHECKED

Brakes must be written here by the driver

How Brakes Are Reported

The word "brakes" must be written each night on the report card in order to keep that all-important unit constantly in the driver's mind. He must also report the condition of the horn, lamps, speedometer, Pyrene and tools, as well as the gasoline and oil consumption

The trucks are kept in running condition throughout the year by means of a daily report card, handed in by the driver. This report takes in the fuel and oil con-



Split Gear Comes Off Easily

This gear operates the hoist and is mounted on the propeller shaft. When made up as a single casting, the propeller shaft had to be taken out before it could be replaced. Now, when wear occurs, all that has to be done is to take out four bolts which hold the gear firmly on the propeller shaft sumption, the number of trips made each day and the tonnage and mileage. Provision has also been made for the inspection of the horn, lamps, speedometer, pyrene, tools, as well as troubles in the engine and chassis and the body and hoist.

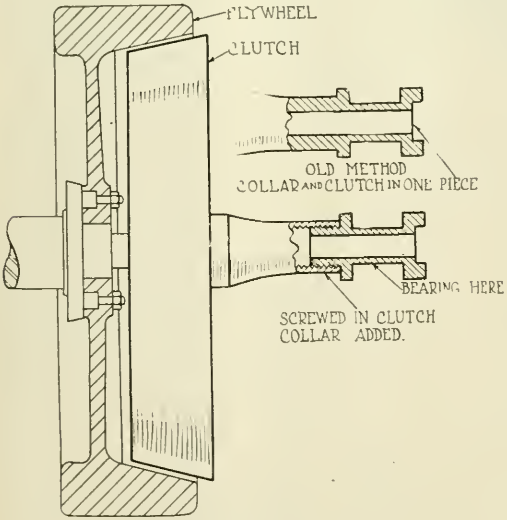
It will be noticed in the reproduction of the card on page 94 that a space has been left blank under the accessories column. There is a bit of psychology in this, as that space has been set aside for the insertion of the word "brakes," with a notation as to their condition. There is no excuse for the driver to forget to report the condition of his brakes, as he is sharply reprimanded when this happens. That blank space means that he must write out the word "brakes," and the daily reports serve as a constant reminder of this very important unit.

The accessories carried on the truck must be given careful attention. Otherwise many accidents would occur as the result of a poorly working horn or lamps failing at the crucial moment.

Private Garage Telephone

In order to keep correct mileage records, the speedometer must be registering perfectly, and it is up to the driver to report any failure in this apparatus which might not be noticed by the mechanic. Pyrene equipment is inspected periodically in order to come within the insurance requirements and to guard against all loss by fire.

As the drivers are able to take care of some small repairs on the road, it is a point of efficiency that each truck carry a simple tool equipment in order to obviate loss of time in calling upon the garage headquarters for assistance when the tools have been forgotten. On the other hand, should heavy work on the truck become necessary while it is on the road, little time is lost in getting in touch with the garage. This has been accomplished by the installation of a private telephone line to the garage. By its use the driver is not delayed in getting in touch with the shop by unnecessary relays at the switchboard in the main office. The office lines are used for customers, and during the busy season of the year it would often take 20 to 30 minutes to get the garage through the main office. The private garage line, which costs $45 a year, has paid for itself many times over.



Clutch Collar in Two Parts

When the clutch cone and collar were in one piece, it was necessary to scrap the whole part each time wear occurred in the collar. Separating the cone and collar and threading the latter has enabled that company to replace the worn collar without adding a new clutch

Stock Kept in Metal Lockers

No time is wasted in getting parts that are needed, as a complete set is always kept on hand. These parts, which include those made in the company's own shop, as well as those bought from outside firms, are valued at $30,000 to $40,000

Supplementing the daily scrutiny of the drivers' report cards is the method of keeping the engines in good running condition through proper lubrication. Though the daily reports are watched carefully to see whether each particular truck is getting its proper supply of oil, it is deemed equally important that the engine oil be changed at least once a month, or at the end of from 600 to 800 miles. This is important, because of the fact that oil loses its lubricating qualities after a month's steady use and should be replaced by a fresh supply.

The trucks are stored in two garages, fifteen at the 138th Street yard and seven at the 177th Street yard. Both garages are former horse stables which have been converted for truck storage use. These places were stripped of all their supporting columns so that there would be no delay in the exit of the trucks in the morning.

The Stephen company's main plant is off Manhattan Island, but its delivery area extends as far south as 100th Street on Manhattan Island, about 3 miles away, and includes all of the Bronx to the Yonkers lines on the west, about 8 miles, and Mt. Vernon. about 7 miles, on the east. Six waterfront yards are used to serve this territory, five in the Bronx and one in Manhattan.

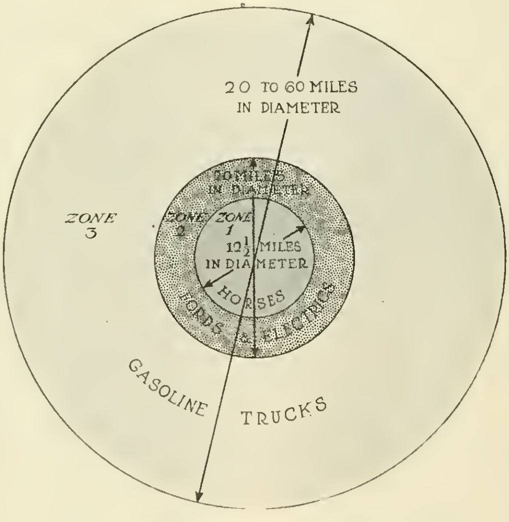
A majority of the Stephens coal bodies have been equipped with a combination tailgate and chute. The reason for this is that certain conditions must be overcome in the unloading of soft and hard coal. Though all coal bodies will carry soft and hard coal, each grade cannot be discharged at the same rate of speed. On a dry day, the larger coal will run from a truck at a lesser angle than will soft or smaller-sized coal, the coefficient friction being less. The solution of these and kindred problems relating to the design of the bodies has been worked out in that company's blacksmith shop, where facilities are such as to enable the complete manufacture of the bodies and all other units.

Delivering Bread by Trucks

ON THE ZONE SYSTEM

Shults Bread Company, Operating 165 Trucks and 890 Horses, Supervises Equipment Through General Manager in Charge of Operation and Garage Superintendent in Charge of Maintenance

Territory of 150 Square Miles Served by Fourteen Plants, from Nine of Which Trucks Maintained at Five Garages Are Operated



The three zones in which horses and different types of trucks are employed to deliver bread from baking plants to the retail stores

DELIVERY of bread from the bakery to the retail grocery store within a radius of 30 miles is best done by the zone system, according to the Shults Bread Co., which operates 165 trucks and 890 horses in New York City and the surrounding territory.

The zones are divided into three circles of diameters of 12½ miles, 20 miles and beyond up to 60 miles. All deliveries within the 12½-mile zone are taken care of by horse vehicles, and from there on to the 20-mile zone by Fords and Ward electrics of 750 pounds and ½-ton capacities. The territory beyond the 20-mile and up to the 60-mile zone is taken care of by Lippard-Stewarts, Hurlburts and Autocars of 1½ to 2-ton capacity and by several converted Mercers and Loziers. The Shults company also has recently purchased twelve 2-ton Packards, which will be used in the territory beyond the 20-mile zone. Three 5-ton Macks are used to help in construction work and in the haulage of supplies to the fourteen baking plants maintained by the company.

The Why of the Zone

It has been found that it is more economical to operate horse vehicles in the short-haul deliveries within the 12½-mile diameter, as the bread delivery schedules can be maintained with that type of delivery just as well as with the trucks. The 20-mile zone deliveries, on the other hand, are best taken care of by the Fords and Ward electrics, which are suited for this work on account of their speed in delivery and the number of extra trips that can be made. The territory beyond the 20-mile zone demands the use of larger trucks on account of the heavier loads carried and the greater length of the routes.

In general, the loading conditions in each zone are the same. The trucks start out on their routes at 12 o'clock midnight. The time of their return depends upon the length of the routes and the number of stops made. The Fords and Ward electrics make from two to three trips a day, the electrics being held down to 45 miles a day on account of the battery limitations. The horse vehicles make on an average of two trips a day within the 12½ mile zone. Only one trip is made by the larger trucks in the territory beyond the 20-mile zone. The number of stops made ranges from forty in the two smaller zones to eighty in the zone covered in the long routes.

Loading starts at 11 p. m. The bread is loaded in boxes, there being 100 loaves, each weighing 1 pound, to a box. The trucks carry from ten to twenty boxes. The boxes are placed on the loading platform and are lifted into the truck by the driver and a helper, the time occupied being about ½ hour.

Body Design Important

The design of the bodies enables quick loading and unloading. The height of the body is such as to make the floor flush with the loading platforms, thus minimizing any lifting effort when the boxes are being loaded into the truck. In order to cut down any wasted effort during the rush of the delivery period, each truck body is equipped with a side door. This is placed on the side on which the driver sits, directly back of the cab. This enables the driver to quickly unload the bread placed in the forward part of the body and obviates the need of going around to the back of the truck and hauling out empty boxes to get at those in the front end of the body. A majority of these side doors are of the sliding type, while a few pivot on hinges, swinging open from the side.

As the bread is delivered in most cases before the stores are opened, the boxes are locked if the entire contents of the box are delivered at one store. On the other hand, should there be a call for less than a full box of bread, the loaves are lifted out and placed in another box which has been set on the sidewalk in front of the store by the store help. The bread remaining in the box on the truck is delivered with the box, if possible, at the one of the next stops, and the box on the sidewalk is placed on the truck. This is also done when the full contents of the box are delivered. Lifting the bread out of one box and depositing it in another is a waste of time, and as a result is avoided as much as possible.

Fourteen Bakeries Maintained

The Shults Bread Co. has its main office at 32 Court Street, Brooklyn, N. Y. Fourteen bakery plants are operated throughout the 150 square miles of territory served. Four of them are located in Brooklyn, four in New York City, three in Hoboken, N. J.; one in Mt. Vernon, N. Y.; one in Jamaica, N. Y., and one in West New Brighton, Staten Island, N. Y. These are widely separated so as to cover the entire territory.

Nine of these plants use trucks for the bread delivery. The five remaining plants take care of a business that is limited to their particular districts within a radius of 6½ miles, the deliveries being made by horse vehicles. One Brooklyn plant uses thirty-two Ward electrics, one Lippard-Stewart, one Ford and an Autocar. Another Brooklyn plant uses a Ford and three Autocars, and the third Brooklyn plant thirteen Fords. One Hoboken plant uses nine Lippard-Stewarts, three Fords and nine Autocars. The plant at Mt. Vernon uses one Lippard-Stewart, ten Fords and seven Autocars. The Jamaica plant uses thirteen Lippard-Stewarts, two Fords and eleven Autocars. The West New Brighton plant, recently built, is equipped with a fleet consisting of three Lippard-Stewarts, three Macks, three Fords and eight Autocars. The Macks have been used in the haulage of building materials and supplies to the Staten Island plant.

One of the Autocars, showing the side door in the body on the same side as the driver's seat. The side door helps to speed up deliveries

The bakeries that use horse vehicle equipment entirely do up their bread in wrappers bearing their own names and not the name of the Shults Bread Co. As a result, there is bound to be an overlapping in territory where these bakeries are located near each other. In the same manner, several of the bakeries using truck equipment and delivering the Shults bread wrapped with paper bearing their own names and not the Shults wrapper will overlap in many cases the territory of another bakery using the Shults bread and wrapper.

Has Six Plants

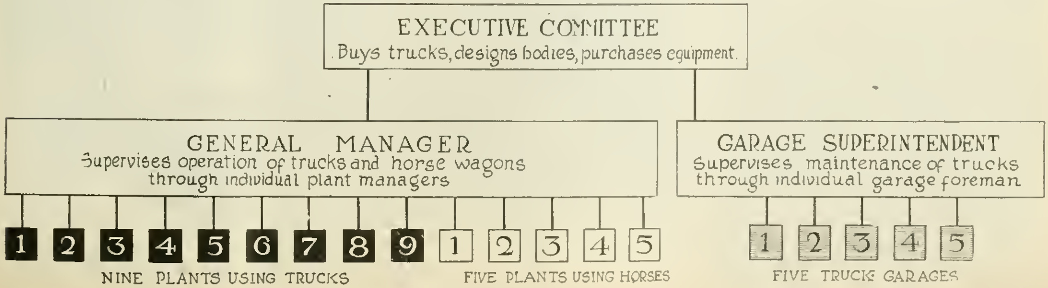
The Shults Bread Co. has six plants under its own name, located respectively in Brooklyn, Hoboken, Mt. Vernon, New York City, Jamaica and West New Brighton. Though these plants are widely separated, they are by no means far enough away from each other to prevent zone overlapping. Therefore, in order to eliminate this overlapping, the zones apply only to the districts outside of the zones of the neighboring plants. As a result, the zones will not be in the form of true circles, but will be more irregular in shape to prevent overlapping.

Five of the six Shults plants have specially-built garages which are separate from the bakery plants. The Brooklyn plant, which uses the thirty-two Ward electrics, stores the trucks in the same building occupied by the plant. Facilities for charging the batteries have also been installed at this plant. Instead of repairing the trucks at one point, this work is done at two service stations, located at the Hoboken and Jamaica garages. These two service stations are completely equipped, being able to take care of all of the heavy repairs needed on the 165 trucks.

An article describing the maintenance methods of the Shults company will appear in a subsequent issue of THE COMMERCIAL VEHICLE. All light repairs are taken care of in the four other garages.

Problems of Supervision

With a fleet of trucks operating in widely separated places, as in the case of the Shults Bread Co., it is natural that in order to keep tabs on the


EXECUTIVE COMMITTEE
Buys trucks, designs bodies, purchases equipment.
GENERAL MANAGER
Supervises operation of trucks and horse wagons through individual plant managers
GARAGE SUPERINTENDENT
Supervises maintenance of trucks through individual garage foreman
1 2 3 4 5 6 7 8 9
1 2 3 4 5
1 2 3 4 5
NINE PLANTS USING TRUCKS
FIVE PLANTS USING HORSES
FIVE TRUCK GARAGES

A typical garage used by the Shults company for the maintenance of its fleet of 165 trucks

maintenance and operation, there must be a centralized system of supervision of these two departments. This supervision is divided into three main departments. The first, or main, department is the executive committee, which buys the trucks, designs the bodies and purchases equipment. Under the supervision of this executive committee come the general manager and the garage superintendent. The general manager supervises the operation of the trucks and horse wagons through individual plant managers. The garage superintendent supervises the maintenance of the trucks through each garage foreman.

Inspect Plants Every Week

These two men make the rounds of the plants each week, to see that the operation and maintenance work are up to the required standard. Each day the garage foremen send in their reports to the plant manager, giving all information as to what work has been done on the trucks, the amount of fuel, oil, etc., consumed, etc. At the end of the month the plant manager sends his report to the main office. As each truck is numbered, there is an individual sheet for noting its performance, etc. In the same manner, the main office keeps the performance records of each truck, noting the total cost of maintenance and operation for each month. An article describing more fully this phase of the work will be published in a subsequent issue of THE COMMERCIAL VEHICLE.

The Shults drivers are also salesmen. Naturally, it is to their advantage to have their trucks running as much of the time as possible. It is stated that the drivers, who are paid a salary plus commissions on the sale of the bread, receive from $45 to $100 per week. Therefore, the running condition of the trucks is of paramount interest to them. The Shults company, however, has made provision for keeping up to its delivery schedules by keeping at least one spare truck at each of the garages. As the Shults bread is sold on a strictly cash basis, the drivers make as many collections as possible so as to receive the commissions all the more quickly. Collections are made every other day by reversing the order of deliveries on the routes. As an example, take the case of a driver whose last customer was 30 miles away. On Monday this driver would start out from the factory at midnight, as usual, and would deliver to every customer on the way out, reaching the last customers after they had opened their stores. In that case, the last customers would be collected from. The next night this same driver would go the length of his route before making his deliveries. The last customers would be reached before they opened their stores. On the other hand, the length of time occupied in making the 30-mile trip would enable the driver to reach most of the customers from the middle to the beginning of the route around their opening hours, thus facilitating collections.

How to Buy Oil

(*Continued from page* 85)

on the splash system. If the oil congeals in the crankcase, it may be several minutes before the oil is heated sufficiently to be thrown up on the cylinder walls and the bearings by the motion of the reciprocating parts. To determine the fluidity of two oils in cold weather two sample bottles of the oil should be set ouside of the window on a cold day. Then turn each of the bottles upside down quickly and note the rise of the bubbles of air from the top to the bottom of the bottle. If the bubble rises to the top of the inverted bottle quickly, it indicates that the oil will flow at the existing temperature. If the bubble does not rise, it serves as a guide to indicate that the oil is too thick.

Another ready test is the emulsion test. A sample bottle is filled one-third full with the oil to be tested and then an equal amount of water added. After the bottle has been corked and shaken vigorously for 20 or 30 minutes, it is set aside for 24 hours. Good oil shows a fine or distinct line of demarkation between the water and the oil above it. This indicates the absence of acid compounds. A slightly poorer grade of oil shows a less distinct line of demarkation, and a poor oil a curdled mass floating upon a milky colored water at the bottom.

Two other types of truck used by the Shults company. A Hurlburt is seen in the front, with a Lippard-Stewart in the background

Routing Trucks by Capacity

Soap Products Manufacturer Obtains Greatest Truck Efficiency by This Unusual Method

No Trucks Run on Regular Routes—Special Dispatcher Has Weights of All Products to Prevent Overloading

MOST truck owners route their trucks by selecting a vehicle large enough to carry the maximum load sent out on any one route or trip. If the load happens to be less than the capacity of the truck, the latter is still kept on the route, notwithstanding that it carries less than its full load. Under these conditions the full work ability of the truck is not made use of. The Kirkman company does not route trucks in that manner. It uses a better method in which the trucks are routed by capacity. A 5-ton load to be delivered in any section is put on a 5-ton truck, and a 3-ton load on a 3-ton truck. No truck is run on a fixed route.

IT is impossible for a fleet owner to successfully operate his trucks without a thorough knowledge of the conditions of the particular territory covered. This must include knowledge of the road and traffic conditions, railroad facilities, selling conditions and the time consumed in deliveries by either horse vehicles, trucks or railroads. Without this knowledge, no fleet owner will be able to economize in his deliveries or get the maximum efficiency out of his vehicles. An illustration of how this knowledge has been successfully applied may be cited in the operation of the fleet owned by Kirkman & Son, Brooklyn, N. Y., manufacturers of soap.

Unlike most concerns, the Kirkman company has no set routes on which to operate its trucks. Orders for soap vary as to size and territory, and as a result, the loads must be skillfully handled to effect any economy in loading and deliveries. A steady flow of orders throughout the day that must be taken care of immediately might disorganize a delivery system. The Kirkman traffic department, which is under the supervision of J. Lustig, has realized this and has made provision for every possible emergency. This department must take care of a wholesale, as well as a retail business. Both vary, the wholesale orders taking in large consignments, and the retail orders small consignments.

The efficient handling of the retail loads is the biggest problem of the company. The solution of this problem is not effected merely by the delivery of these small orders, but by the skillful handling of the loads so that the trucks will carry maximum loads and dispose of them in the shortest possible time. Handling of a situation such as this demands a study of the conditions that were outlined in the first paragraph. Mr. Lustig, who is also in charge of the maintenance of the Kirkman fleet, has found that this work is more than a one-man job, and as a result he has under him an assistant and a route clerk. Upon the latter falls the task of routing the trucks and distributing the loads.

In order to accomplish this, the route clerk has under his fingertips the time it takes to reach all of the towns and cities in the surrounding territory, the road and traffic conditions, the location of every load at the shipping department, and the location of every truck when on the road. This knowledge is obtained by a card record of the time consumed in every trip, as well as the number of stops made. As a result, the route clerk can determine whether a certain truck, which has come in late in the afternoon from a delivery, can make another delivery. The type of card employed is shown on page 100. His knowledge of the traffic and road conditions throughout the territory, as well as the number of orders that have come in for a given section, will also determine whether it is possible for a truck to make a delivery late in the afternoon.

Orders Numbered

All loads that cannot be taken care of during the day are made up in the afternoon for the morning deliveries. The orders are grouped so that they will be taken care of by one truck in a certain section. Each order is numbered. The driver is directed in the morning to his particular load by a dispatcher, who waits for each truck

One of the six 3-ton Macks used in the delivery of soap products, showing the type of body employed and how its advertising possibilities are made use of by large colored signs

One of the loading platforms at the Kirkman plant, showing how the cartons and boxes of soap and soap powders are sent down from the upper storage floors by means of gravity chutes. These enable the truck loads to be assembled quickly

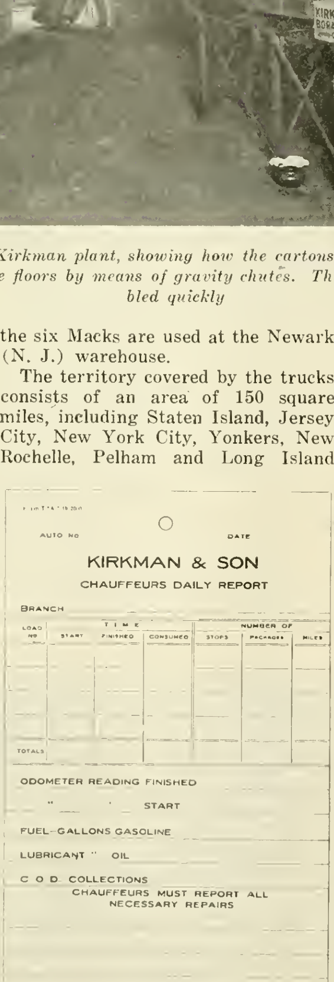
as it comes from the garage. As a result, all confusion is avoided at the loading platform. The average loading time is 15 minutes, each truck carrying about sixty packages, weighing from 20 to 70 pounds each. As stated before, the trucks are loaded so as to make deliveries as quickly as possible. The package-carrying capacity of each truck differs. The 5-tonners average about 165 packages, and the 3-tonners 110 packages.

Before making up his loads, the route clerk will determine the number of packages he has for a certain route and will then select the size truck most suited for the delivery. In order that each truck will not be overloaded, Mr. Lustig's assistant has a printed booklet of the weights of the different grades of soap per box, together with the weights up to 100 boxes. The cover of this booklet and the list of the weights are shown on page 101. The average number of stops made by the trucks is twenty, the number of trips ranging from two to four a day. All deliveries to the wholesale houses in the lower part of New York City are taken care of by the twenty horse vehicles, which also take care of the deliveries to and from the railroads and steamship piers.

Two 12-Year-Old Macks

The Kirkman fleet consists of two 5-ton Macks, which are 12 years old; three 2-ton Hewitts, six 3-ton Macks, four $3\frac{1}{2}$-ton Alcos, four 5-ton Pierce-Arrows and two 1-ton Fords. Two of the six Macks are used at the Newark (N. J.) warehouse.

The territory covered by the trucks consists of an area of 150 square miles, including Staten Island, Jersey City, New York City, Yonkers, New Rochelle, Pelham and Long Island City, Whitestone, College Point and Hollis, Long Island, N. Y. New Rochelle, on the mainland, is 15 miles from the Brooklyn plant, and Whitestone, on Long Island, is 10 miles.



AUTO NO ○ DATE

KIRKMAN & SON

CHAUFFEURS DAILY REPORT

BRANCH

LOAD NO	TIME			NUMBER OF		MILES
	START	FINISHED	CONSUMED	STOPS	PACKAGES	
TOTALS						

ODOMETER READING FINISHED

" " START

FUEL—GALLONS GASOLINE

LUBRICANT " OIL

C O D COLLECTIONS

CHAUFFEURS MUST REPORT ALL NECESSARY REPAIRS

CHAUFFEUR

The driver's daily route card, a close study of which enables the transportation superintendent to keep in close touch with the operating conditions on any route

Trucks Double Business

Without the installation of a fleet of trucks, the Kirkman company would not have been able to have attained a 100 per cent increase in business in the past 8 years. Seventy-five per cent of the Kirkman soap product deliveries are made by truck, the rest being made by the railroads, steamships and horse vehicles. Fully 5,000 packages leave the plant daily. Deliveries that were formerly handled by horse vehicles in the surrounding territory amounted to less than one-fourth of those now made by the trucks. Instead of delivering to Harlem and places beyond that, as is now done with the trucks, that territory was taken care of by a warehouse located in Harlem. Shipments from the factory in Brooklyn to the Harlem warehouse were made by boat.

The installation of a fleet of trucks has enabled that company to dispose of the warehouse and to take care of that territory by deliveries direct from the factory. The Newark (N. J.) warehouse is maintained because it is too expensive to run trucks out there daily for small deliveries. That warehouse is kept stocked up by means of railroad shipments, few deliveries by trucks being made. Two trucks are used at the Newark warehouse to take care of the orders in that territory. It is stated, however, that as soon as the business increases to warrant the direct delivery of soap from the factory, the Newark warehouse will be disposed of. Freight shipments to Newark, only 12 miles away, take from 3 to 4 days. When the retail business gets to such a size that the capacity of this warehouse will not take care of the daily demands, it will be given up.

Some Return Loads

The Kirkman traffic department pays particular attention to the return loads of the trucks. Before a truck starts out on a delivery in the morning, it is first ascertained whether its return trip will enable it to pick up shipments that have come in by railroad or steamer. Occasionally a customer will refuse to take a certain order. In that case, the driver telephones in to get instructions. If another order has come in since he left the factory that can be delivered by that driver, he is instructed to use the order that was refused for the new customer. The traffic department may have 25 tons of raw material at the pier, which should be picked up during the day. In this case, two 5-ton trucks would be selected to help pick up 10 tons on their return trip. The rest of that shipment would be taken care of by the horse vehicles while the trucks were out on their routes.

The trucks that come in after 4 p. m. are loaded and then sent to the garage, from which they start on their deliveries the next morning. This is to save the time wasted in loading the next day. The Kirkman garage is located some distance away from the factory. Though it serves the purpose of its owners, it is doubtful whether the building comes up to standard garage design. It is a two-story building, 65 feet wide and 115 feet deep. The second floor is of wooden construction and barely strong enough to hold even one truck. It is reached by a hand-operated elevator, and as a result none of the trucks can be stored or repaired there. The first floor is used entirely for that purpose. Though this floor is of cement construction and large enough for the storage and repair work of the nineteen trucks, it is by no means satisfactory on account of the large number of supporting columns. There are twenty wooden columns, 1 foot square, in two rows of ten, extending at 10-foot intervals for the length of the building. The space between the two rows of columns is 20 feet, just large enough for two rows of trucks. The space on either side of the columns is 25 feet, thus giving 50 feet more of width, sufficient for four more rows of trucks. By virtue of the narrow turning radius, all of the trucks are backed into the garage through the two entrances on either side of the front of the building. All trucks parked between the two rows of columns must be backed carefully into this space so as to prevent any damage from bumping into these supports. To make matters worse, the counterweight of the elevator occupies space directly in the path of incoming trucks in between the columns, thereby adding further to their difficulties. However, by backing the trucks in at night, it has made conditions better for the exit of the trucks in the morning, as they can then run out head on.

LIST OF WEIGHTS

OF OUR

PRODUCTS

TRAFFIC DEPARTMENT

KIRKMAN & SON

R. Hammarstrom

Cover of the Kirkman booklet of weights shown below. The truck dispatcher uses this booklet to prevent overloading

Trucks Washed Daily

Much pride is taken in the appearance of the trucks as they go on their routes. The curtains must be neatly rolled up, and everything must look spic and span. The trucks are painted once or twice a year, the number of times being governed wholly by their appearance. They are washed every night. This attention to neatness and cleanliness is reflected in the drivers, who take pride in keeping their particular trucks up to these standards.

Most of the truck operators are former horse drivers for that company. They have risen from the ranks.

No. of Boxes	BORAX SOAP		WHITE SOAP		No. of Boxes	SOAP POWDER		SCOURING CLEANSER (All Fibre, Plain and Kosher, 60 Lbs.)	
	Large Fibre	No. 3 Fibre	100 Fibre	50 Fibre		50 Fibre*	Large Fibre	48 Fibre	48 Wood
1	70	65	35	20	1	55	55	60	70
2	140	130	70	40	2	110	110	120	140
3	210	195	105	60	3	165	165	180	210
4	280	260	140	80	4	220	220	240	280
5	350	325	175	100	5	275	275	300	350
6	420	390	210	120	6	330	330	360	420
7	490	455	245	140	7	385	385	420	490
8	560	520	280	160	8	440	440	480	560
9	630	585	315	180	9	495	495	540	630
10	700	650	350	200	10	550	550	600	700
11	770	715	385	220	11	605	605	660	770
12	840	780	420	240	12	660	660	720	840
13	910	845	455	260	13	715	715	780	910
14	980	910	490	280	14	770	770	840	980
15	1050	975	525	300	15	825	825	900	1050
16	1120	1040	560	320	16	880	880	960	1120
17	1190	1105	595	340	17	935	935	1020	1190
18	1260	1170	630	360	18	990	990	1080	1260
19	1330	1235	665	380	19	1045	1045	1140	1330
20	1400	1300	700	400	20	1100	1100	1200	1400
30	2100	1950	1050	600	30	1650	1650	1800	2100
40	2800	2600	1400	800	40	2200	2200	2400	2800
50	3500	3250	1750	1000	50	2750	2750	3000	3500
60	4200	3900	2100	1200	60	3300	3300	3600	4200
70	4900	4550	2450	1400	70	3850	3850	4200	4900
80	5600	5200	2800	1600	80	4400	4400	4800	5600
90	6300	5850	3150	1800	90	4950	4950	5400	6300
100	7000	6500	3500	2000	100	5500	5500	6000	7000

How to Train Your Truck Drivers

DISCUSSIONS ON THE VALUE OF

1—Bonus Systems
2—Closed Cabs
3—Vacations
4—Overtime Pay
5—Clean Garages
6—Clean Trucks
7—Commissions
8—Driver Partnerships
9—Weekly Meetings

DRIVERS are the human element on which depends either the success or failure of truck operation. Truck owners have realized that this is a fact. Yet they have done little or nothing to really help their drivers to become better truck operators.

We hear of welfare work, training schools and night lectures at truck factories and industrial plants of all kinds, but who ever heard of welfare work being carried out with truck drivers in average commercial service?

Truck drivers can be trained in many different ways, according to the business in which they are engaged. Some methods which have proved eminently satisfactory in one industry are failures in others. Instead of trying to point out the best methods for truck operators to follow in training their drivers in any one industry, it is the purpose of this article to discuss some of the fundamental principles upon which better drivers are made.

The Bonus System

Perhaps one of the most usual methods followed in training truck drivers to do more and better work is by means of bonus systems. First of all, it is evident that no one bonus system can be applied to different sizes of trucks engaged in entirely different classes of work. If an owner operates different sizes of trucks in entirely different classes of work, he must determine upon a basis for each class of work. The necessity for this classification is apparent, since it is obvious that the same basis could not be applied to 5-ton trucks hauling bulk material, such as sand and stone, and to light ¾-ton trucks delivering packages.

One of the first requisites of any successful bonus system is that it be fair to all of the drivers. There must be no basis for complaint on the part of any one driver or group of drivers, or the system is doomed to failure.

The items which should be taken under consideration in the determination of a bonus system are of course settled to some extent by the particular business in which the trucks are engaged. For example, department stores have bonus systems in which prizes are given for neat appearance; number of complaints received from customers; number of times late, and truck operation items such as gasoline and oil mileage, tire mileage, cost of repairs, number of accidents, greatest number of packages delivered per year, etc.

The Fundamentals

All bonus systems are fundamentally intended to increase the efficiency of the truck and permit it to do more work at a lesser cost. Since the driver is the human element which can either make or mar the success of the vehicle, the idea is to pay the driver extra for meritorious work performed.

In this work it is necessary that only such items are included in the bonus system as are under the driver's control. It is evident that it is not practicable, for instance, to use the total cost of truck operation to determine the driver's efficiency where the total cost per day or month includes taxes, interest on investment, overhead charges, depreciation, licenses, etc. These items are in most cases calculated on a yearly basis, which makes the monthly or daily charges the same under all conditions, regardless of the good or poor performance of the truck or its driver. If such items are included in the standard determined upon for the bonus plan, they are likely to have an undue influence and, in some cases, to make the plan entirely ineffective.

The items for which the driver is responsible to a large extent and which therefore should be included in the total cost used in a bonus system to determine truck efficiency are:

1. Miles traveled.
2. Pounds, tons or packages carried.
3. Time consumed.
4. Wages of driver and helper, if any.
5. Tire expense.
6. Maintenance and repair expense.
7. Cost of gasoline, oil, grease and waste.
8. Time in service.
9. Time waiting for loading and unloading.

While several of these items are only contributory to the determination of the final cost, they have some effect upon it and should therefore be considered.

In determining upon the basis which shall be taken as a good day's work, it is well to take the average conditions at a time before the system is installed. For a better day's work, the bonus system should pay rewards commensurate with the results obtained as compared with the average.

The Timken-Detroit Bonus

The Timken-Detroit Axle Co. some time ago installed a bonus system for its drivers that can be cited here as one instance of how greater efficiency of truck and driver may be secured. That company determined a standard cost per commercial ton-mile and then established a maximum cost per commercial ton-mile slightly in excess of the standard cost. The drivers and helpers were then offered a bonus of 50 per cent of the savings they could effect between the standard cost per ton-mile and the maximum cost. The efficiency of the truck performance was then determined easily by dividing the standard cost per commercial ton-mile by the actual cost.

This may best be explained by an example, as follows:

a—Standard cost per ton-mile equals $0.05
b—Maximum cost per ton-mile equals $0.075
c—Operator's actual cost per ton-mile ....equals $0.06
d—Total commercial ton-miles equals 1800

The driver's bonus is then determined by the formula:

$$\frac{b - c}{2} \times d = \text{Driver's Bonus.}$$

In the case just given, the bonus would work out as follows:

$$\frac{.075 - .06}{2} \times 1800 = \$13.50.$$

The efficiency of operation would then be represented by:

$$\frac{a}{c} = \frac{5}{6} = 83.33$$

While the bonus of $13.50 may appear as rather high for an efficiency of only 83.33 per cent, the Timken company found that the high reward encouraged a high accomplishment as compared with unstandardized conditions and no efficiency reward or bonus system.

The Timken company found, after applying this method for a period of 15 months, that it has resulted in a general all-around higher efficiency. Increased loads have been carried, trucks have been operated for a higher percentage of the possible working time and at decreased costs.

Closed Cabs Help

Aside from bonus systems, there are many other ways to increase the truck efficiency by increasing the efficiency of the driver. One of these is to fit a closed cab to the truck. Such a cab enables the driver to keep warm in the coldest weather and protects him from rain and snow during storms. A man who is warm and comfortable will do much more work than a man who is cold and disagreeable. He will not only do more work, but do it better and at the same time take better care of his truck.

Another truck accessory which will increase the efficiency of the truck driver and subsequently the truck itself is the self-starter. Unfortunately, the self-starter has not yet developed to the point where it has become standard equipment on trucks of 2-ton capacity or more when mounted on solid tires. There is no question as to the great savings which can be effected by the self-starter, and there is no reason why all trucks, just like passenger cars, should not be fitted with some means of starting the engine mechanically. In fact, there is a greater need for self-starters on trucks to-day than there is on passenger cars, since the average truck is in use during a larger percentage of the day and is continually starting and stopping in traffic or while picking up or delivering its loads.

Self-starters make the driver more productive in two ways: First, it enables him to cut down his gasoline consumption, and second, it enables him to do more and better work. The self-starter which will stand up and give continuous service on solid-tired trucks operating over rough roads will enable the gasoline consumption to be reduced by making it possible for the driver to shut off his engine each time his truck is not in motion for periods over 2 or 3 minutes long. The problem of cranking an engine twenty-five or fifty times a day, or even 100 times a day, as would be necessary in package delivery work if the engine were stopped at every delivery, becomes a serious one, because it is liable to sap the physical vitality of the driver. With a low vitality, the driver is much more liable to be careless in his operation of the truck and to take more chances than he would if he were not tired.

Aside from these benefits of the self-starter, it enables the driver to accomplish more work with the truck. Every time the driver has to get down off his seat to crank the engine, he consumes 2 or 3 minutes' time before he can drive his truck off. At an average length of time of 3 minutes to start the engine and get back onto the seat, it is evident that the driver would only have to crank his engine ten times a day in order to consume a valuable half-hour of time. With a truck worth $3 an hour, this one simple operation repeated ten times throughout the day would thus be equivalent to $1.50 worth of truck time. This amount would be lost through no fault of the driver.

Vacations With Pay

Aside from bonus systems, closed cabs and self-starters, the fleet owner should consider seriously the matter of vacations with pay for drivers. Vacations with pay and additional money for overtime work are linked together, since it is the general plan to pay overtime wages but give no vacation except without pay, or at the expense of the driver himself.

There seems to be no good reason why motor truck drivers should not receive vacations with pay, just the same as office workers. True, it is not done simply because drivers are classed with other tradesmen such as machinists, bricklayers, plasterers, etc., who generally belong to unions and in whom the employer takes very little interest after providing union wages and union working conditions.

Notwithstanding that vacations with pay are not generally accorded to drivers, a few concerns have begun the practise, and with very good results. The driver's work is none too easy and a vacation and change of surroundings generally bring him back to to his job with a new ambition and physically able to begin the new year's work with increased vigor.

Cleanliness Big Asset

The matter of cleanliness is also of great importance in efficient motor truck operation. Cleanliness applies both to the driver and his truck and even to the garage in which it is stored. A clean driver generally means a clean truck and a clean truck means one which is well taken care of. In turn, a truck well taken care of is generally operated at a low cost for maintenance and repairs.

One of the new ideas in motor truck operation to secure better work from the drivers is to pay them a commission on the amount of goods delivered. Such a plan has been worked out by the General Storage and Cartage Co., Detroit. That concern operates sixteen trucks and pays its drivers a commission of 20 per cent on the gross income of all tonnage handled. This in reality has put every driver into business for himself. The drivers of that company earn on an average of $7 a day, as compared with a wage of $3.50 per day as a good average the country over. The company considers its highest-priced driver the cheapest man employed because he makes more money with the same equipment than does the low-priced driver.

For the sixteen drivers, the company pays $56 a day extra in bonuses above the average driver's wage. This is only 10 per cent of the total income, for which, however, the company gets a 50 per cent increase in earnings.

This paying of commissions to drivers really makes them partners in the business and has produced excellent results. It is particularly applicable in cases where the trucks are employed in the transfer business to haul other peoples' goods.

Building up an *esprit de corps* is sometimes best accomplished by holding weekly meetings of the drivers on the company time, when the number of men is not so large as to make the gatherings unwieldly. In such meetings, the drivers get to know each other better and become better acquainted with the aims and policies of the company. They take a greater interest in the work and do not make errors which they otherwise would if they were ignorant of the company's ideals.

Better Truck Repair and Maintenance

No. 1—Vise Fixture to Reline Brakes

A SIMPLE device for relining motor truck brake bands may be made from a piece of soft iron heated and bent in the shape of an L. Preferably a piece of square iron should be used, so that the flat surface may be employed to hold the member in the jaws of an ordinary vise on the workbench. A hard steel punch should be set in the top of the long arm of the device to serve as a base against which the brake band rivets may be hammered. The edges of the horizontal arm should be rounded off as shown, to fit the curvature of the brake band which is hung over the device and moved around as each rivet is inserted and upset. A rivet set and a hammer complete the tools required for relining any size of brake.—T. D. PRICE, New York City.

No. 2—Truing Up the Crankshaft Bearings

CRANKSHAFT bearings may be trued up by means of a homemade device consisting of a two-part wood block fastened to the top of the workbench near its edge and a movable vertical stand with a Y-ended top. The bearings are first marked with Prussian blue and the connecting rods put in place and turned about the crank pins to determine the amount of wear or any uneven machining after the bearings have been ground. The two-part block on the bench is split at its middle along a horizontal line. A notch is cut in each block at the center to form a rectangular opening through which one end of the crankshaft is inserted. The upper block is held rigidly to the lower by means of nuts on two bolts inserted up through the bottom of the workbench.—J. M. HORTON ICE CREAM CO., New York.

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks, THE COMMERCIAL VEHICLE *initiates on these two pages a new department in which better methods of maintaining trucks and the latest ideas in making quick repairs will be published.*

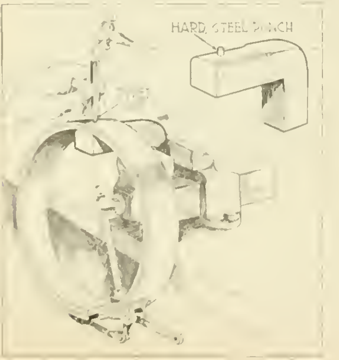
THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

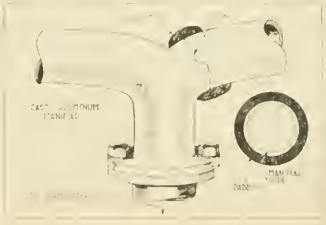
No. 3—A Quick Repair on a Broken Manifold

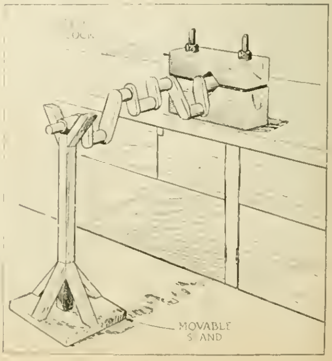
A SIMPLE method to repair a break in an aluminum engine manifold is to form a ring of babbitt about the crack. This may be done by running the babbitt into place after building up a mold of fire clay around the fracture and pouring the molten metal in from a vent at the top. By making the babbitt band extend far enough on either side of the break, sufficient rigidity is secured to make the repair a permanent one. The unsightliness of the babbitt ring after it has been formed may be lessened by filing off the rough spots after the ring has cooled. If the manifold is of cast iron, a similar method may be employed to solder on a band of metal.—F. E. SPOONER, East Orange, N. J.

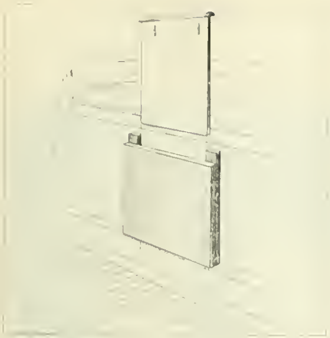
No. 4—A Truck Garage Oil Supply System

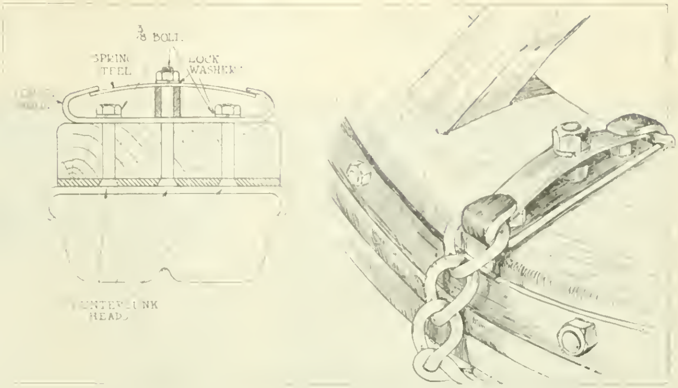
IN motor truck garages in which the first or storage floor is so crowded as to prevent setting up tanks for lubricating oil, valuable space may be saved by placing the tanks on the second floor and running pipes from them to a filler stand on the floor where the trucks are stored. A valve should be placed in each pipe line at a point near the tank itself and a second valve at the draw-off point on the lower floor. To save oil which might otherwise drip on the floor from the containers in which it is handled, a tray should be provided underneath the draw off spigot. A perforated plate set $\frac{1}{2}$ inch or more above the base of the tray enables the oil to be











No. 7 above
No. 6 right

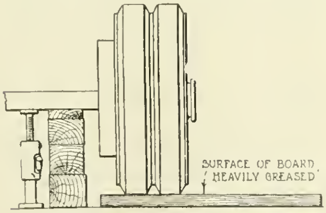
collected and still keeps it off the bottoms of the oil cans each time they are set down in the tray.—J. LUSTIG, Brooklyn, N. Y.

No. 5—Removing Heavy Motor Truck Wheels

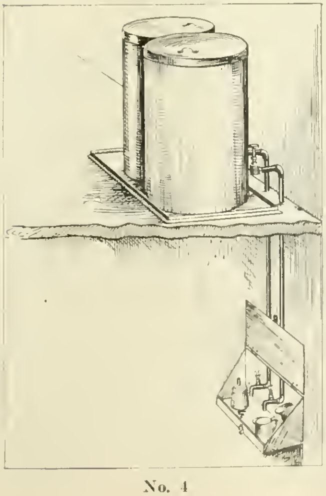
ONE easy method of removing a heavy motor truck rear wheel with dual tires is by the use of a well-greased plank. The rear axle of the truck is first jacked up until the rear wheel is lifted off the floor a distance slightly in excess of the depth of the greased plank. Then blocks are placed under the axle to hold the truck should the jack slip. These blocks are not fitted tightly under the axle to prevent its being lowered a small distance, but are employed merely as a precaution. The jack is then lowered until the rear wheel rests on the greased plank which is inserted under the wheel parallel to the centerline of the axle or perpendicular to the side frame of the truck. At this height, the axle should rest on the blocking so that the weight is taken off the wheel. This permits the wheel to be taken off the end of the axle shaft by sliding it along the greased plank.—*Motor Age*, Chicago.

No. 6—Homemade Device to Hold Skid Chains

A SIMPLE means of attachment for skid chains on a motor truck wheel is made of a bar of ⅜ by 2-inch iron bent over at each end. This is bolted to the inside of the wheel felloe between every other set of two adjacent spokes, or, in other words, with two spokes between each bar. The bar is held in place by means of a bolt at the center which also serves to hold a piece of spring steel held in contact with the ends of the bar by means of a pipe spacer around the bolt. The bar is prevented from turning about its center bolt by two other bolts through the felloe of the wheel. These latter are ⅜-inch bolts with countersunk heads flush with the steel band around the circumference of the felloe. Set screws with lock washers are not sufficiently strong to withstand the strains set up in such a device and should not be employed. The bolt clear through the wood felloe gives the best results. Each bolt should be provided with a lock washer to prevent the nut from working loose due to the vibration while the truck is in motion. The non-skid chain is simply slipped over the hooked ends of the bar and prevented from working loose by means of the spring steel retainer. The device remains in place when the chains are not in use. It has one advantage over an ordinary hook in that the chain cannot come loose.—T. D. PRATT, Newark, N. J.



No. 5



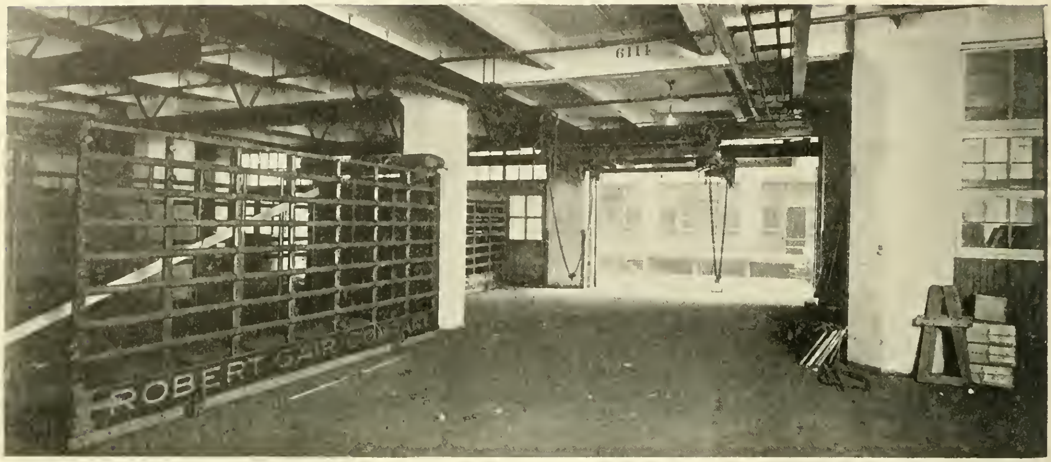
No. 4

No. 7—Pocket to Hold Driver's Route Cards

WHEN the driver's route cards or book of delivery receipts is carried in an aluminum cover to protect the writing on them until they are turned in at the end of the day's work, they may be carried conveniently in a wooden pocket on the front of the riser of the driver's seat. The pocket is made by two narrow strips of wood nailed vertically to the riser and covered with a thin piece of board or strip of tin. The aluminum cover for the cards or receipts is inserted open end downward into the pocket so that its hinged end is at the top. When in this position, the hinged top serves to keep out the rain. The position of the pocket is very convenient to the driver and does not interfere with his operation of the truck. It is a much more convenient location for carrying the data sheets than under the seat cushion which otherwise must be lifted each time a delivery is made. The location of the holder on the seat riser is particularly advantageous on a truck which is not fitted with a permanent top, closed-in cab, or other protection contrivance for the driver.—WILLIAM CAMERON LUMBER CO., Fort Worth, Texas.

Using Trucks in the Paper Products Industry

(Continued from page 91)



View of one of the Gair motor truck loading platforms, looking toward the door. Overhead is seen the truck arrangement on which the demountable body lifting framework moves inward perpendicularly from the door. To the left are seen the two sets of body tracks at right angles to that leading in from the door. The empty bodies ready to be loaded are seen at the left

each other and at right angles to the main tracks, as shown in the sketch on page 107. This means that the truck has to wait until the empty body has been taken off and moved out of the way of the loaded body before the latter can be lifted clear of the loading floor and started on its way to the waiting truck.

Takes Too Long to Load

The time thus consumed is about 20 minutes. It is figured, however, that this can be reduced to 5 minutes by the installation of an electric motor to propel the hoist on the tracks and take the place of the present slow and laborious chain-pulley system of maneuvering the load. In addition, in order to effect that reduction in time, some arrangement will have to be made to eliminate the present method of shunting the bodies on switch tracks. A better method would provide for the loading of the bodies at three or more alternate sections along the loading platform, the empty bodies being taken off in the other sections, as shown in the sketch on page 107. A truck could then back up under one overhead track, dispose of its empty body and then back up to the adjoining section to take on the loaded body. Channel irons laid on the ground to guide the rear wheels of the trucks to their proper position under the overhead track would also save considerable time now expended in maneuvering to get directly under the hoist.

As the loading platforms at the Gair plant do not allow the trucks to be run inside the building, it would be impossible to take advantage of the fixed-hoist system where the body is loaded while suspended on the hoist and then dropped onto the truck, thus requiring only two motions and but a minute's time for the whole operation. It would be a violation of the city ordinances to congest the sidewalks, as would be the case if the Gair company should attempt to adopt such a method.

The 7½-ton Macks and 5-ton Whites are used for the bulky freight which is taken to and from the Piermont, N. Y., plant, 21 miles away. These trucks start out from Brooklyn early in the morning, loaded with office equipment and supplies, which are delivered to the Piermont plant. As soon as the loads are taken off, the trucks take on deliveries that are to be made on the return trip. These deliveries consist largely of corrugated paper, a bulky product. As a result, the Gair company has realized the necessity of adapting the individual load to the capacity of the truck which is used to transport it.

Problems of Bulky Loads

Corrugated paper constitutes an exception to the rule, however, of full capacity loads, for it is only practicable to carry 3½ tons of this product on the regular 5-ton truck. Obviously this means an apparent loss of 1½ tons of pay load. Up to last May this paper product was carried on the 3½-ton trucks entirely, so as to get the maximum service. Since then these trucks, which were Alcos, have been disposed of, the 7½-ton Macks and 5-ton Whites being used on account of the large capacity of their bodies. Fully 70 per cent of the load capacity of these trucks is used. The whole trip takes a little over 6 hours, including ½ hour at each end for unloading and loading.

Ashes Hauled by 2-Tonner

The 3½-ton Alco, which was formerly used on the Piermont deliveries, has been taken off that route to be used as a machinery truck. This latter work was formerly taken care of by the horse vehicles. That truck has been in the service of the Gair company for about 8 years and the wear and tear caused by the runs through the hilly country up to Piermont has been responsible in ending its usefulness for the long hauls each day. The haulage of ashes and rubbish from the factories, formerly handled by three-horse vehicles, is now taken care of by a new 2-ton dump body Autocar. By equipping this body with 2-foot side racks the capacity for rubbish has been doubled.

Each truck in the fleet carries a driver and a helper. It is the duty of the helper to fill the radiator and replenish the fuel and oil supply both at the garage and when the truck is being loaded at Piermont. This is done during the loading or unloading period in order to save time. The drivers are expected to make any light repairs when on the road. The loading schedule at Piermont has been so arranged that the trucks will follow each other at close intervals. In that way, should any one of the vehicles become incapacitated on the return trip, the truck following it will be able to pull it back to New York City, thus completing the deliveries. On the other hand, should the last truck be laid up on account of an accident or heavy repair, the driver telephones the garage for instructions. For instance, in the case of a burned-out bearing, he is instructed to take off the bottom of the crankcase in order to save time while the new bearing is being sent from the garage.

How Trucks Are Supervised

The operation and maintenance of the Gair trucks are respectively under the supervision of the traffic manager and the factory engineer. These two men are in charge of the operating and maintenance costs, as well as supervising the executive work connected with the two branches of the work. The actual repairs, etc., are taken care of by the garage foreman and the drivers and loading and routing by the superintendent of transportation. The latter men carry out the orders of the engineer and traffic manager respectively.

William H. Costigan, superintendent of transportation, has been in the delivery service of the Gair company for 20 years, and, as a result, is perfectly familiar with the work he is now handling.

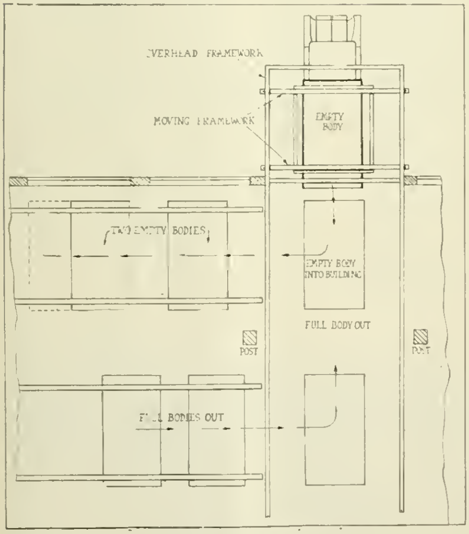
He has perfected a system that is fool-proof, as far as the allocation of loads is concerned. He has arranged so that a list of the next day's shipments will be sent to him the night before. He then assigns the various loads, which are numbered, to the drivers. Complete instructions are written out and placed in envelopes, which are in turn placed in a special rack in the garage. All that the driver has to do each morning is to take out the envelope placed in the rack under his name. The instructions tell him where to go for his load, thus eliminating all confusion in the morning, as well as relieving Costigan of much responsibility.

In order to bring the trucks near the loading platforms, the garage was located between two of the Manhattan Bridge supports, across the street from the shipping department building. The company owns the garage building and leases the land from the city. A description of the garage, storage and maintenance methods was published in the May 15, 1919, issue of THE COMMERCIAL VEHICLE.

Parking Vehicles

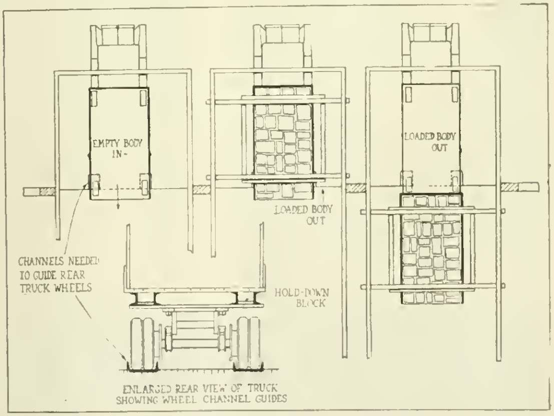
During the day when the garage space is partly occupied by the passenger cars owned by the company's officers as well as outside owners and by unused trucks owned by the company and other firms, little difficulty is experienced in parking the vehicles on account of the ample space afforded. The garage has a floor space of 18,000 square feet and room for the storage of sixty trucks.

At night, however, conditions are different, all of the trucks being in, and, as a result, a systematic apportionment of space must be made in order to get the best results. A number of the trucks are loaded before they are sent to the garage at night so that they may get under way the next morning without delay. These are placed at the rear end of the garage, near the exit, in order to give them preference in the morning. Each truck has a specified space. The electrics, which are charged at night, and which go out the front entrance, are placed along the left side walls, where there are eighteen electric connections for charging purposes.



As It Is Now

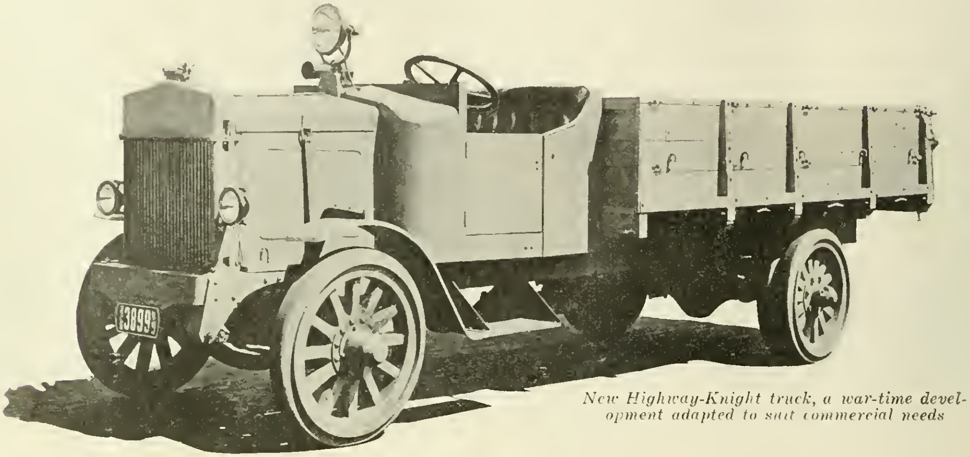
In the plan shown above, the empty body must be got out of the way by moving it at right angles to the track extending out over the truck before the loaded body can be moved to the waiting truck chassis. This takes 20 minutes. Many minutes are wasted in backing the truck up to the platform so that it is directly under the hoist


EMPTY BODY IN-
LOADED BODY OUT
LOADED BODY OUT
CHANNELS NEEDED TO GUIDE REAR TRUCK WHEELS
HOLD-DOWN BLOCK
ENLARGED REAR VIEW OF TRUCK SHOWING WHEEL CHANNEL GUIDES

As It Might Be

In this proposed plan, the hoists are arranged side by side, in a row of three or more. By this means, the truck backs under one hoist to discharge its empty body and then runs and backs up to a second platform where the loaded body, already in waiting, is put on. Channel guides, set flush with the street close up to the edge of the platform, would help greatly to place the truck exactly under the hoist without excessive maneuvering. By this method, the empty body could be discharged and the full one put in place in about 5 minutes' time

Highway-Knight 4- and 5-Ton Trucks Now in Production



New Highway-Knight truck, a war-time development adapted to suit commercial needs

HIGHWAY SPECIFICATIONS

Capacity, tons	4	5
Price	$4,700	$5,250
Wheelbase, in.	159	159
Tires, front	36 x 5	36 x 5
Tires, rear	36 x 6	40 x 6
Bore, in.	4	4
Stroke, in.	6	6
N.A.C.C. hp.	25.6	25.6
Speed, r.p.m.	1200	1200
Speed, m.p.h.	14.7	14.7
Gear ratio in high gear	8.75 to 1	8.75 to 1
Final drive	Worm	Worm

DEVELOPED to meet war-time requirements and now adapted to suit commercial needs the Highway-Knight truck, in 4- and 5-ton capacities, is in production at the plant of the Highway Motors Co., Chicago. This truck, which is equipped with a sleeve-valve engine, embodies with few exceptions the same features that were incorporated in the 4-ton chassis built in 1916 by the Motor Trucks, Ltd., Brantford, Ont., under the direction of the British Mechanical Transport. Production of 100 of these vehicles was started July 1. This company is a close corporation, organized under Illinois laws. The 4-tonner, which uses the same sized engine as the 5-tonner, is designed for bus use. Changes in design are few. The fuel tank has been mounted under the seat instead of at the sides of the frame in back of the cab. The two models are alike with the exception of the spring and rear wheel sizes. The front springs of the 5-tonner are 46 inches in length, being 2 inches longer than those on the 4-tonner. The rear springs on the larger model are also 2 inches longer than those on the 4-tonner, being 58 inches in length. There is a ½-inch difference in the widths of the rear springs, that of the 5-tonner being 4 inches and that of the smaller model 3½ inches.

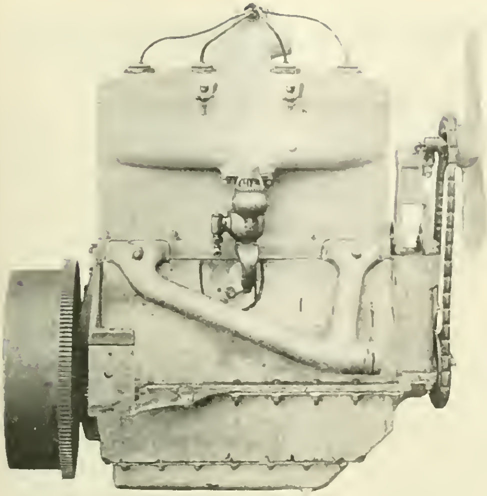
The cylinders of the four-cylinder engine are cast in block, together with the inlet manifold, which is completely water-jacketed. The sleeves are so placed in the cylinder that their upper ends are encased by water-jackets on both sides, and they are operated by eccentrics in the usual manner. The cylinder heads are covered by a removable plate which leaves between the cover and cylinder head an unusually large water space. The cylinder head is a cone-shaped cap with a spark plug in its center to a depth of several inches. The space between the center and sides of the cap is in the water circuit so that the upper ends of the two reciprocating sleeves have water circulation on both sides of them and the upper half of the spherical combustion chamber is surrounded by a water jacket. The reciprocating sleeves throughout their entire length, except at the ports and at their extreme lower ends, are surrounded by water. Circulation is by the thermo-syphon system. The cylinder cover plate forms the upper water manifold through which water passes to the radiator. The lower connection from the radiator has two branches, one leading to the forward end and the other to the rear end of the lower edge of the cylinder block. By this means an equal flow of water is assured to all cylinders, the cooling fluid passing around the cylinder barrel, then around the intake manifold, thence to the cylinder head and through the water outlet. The radiator is of the vertical finned tube type with a cast iron case.

The sleeves are operated by connecting rods from the eccentric shaft, which is driven by silent chain from the crankshaft. The chain also passes over the sprocket, which drives the magneto and generator, which are mounted on top of a base plate on the left side of the engine.

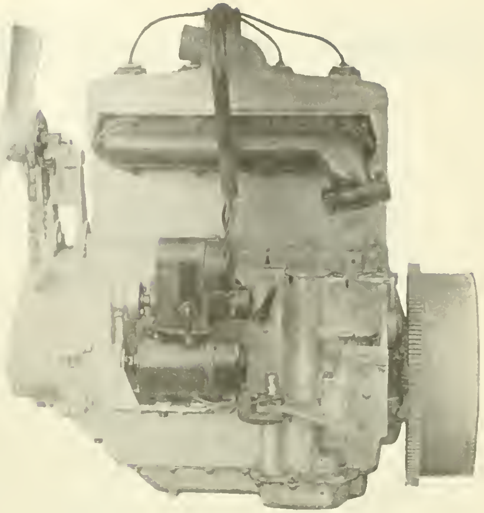
Lubrication is by force feed from a gear-driven pump. Oil is forced at a pressure varying up to 50 pounds through a drilled crankshaft to every bearing in the engine. The circulation and pressure are maintained by a gear pump, which takes the oil from a sump in the bottom of the crankcase through a screen, forces it through a manifold which runs the entire length of the engine and parallel with the crankshaft. At the three main bearings, the leads conduct the oil to the crankshaft bearings.

The Zenith carbureter is fed by gravity from a 30-gallon tank under the seat. The location of the tank in the model turned out by the Motor Trucks, Ltd., was different than in the present model. Two tanks were then used, each mounted on either side of the frame in back of the cab. They were suspended by steel straps from two yoke-like wood beams laid across the frame. Incorporated with the carbureter is the Monarch gas-velocity governor, operated by the suction created in the inlet manifold. Ignition is by means of a high-tension single magneto with hand spark control. The auxiliary electrical system consists of a Wagner starting and lighting outfit and a Vesta battery.

The gearbox, driveshaft, torque tube, clutch, change lever, brake lever, clutch and brake pedals, and brake rocker shafts are all combined in one unit. This unit is attached to the frame at three points



The inlet manifold is completely water-jacketed on the Highway-Knight engine



The crankcase of the Highway-Knight engine is suspended at three points

on spherical seats. The multiple-disc clutch is attached to the front end of the torque tube. The front end of this case is supported through a spherical bearing to a tubular cross member of the frame. The four-speed gearset is mounted amidships. Driving torque and propulsion are taken through the half-elliptic springs.

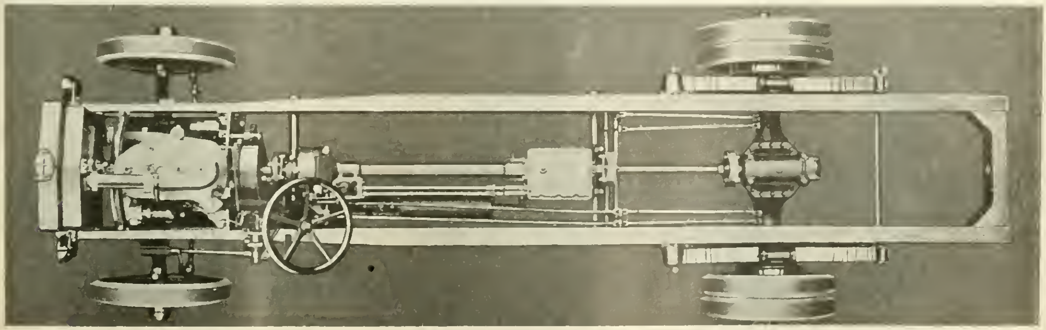
The springs are of the banded type, steel bands being shrunk on at their middles in lieu of a center bolt, thus avoiding any weakening hole at this point. They are flat under load and have three reversed leaves on top, to resist rebound. These rebound springs are equal to about one-fourth the thickness of the main springs. The front spring eyes are bushed for ¾-inch diameter bolts, while those of the rear springs are bushed for 1¼-inch bolts at their fronts and for 1¼-inch ones at the rear, or shackled ends. Three rebound clips are used on each spring.

The flexible coupling between the engine and the clutch is made of six flexible fabric discs. The driveshaft is 26 inches long between the joints and operates in a straight line when the truck is loaded and the maximum angle under any conditions is 5 degrees. The driveshafts are made from alloy steel and triple heat-treated.

The housing of the worm-driven type of rear axle is of one-piece cast steel reinforced by pressing seamless steel tubing inside. The front axle is drop forged I-beam section. Taper roller bearings are used on the spindles, with a ball-thrust bearing in the knuckle head. It is also equipped with removable hardened and ground steel bushings in all of the steering connections. The steering arm and ball are carried above the axle and the steering tube is carried in back. All parts throughout the truck which are subject to wear are provided with removable bushings. The break levers are also bushed. Both the emergency and service brakes are of the internal type. All four brakes and their parts are interchangeable. The diameter is 20 inches and the facing 2½ inches. They are faced with non-burning asbestos and interwoven with wire material.

The channel frame is of pressed steel construction, with no offset or taper back of the seat. The loading space back of the seat is 12 ft. 3 in., and the chassis length overall is 20 ft. 3 in. The height from the ground to the top of the frame in 32 in. and the width overall is 7 ft. Wood wheels are used all around, mounted with single solids on the front and dual solids on the rear.

The gear change lever and emergency brake lever are mounted in the center of the truck, directly to the clutch case. The gear shift rods extend through the front end of the gearbox housing and run parallel with the torque tube and into the control set housing. This avoids any wearing joints between the front shift finger and the shift forks in the gearbox. The brake rocker shafts are mounted on the power transmission unit, therefore not being affected by the weaving of the flexible frame. Steering is on the left. The steering gear is attached to the main frame side member and is set at an angle of 35 degrees.



The channel frame of the Highway-Knight truck is of pressed steel, with no offset or taper back of the seat

Load Carrying Member Features New Adams Worm-Driven Axle

Klevis-Klips Replace Cotter Pins — Ketch-a-Kick for Fords Prevents Injury from Back-Kick of Engine—Tungar Battery Charger — Onan Spring Spreader — Miles Piston Vise

A NEW worm-driven truck axle and a new front axle are being produced by the Adams Axle Co., Findlay, Ohio. The worm-driven axle is of approximately the same weight as internal-gear driven axles of similar capacity.

The load-carrying member of the worm-driven axle is an outstanding feature. This consists of an I-beam of standard section, to the ends of which are riveted the spring pads and wheel bearing supports. By means of two slight bends in this I-beam, near the center, it is carried around the worm-drive housing, which it supports through flanges cast integral with the housing side plates. Other features are centered in the mounting of the worm gear and in the design of the internal-expanding hub brakes.

I-Beam Sizes Vary

The 1 and 1½-ton sizes use a 4-inch I-beam of 5 pound section for the 1 tonner and 7 pound section for the larger model. For the heavier sizes a 5-inch I-beam of 7½-pound section is used foı the 2-ton, and a similar beam of 9.75-pound section for the 2½-ton size.

Made of malleable iron, the worm-drive housing is cast in three parts, consisting of the central barrel and two side plates. The central barrel mounts the worm-drive on its top, the worm being supported by two radial thrust ball bearings. The back of the worm-barrel is closed by a cap, while the front is closed by a castellated nut, by means which the worm bearings are adjusted. This nut is locked by a compression bolt at the top of the barrel and by a clip which engages in the notches in the nut.

The differential gear is of the Brown-Lipe-Chapin bevel type. On this is mounted the worm wheel. The usual method of bolting is superseded in this design by having the teeth cut on the inside of the worm wheel. These correspond to similar teeth on the periphery of the differential. The worm wheel is pressed in place while hot, shrinking to a very tight fit as it cools. Flange rings, hot riveted through the worm wheel with six ⅜-inch rivets, insure it against sidewise slipping. As a result, the driving stresses through the entire mechanism are distributed evenly.

Housing Rigidly Attached

Two felt oil washers and one oil groove are carried on the gear housing side plates around the drive axles.

Rigid attachment of the worm-drive housing to the I-beam load supporting member is secured by means of generous flanges on the housing side plates, which extend forward over and below the I-beam. Four bolts, passing through upper and lower flanges of both rear housing and I-beam and through spacers between the I-beam flanges, hold the assembly rigidly in place. These bolts are ½ inch diameter in the 1 and 1½-ton sizes and ⅝ inch in the larger sizes.

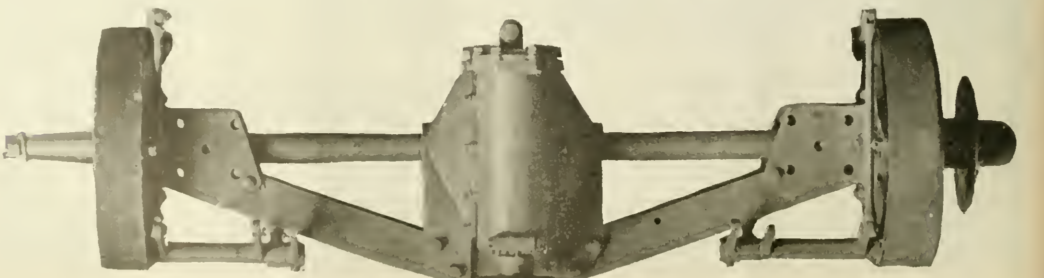
The brake spider and wheel bearing housing are cast integral and are hot riveted to the axle end brackets by a flange on the latter by eight ½ inch rivets to each casting. The housings carry ball bearings, adjustable with castellated nut, locked with split lug and clip, and with a felt oil ring on either side of the bearing.

Instead of following the usual practice of having two separate expanding rings for the emergency and service brakes, but one ring is used, the full width of the brake drum. This ring is split into two halves, the braking cam of the service brake operating between the ends at one of these separations, and the cam operated by the emergency lever operating between the ends at the opposite split. This makes possible an adjustment of the brakes from the driver's seat while the truck is running, as pulling up the emergency lever a notch or two will expand the worn brake bands just sufficiently to take up the wear, and when the service brake pedal is pressed it will work instantly. The brake bands are 2½ inches wide in the smaller sizes and 3 inches wide in the larger.

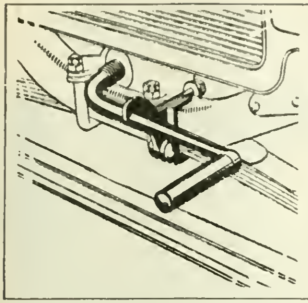
The thrust of the expanding bands is taken at four points on the brake spider at each cam, and at points 90 degrees from these, where the bands are held by notched supports sliding on forged pins passing through the brake spider. At all of these four points springs hold the brake bands away from the brake drum friction surface when in the release position.

Brakeshafts on Oil-less Bearings

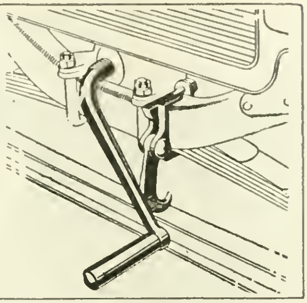
Both cams are operated from levers carried on the front of the axle assembly, making for simplicity in arrangement and operation. The inner ends of the brake camshafts are supported from the I-beam in a malleable bracket riveted to the web of the I-beam, the immediate support being a forging carrying in its end an oil-less bearing, through which the inner shaft passes. All brake and cam shafts are mounted on oil-less bearings, either Boundbrook or O. & S. The brake levers are drop forged.



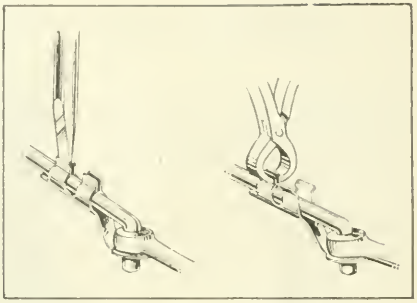
The load carrying member of the Adams worm-driven truck axle is bent around the worm-drive housing which it supports



The Ketch-A-Kick hook has caught the Ford crank during a kick-back



The crank when turned forces the Ketch-A-Kick out of the way



Klevis-Klips being applied and taken off by a screwdriver and pliers

Ketch-a-Kick for Fords

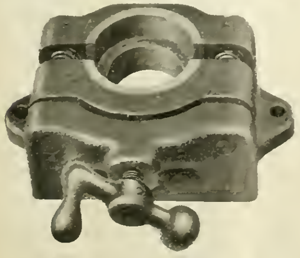
LEET owners using Fords are often inconvenienced through injury caused by back-kick of the engine. A device called the Ketch-A-Kick has been designed to overcome this result of back firing. It sells for $1.50 and is made by the Automotive Exchange of America, Cleveland, Ohio. It is designed so that during the back-kick of the crank the latter will be caught in a hook before it can do any injury. The device consists of a clamp and a hook pivoted on it. The hook is thrown to an upright position by means of a coil gun spring.

In operation, the crank when being turned to the right forces the hook out of the way until the crank is almost halfway around, when the hook is released and flipped back to the upright position Should a back-kick occur, the crank in its anti-clockwise direction will strike the upright hook and will be forced outward, thus being disengaged from the engine.

Klevis-Klips

A NOVELTY which will replace the cotter-pin for many of its applications is being manufactured under the name of Klevis-Klips by the Chas. S. Monson Co., Detroit. Much time is saved in their application in that they dispense with the drilling of the hole necessary to the use of cotter-pins. They are attached in a moment and are as quickly taken off. All that is needed are a screwdriver and pliers.

Two methods are in common use for attaching a rod end to a lever or similar part. A forged yoke or clevis is either welded or screwed to the end of the rod, or it is bent at right angles to form a hook which is inserted in a hole in the end of the lever and held in place by a cotter-pin. The Klevis-Klip requires no special preparation of the part for its use.



The Miles piston vise, useful in taking out connecting rods

Tungar Battery Charger

FLEET owners using trucks equipped with batteries for ignition and lighting will be interested in a device that will take care of a small amount of battery charging. The General Electric Co., Schenectady, N. Y., has placed on the market a new "Four Battery" Tungar battery charger, designed to meet the needs of truck owners. This device will charge from one to four three-cell batteries at a maximum of 5 amperes. The rate can be varied from 3 to 5 amperes. It operates from a standard 115-volt, 60-cycle alternating current circuit.

The Tungar battery charger which takes care of four three-cell batteries

The essential parts are a bulb for rectifying the current and a transformer for reducing the voltage, both of which are contained in a sheet-metal case. An ammeter for reading the charging current and a dial switch are mounted on the front of the case.

The device is easily installed. It is installed on the wall with four screws and then connected through the leads to the AC supply. It is operated by connecting the DC leads to the batteries. The dial switch is turned to the right until the ammeter reads the desired charging current. To stop charging, the switch is turned back. There are no moving parts in the device, and it requires no oil or grease.

Spring Leaf Spreader

A NUMBER of devices have been designed to facilitate lubrication of the springs. One of these is a tool for spreading the leaves of springs apart. This device is made by David W. Onan, Minneapolis, Minn., and sells for $6.

The head of the device consists of a C-clamp, in the front end of which is a movable plunger operated by the handle at the other end. Pulling the movable handle toward the stationary handle drives the plunger in, thus forcing the spring apart.

The Onan spring spreader

Miles Piston Vise

A VISE has been designed to hold a piston while assembling or disassembling connecting rods or while reaming piston pin bushings. It sells for $10 and is made by the Miles Mfg. Co., Newton, Iowa.

The jaws of the vise are lined with babbitt to prevent injury to the piston and it is an easy matter to reline them when the babbitt becomes worn. The vise operates by a screw and the hole permits of all operations on the piston, even with the connecting rod assembled.

Getting Business for the Truck Transferman

(Continued from page 83)

trailer outfits and two 3½-ton four-wheeled trailers are used for the haulage between the four terminals in the Chicago district or from the company's distributing plant to the same terminals.

These trucks and trailers are capable of handling a maximum of 1,000,000 pounds of goods a week, which is 400,000 pounds in excess of the amount now moved.

None of the Interurban trucks are operated off paved streets, and Mr. Porter attributes much of the success of his truck work to this important fact.

The Interurban office on the second floor of its distributing station in the Loop district of Chicago. Two of the business solicitors are seen at the left

The Goods Carried

A very miscellaneous class of goods is handled, since the motor truck service opens up a new means of transportation which was never before available to Chicago shippers. Before the Interurban vehicles were installed, the shippers had to use the steam railway express service or ship over the railroads as freight. The business of the Interurban company has grown, notwithstanding that the cost of the truck service is 30 per cent higher than that of the steam railroad express and 35 per cent higher than by freight. The advantage to the shipper is really not expressed by these ratios, since he gets both a quicker and more direct service, and this is worth more than the increased cost.

The great bulk of goods moved includes tires, dry goods, steel and groceries. Fish, meat, eggs and produce are also hauled to a lesser extent and are carried at an extra charge because of the greater risk due to spoilage. Some of the illustrations used in connection with this article indicate the manner in which these different classes of goods are collected at the central distributing station and then loaded onto the trucks according to their destination. The service rendered by the trucks guarantees an overnight delivery to any point on the lines served. This is a real business asset in itself, since it permits merchants outside of the city proper to carry much smaller stocks than would otherwise be necessary if railroad express or railroad freight were employed.

View inside of the distributing station, showing goods brought in by the pickup trucks waiting to be assembled into loads for trucks hauling to one of the four electric railway terminals

The pickup trucks work during the daylight hours, this being necessary because a large volume of the goods must be moved out of the stores while they are open for business during the day. The goods from the various companies are brought to the central distributing station and then made up into loads at night and later transferred to the necessary terminals by means of the 3½- and 5-ton trucks and the tractor and trailer and semi-trailer outfits.

Details of Truck Work

This day and night work necessitates the employment of two shifts of drivers, seven in the day and five at night. The drivers work approximately 9½ hours a day and are paid at the rate of 53½ cents an hour, which is equivalent to $30.50 a week. They receive time and a half for all overtime work.

The trucks are maintained in a public garage near the central loading station. All service work is done at the local Gramm-Bernstein station. While it takes from 1 to 1½ hours to reach the service station, this has not as yet proved a detriment to truck operation, since the vehicles are only lightly over one year old and have given very little trouble, with the ex-

One of the pickup trucks being unloaded inside the distributing station. The truck has backed in from the street to lessen the handling of the goods

ception of the minor repair work, such as grinding valves, tightening up bearings, plugging radiator leaks due to collisions, etc.

One of the reasons for the small amount of mechanical trouble experienced has been due to the fact that a greaser, who is paid at the rate of $25 a week, has been employed to do nothing else but to see that the various parts of the trucks are properly lubricated. This is an important lesson for all fleet owners, since the wages of the greaser are far less than would have had to be expended had the truck lubrication not been given such thorough care. The supervision of the trucks is entrusted to one man who does nothing else.

Details in the operation of the trucks include the use of rubber tires on the rear wheels of the six-wheeled semi-trailer outfits. When the four-wheeled trailers were first used, they had to unload at the Evanston city limits because four-wheeled trailers were not allowed in Evanston. As a result, semi-trailers are now sent on that route. The semi-trailers are fitted with 20-foot bodies which permit them to carry capacity loads of bulky goods. Firestone tires are used on most of the trucks and have averaged from 8.000 miles on the rears to 12,000 miles on the fronts.

Need for Records

In doing a trucking business in cooperation with the four electric trunk lines, it has been found necessary to keep a concise record of the goods handled. While these records are complete, they are secured by the use of only three forms. First there is a pickup order given to the driver for the collection of the goods. When he receives the goods, he makes out a bill of lading in quadruplicate. The original is on white paper; the second copy on green paper; the third on pink and the fourth on yellow paper. The original is retained by the Interurban company as its record. The other three copies go to the electric line on which the goods are shipped, one copy for the auditor, one for office records and one for the delivery agent. All shipments are then made out in abstract. These abstracts are made in duplicate, one for the agent of the line and one for the Interurban company.

The service rendered by the Interurban trucks is divided into three classifications, two under the heading of express and one under freight. The Class A service express rate covers both pickup and delivery. The Class B rate provides exactly the same quality of service except that either pickup or delivery, but not both, is included. These two services are only rendered at points where the Interurban company has connections to deliver to the store or house door or pick up shipments, as the case may be. Class C service provides a rate applying only between its central express and freight station in Chicago and to points named in the regular tariff. No collection or delivery is included except under special conditions. In Chicago, the Class A and B services are provided within the regular express delivery zone, as indicated on the map on page 82.

In order that shippers may plan to use the service of the Interurban Motor Despatch, the latter company publishes a regular express and freight tariff booklet naming class and commodity rates between the Chicago territory served by the company and the stations on the four electric trunk lines.

OFFICIAL LIGHT INSPECTOR

ST. LOUIS, MO., Aug. 16—The City of St. Louis has appointed an official light inspector who daily passes on the lights of hundreds of trucks to see if they conform to the requirements of the State law which fixes punishment for carrying weak or glaring lights. If the inspector "passes" lights he puts a sticker on the truck that insures the owner against arrest. The service is free.

One of the 3½-ton trucks bringing in a load of goods from one terminal to the distributing station. Part of the goods will be loaded onto another truck running to one of the other electric trolley freight depots

Watch the Brakes!

"WATCH the brakes!" should be a slogan for every superintendent in charge of the operation or maintenance of a fleet of trucks. Aside from recklessness and carelessness on the part of truck drivers, worn-out brakes or faultily adjusted brakes are the cause of more truck accidents than perhaps any other cause.

When brakes begin to go bad, they should be attended to at once. An ounce of prevention is surely worth a pound of cure in this instance. When trucks are run with poor brakes it is generally due to one or two causes. In the first instance, it may be lack of a system whereby the driver is forced to report the condition of his brakes each night after he comes in from his day's work. If the condition of the brakes is reported daily, the fact that a truck is allowed out on the road with poor brakes can only be due to a lack of vigilance or action on the part of the maintenance crew or the maintenance superintendent, who should be held directly responsible.

Elsewhere in this issue is told the story of how one coal operator running more than twenty trucks has solved the problem of keeping the brakes of every truck in good condition by a simple system making use of a driver's daily report card. This card does not have the word "Brakes" printed on it, with a space for the driver to indicate their condition. Instead, it has a blank space in which the driver must write the word "Brakes" and then report their condition. By making the driver write the word "Brakes," or else be severely censured by the truck superintendent, the former never forgets his brakes and never forgets to report their condition every night.

This is a bit of driver psychology which every fleet owner can put to good use, no matter whether he operates one or a hundred trucks or whether they are ¾-tonners or 7½-ton trucks.

The same driver psychology can be applied equally well to keep the other accessories of the truck in proper shape. This is particularly true in regard to the horn and the tail and dash lights. Many truck accidents are due to the horn failing to act just when a person steps off the curb into the street without looking to see what vehicles are approaching in either direction. Rear-end collisions are mostly due to carelessness or a sudden stopping of the vehicle ahead. Accidents caused by either of these reasons are aggravated when the tail-light has gone out.

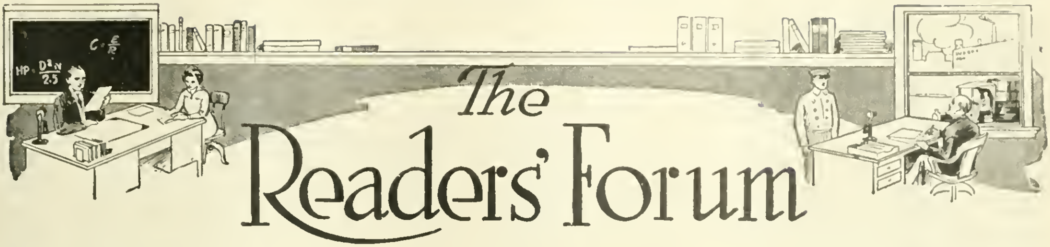
Then there is the case of the speedometer or odometer. Of what value is it to a fleet owner to attempt to keep cost records of his trucks if he has no accurate record of the mileage covered by each truck? By making it necessary for the driver to note the condition of horn, light and odometer on a card, he will not neglect them.

The Commercial Ton-Mile

IN figuring truck costs and truck efficiency, fleet owners should use the commercial ton-mile as the unit of comparison. The cost per ton is no fair measure of a truck's ability, since it costs more to deliver a ton 10 miles than it does 1 mile. Neither is the cost per mile any fair measure of work ability, because it costs almost as much, if not more, to run a 5-ton truck empty for 5 miles as it does to run it loaded. It is therefore evident that some unit which combines both mileage and tonnage must be employed.

The commercial ton-mile is such a unit. The commercial ton-mileage is obtained by multiplying the total tonnage carried on any trip by the mileage of that trip divided by two. For the day, it may be obtained by adding the ton-mileage of the trips made in that day. It may also be figured direct per day, month or year by multiplying the total tons carried during the period considered by one-half the average trip distance during the same period.

Fleet owners often look on the commercial ton-mile as some sort of complicated, visionary unit which is all right for business office men and expert mathematicians, but which has no place in their work. In this they are decidedly wrong, for it will not be long before trucking rates over the highways will be established and regulated just like railway rates. This has already been done by Nebraska, and other states will follow suit. When this time comes, truck owners will be in a sorry plight if they have not substantial facts and cost figures to back up their arguments against rates which are unfair.



The Readers' Forum

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Bonding Motor Truck Drivers in Chicago

To the Editor, COMMERCIAL VEHICLE:

I desire to hire bonded drivers to operate new 5-ton trucks on a rural express route. Kindly inform me where I can obtain sample bonds. What is the average amount required in such a case? One load per day of perishable foodstuff, ranging in value from $1,000 to $2,000, is to be handled by each truck. The bond requirement is chiefly to guard against carelessness on the drivers' part.—R. M. P., Chicago.

The Marine Department of the Aetna Life Insurance Co., 175 Jackson Blvd., Chicago, Ill., will write insurance on truck loads for one year, or will insure each truck load individually as the truck operator may desire. The rates for such insurance must be taken up direct with the company mentioned.

Four additional companies which write bonds to cover drivers operating motor trucks in the Chicago territory are as follows:

American Surety Co. of New York, 208 S. La Salle St.

National Surety Co., 209 S. La Salle St.

Fidelity & Deposit Co. of Maryland, 175 W. Jackson Blvd.

Maryland Casualty Co., 175 W. Jackson Blvd.

We would say that this class of business is not considered desirable by bonding companies and as a general proposition is only taken on where the customer places other business with them.

License Fees for 1½- and 2-Ton Trucks

To the Editor, COMMERCIAL VEHICLE:

Have you any information which will give us details on the tax on 2-ton trucks in certain states over that charged on 1½-ton trucks?—W. H. DENNEY, SHERMAN & BRYAN, INC., New York City.

Taking Pennsylvania, New Jersey, New York, Connecticut, Massachusetts, Ohio, Illinois, Montana and California as representative states, the license fees for 1½- and 2-ton trucks are as follows:

PENNSYLVANIA

In Pennsylvania, the license fees for motor trucks vary according to whether the truck is mounted on pneumatic tires or solid tires. For pneumatic tired trucks the license fee is based upon horsepower as follows:

Less than 25 Hp.	$5
20-34 Hp.	10
35-49 Hp.	15
Over 50 Hp.	20

For solid-tired trucks, the license fee is based upon a gross maximum weight of load and vehicle.

As told on page 13 of THE COMMERCIAL VEHICLE for June 15, 1919, the approximate chassis, body and total weight without load for 1½- and 2-ton trucks are as follows:

	1½-ton	2-ton
Chassis weight, approximate lbs.	3500	4500
Body weight, approximate lbs.	1050	1200
Total weight, approximate lbs.	4550	5700

Adding to the above figures the load of 3000 pounds in the case of the 1½-ton truck and 4000 pounds in the case of the 2-ton truck, the total weight will be as follows:

1½-ton truck	7550 lbs.
2-ton truck	9700 lbs.

On this basis license fee for both 1½- and 2-ton trucks is the same, since the fee is $15 for each motor vehicle of 5000 pounds and less than 10,000 pounds gross weight of load and vehicle.

NEW JERSEY

In the State of New Jersey, the license fees for trucks is based on the total gross weight of vehicle and load and the license fees for 1½- and 2-ton trucks would be as follows:

From 7001-8000 lbs.	$23
From 9001-10,000 lbs.	27

NEW YORK

In the State of New York, the license fee is also based on gross weight of load and vehicle with the fees as follows:

For 1½-ton truck over 3 tons and less than 4 tons	$20
For 2-ton truck over 4 tons and less than 5 tons	25

CONNECTICUT

In Connecticut, the license fee is based upon the carrying capacity of the truck as listed by the manufacturer. The fees are as follows:

For 1½-ton truck	$20
For 2-ton truck	25

MASSACHUSETTS

In Massachusetts, the license fee for a carrying capacity of 1 ton or less is $5 a year and for each additional ton or fraction of a ton of carrying capacity in excess of 1 ton, $3 additional. For the two sizes of trucks, the fees would be as follows:

For 1½-ton truck	$8
For 2-ton truck	8

OHIO

In Ohio, the truck license fee is set irrespective of capacity and is as follows:

For 1½-ton truck	$5
For 2-ton truck	5

ILLINOIS

In Illinois, the truck license fee is based upon horsepower and is as follows:

For 10 Hp. or less	$4.50
For 10-25 Hp.	6.00
For 26-35 Hp.	9.00
For 36-50 Hp.	16.00

MONTANA

In Montana, the truck license fee is not clearly defined by law. For instance, motor vehicles other than motor trucks having a rated engine capacity not exceeding 23 hp. (according to S. A. E. formula) are charged $5 and motor vehicles having a rated capacity exceeding 23 hp. and not exceeding 50 hp. (according to S. A. E. formula) are charged $10.

All motor vehicles other than motor vehicles having a rated capacity exceeding 50 hp. (according to S. A. E. formula) are charged $15, while a second provision requires that trucks over 1- and not over 2-ton capacity shall pay $15. It is not quite clear from the law whether a 1½-ton truck with an engine having a horsepower between 23 and 50 should pay $20 or $15. It is evident that if the vehicle were registered under the tonnage provision it would have to pay $15, while if it were registered under the horsepower provision it would only have to pay $10.

CALIFORNIA

In California, the license fee for motor trucks is based both upon horsepower, the type of tire employed and the weight of the chassis and body without a load.

If both the 1½-ton and 2-ton trucks are mounted on pneumatic tires, the license fee is at the rate of 40 cents for each engine horsepower. As told on pages 8 and 9 of THE COMMERCIAL VEHICLE for Nov. 1, 1918, the average engine horsepowers of 1½- and 2-ton trucks are as follows:

Engine horsepower, 1½-ton trucks	22.50
Engine horsepower, 2-ton trucks	25.60

On this basis, the yearly fees would be as follows:

For 1½-ton trucks	$9.00
For 2-ton trucks	10.24

If the truck is mounted on solid instead of pneumatic tires, an additional tax of $5 is made for each vehicle weighing 6000 pounds and over and less than 10,000 pounds. As both the 1½- and 2-ton trucks come between the 6000 and 10,000 pound limits, the additional fee in each case would be $15, making the total fees as follows:

For 1½-ton trucks	$24.00
For 2-ton trucks	25.24

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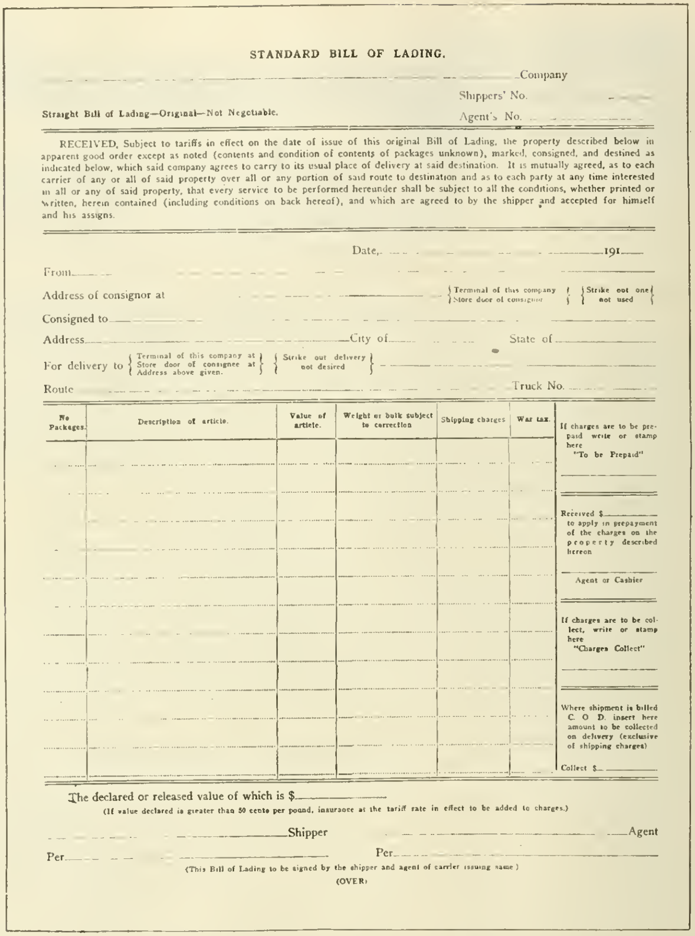
Standard Bill of Lading for Overland Haulage

To the Editor, COMMERCIAL VEHICLE:

Will you please tell me if any of the companies now operating overland haulage lines have worked out a standard bill of lading which has given satisfaction. If there is such a thing as a standard bill of lading will you please tell me where a copy of it can be obtained? If such a bill of lading is not available will you kindly state what you consider should be included in such a bill of lading for use in connection with overland haulage truck companies running between cities or by similar lines running out from large cities to the rural districts?—H. JUDSON, New York City.

A standard bill of lading such as you inquire about has been worked out by the Bureau of Markets of the United States Department of Agriculture, Washington, D. C. Both front and reverse sides are shown in the accompanying illustrations. The bill of lading shown was incorporated in a booklet entitled "Motor Transportation for Rural Districts," by J. H. Collins, Investigator in Market Surveys, and known as United States Department of Agriculture Bulletin No. 770.



STANDARD BILL OF LADING.

Company

Shippers' No.

Straight Bill of Lading—Original—Not Negotiable.

Agent's No.

RECEIVED, Subject to tariffs in effect on the date of issue of this original Bill of Lading, the property described below in apparent good order except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company agrees to carry to its usual place of delivery at said destination. It is mutually agreed, as to each carrier of any or all of said property over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions, whether printed or written, herein contained (including conditions on back hereof), and which are agreed to by the shipper and accepted for himself and his assigns.

Date, 191

From

Address of consignor at { Terminal of this company / Store door of consignor } { Strike out one not used }

Consigned to

Address City of State of

For delivery to { Terminal of this company at / Store door of consignee at / Address above given. } { Strike out delivery not desired }

Route Truck No.

No Packages.	Description of article.	Value of article.	Weight or bulk subject to correction	Shipping charges	War tax.

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ to apply in prepayment of the charges on the property described hereon

Agent or Cashier

If charges are to be collect, write or stamp here "Charges Collect"

Where shipment is billed C. O. D. insert here amount to be collected on delivery (exclusive of shipping charges)

Collect $

The declared or released value of which is $

(If value declared is greater than 50 cents per pound, insurance at the tariff rate in effect to be added to charges.)

Shipper Agent

Per Per

(This Bill of Lading to be signed by the shipper and agent of carrier issuing name)

(OVER)

Front side of the standard bill of lading as suggested by the Department of Agriculture for trucks employed as common carriers

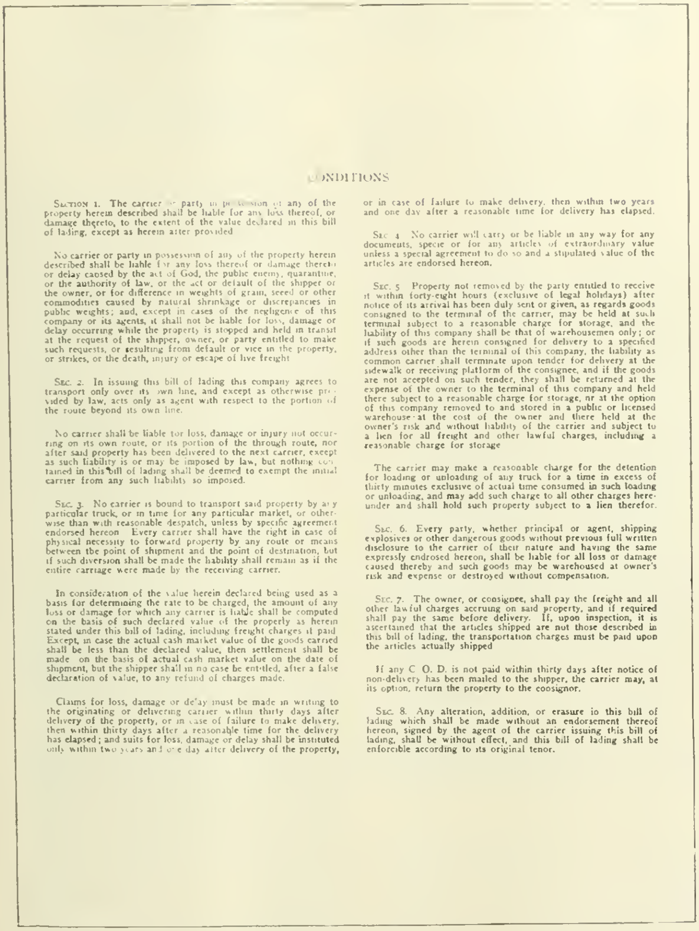
Any satisfactory bill of lading should bind the operator to the obligations of a long carrier and should set forth very clearly the extent of his liability. It should also be designed to permit the transfer of goods from one carrier to another. In addition to the items of the ordinary railroad bill of lading, one for motor truck lines should include some of the features of the invoice and the expense bill so as to obviate the need of a large number of forms for a relatively small business.

The standard bill of lading shown herewith has been patterned somewhat after the "uniform bill of lading" as used by the railroads, but certain important changes have been made to conform to the needs of the motor transportation business. The bill of lading contains certain items not ordinarily incorporated in the regular bill of lading, such as space for statement of the value of the goods carried and the shipping charges. While these items are not a part of the ordinary bill of lading it is perhaps best to refer to the form as a bill of lading, although it includes the essentials of the invoice and the expense bill. In some cases it may be necessary to modify certain provisions of the standard bill of lading as shown to conform with the laws regulating the business of long carriers in the different states.

It is also to be noted that a space is provided for a declared value of shipment and since most truck owners have found it advantageous to insure the goods carried as well as the trucks which carry them, some certain value is generally accepted as a minimum at which the goods will be carried without an extra charge for insurance. For instance, the page shown herewith indicates that if a value is declared greater than 50 cents a pound insurance at the tariff rate in effect will be added to the charges.

The conditions under which the goods are handled as printed on the reverse side of the standard bill of lading are most complete and should be carefully studied as a means of protection to the shipper and incorporated with the bill of lading as shown herewith.

Too often the motor truck operator who handles other peoples' goods for hire accepts the goods without any conditions, with the result that in case of damage due to accident or collision, he gets into a controversy which either results expensively for him or makes him lose the business of the customer. The bill of lading shown eliminates this.



CONDITIONS

SECTION 1. The carrier or party in possession of any of the property herein described shall be liable for any loss thereof, or damage thereto, to the extent of the value declared in this bill of lading, except as herein after provided

No carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto or delay caused by the act of God, the public enemy, quarantine, or the authority of law, or the act or default of the shipper or the owner, or for difference in weights of grain, seed or other commodities caused by natural shrinkage or discrepancies in public weights; and, except in cases of the negligence of this company or its agents, it shall not be liable for loss, damage or delay occurring while the property is stopped and held in transit at the request of the shipper, owner, or party entitled to make such requests, or resulting from default or vice in the property, or strikes, or the death, injury or escape of live freight

SEC. 2. In issuing this bill of lading this company agrees to transport only over its own line, and except as otherwise provided by law, acts only as agent with respect to the portion of the route beyond its own line.

No carrier shall be liable for loss, damage or injury not occurring on its own route, or its portion of the through route, nor after said property has been delivered to the next carrier, except as such liability is or may be imposed by law, but nothing contained in this bill of lading shall be deemed to exempt the initial carrier from any such liability so imposed.

SEC. 3. No carrier is bound to transport said property by any particular truck, or in time for any particular market, or otherwise than with reasonable despatch, unless by specific agreement endorsed hereon Every carrier shall have the right in case of physical necessity to forward property by any route or means between the point of shipment and the point of destination, but if such diversion shall be made the liability shall remain as if the entire carriage were made by the receiving carrier.

In consideration of the value herein declared being used as a basis for determining the rate to be charged, the amount of any loss or damage for which any carrier is liable shall be computed on the basis of such declared value of the property as herein stated under this bill of lading, including freight charges if paid Except, in case the actual cash market value of the goods carried shall be less than the declared value, then settlement shall be made on the basis of actual cash market value on the date of shipment, but the shipper shall in no case be entitled, after a false declaration of value, to any refund of charges made.

Claims for loss, damage or delay must be made in writing to the originating or delivering carrier within thirty days after delivery of the property, or in case of failure to make delivery, then within thirty days after a reasonable time for the delivery has elapsed; and suits for loss, damage or delay shall be instituted only within two years and one day after delivery of the property, or in case of failure to make delivery, then within two years and one day after a reasonable time for delivery has elapsed.

SEC 4 No carrier will carry or be liable in any way for any documents, specie or for any articles of extraordinary value unless a special agreement to do so and a stipulated value of the articles are endorsed hereon.

SEC. 5 Property not removed by the party entitled to receive it within forty-eight hours (exclusive of legal holidays) after notice of its arrival has been duly sent or given, as regards goods consigned to the terminal of the carrier, may be held at such terminal subject to a reasonable charge for storage, and the liability of this company shall be that of warehousemen only; or if such goods are herein consigned for delivery to a specified address other than the terminal of this company, the liability as common carrier shall terminate upon tender for delivery at the sidewalk or receiving platform of the consignee, and if the goods are not accepted on such tender, they shall be returned at the expense of the owner to the terminal of this company and held there subject to a reasonable charge for storage, or at the option of this company removed to and stored in a public or licensed warehouse at the cost of the owner and there held at the owner's risk and without liability of the carrier and subject to a lien for all freight and other lawful charges, including a reasonable charge for storage

The carrier may make a reasonable charge for the detention for loading or unloading of any truck for a time in excess of thirty minutes exclusive of actual time consumed in such loading or unloading, and may add such charge to all other charges hereunder and shall hold such property subject to a lien therefor.

SEC. 6. Every party, whether principal or agent, shipping explosives or other dangerous goods without previous full written disclosure to the carrier of their nature and having the same expressly endrosed hereon, shall be liable for all loss or damage caused thereby and such goods may be warehoused at owner's risk and expense or destroyed without compensation.

SEC. 7. The owner, or consignee, shall pay the freight and all other lawful charges accruing on said property, and if required shall pay the same before delivery. If, upon inspection, it is ascertained that the articles shipped are not those described in this bill of lading, the transportation charges must be paid upon the articles actually shipped

If any C O. D. is not paid within thirty days after notice of non-delivery has been mailed to the shipper, the carrier may, at its option, return the property to the coosignor.

SEC. 8. Any alteration, addition, or erasure io this bill of lading which shall be made without an endorsement thereof hereon, signed by the agent of the carrier issuing this bill of lading, shall be without effect, and this bill of lading shall be enforcible according to its original tenor.

The reverse side of the bill of lading shown opposite. The conditions set forth are a necessary protection for the truck owner

Data on Transport of Goods by Trucks

To the Editor, COMMERCIAL VEHICLE:

We are very much interested in a proposed bond issue in the sum of $50,000,000 upon which an election will be held shortly within this State. We are further interested in the proposition of the feasibility of operating trucks on a large scale for the purpose of handling freight. Through your organization you have doubtless accumulated more or less information, which would evidence the successful operation of trucks for this purpose.

We wondered whether or not it would be agreeable with you to furnish us with such data in order that we might in turn use it in the promotion of good roads and the establishment of transportation facilities along these lines.—DON A. TOLBERT, President, TOLBERT CONSTRUCTION CO.

As THE COMMERCIAL VEHICLE is exclusively a motor truck paper and as we have gone into the subject of intercity and rural motor truck hauling problems very thoroughly, we believe that you will find much valuable information in the following articles which have been published in THE COMMERCIAL VEHICLE from time to time:

Employment of Trucks in Transfer and Storage Work Enables Peak Loads to Be Handled, May 1, 1919, pages 26 and 27. The Morrow Transfer & Storage Co., Atlanta, Ga., has increased its business and gives more efficient service through the use of trucks in addition to horse wagons in and around Atlanta.

Countrywide Investigation Shows Great Value of Motor Trucks to the American Farmer, May 1, 1919, pages 21 to 23. This article gives a survey of the difference in cost of hauling by truck and horse wagons in different parts of the country. On page 23 a table is published showing comparative costs of farm haulage by trucks and horse wagons.

Motor Trucks Enable New England Drayage Company to Triple in Three Years the Tonnage Handled, April 15, 1919, pages 30 and 31. This story tells how the Youldon, Smith & Hopkins company in Boston has been able to take on additional business not only in Boston but within a 30-mile radius of the city.

Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections, April 1, 1919, pages 16 to 18. The success of truck hauling in the State of Iowa is shown in this article by quoting figures of the livestock, etc., handled by this method and pointing out what saving has been effected.

Hauling Goods Overland Between Dallas and Fort Worth Proves Successful, March 15, 1919, pages 5 to 8. With the article on the operation of this company's trucks are given the rates which the company charges and the forms used in the delivery of the material.

Four Michigan Lines Use One Warehouse, March 1, 1919, pages 8 and 9. These four companies all operate out of Flint to cities within a 70-mile radius and utilize one warehouse in Flint.

Reo Company Operates Own Overland Haulage Line to Get Incoming Goods from Detroit, March 1, 1919, pages 21 to 23. The Reo company operated trucks over the road from Lansing to Detroit, 104 miles apart, to get its material promptly while the railroad congestion was at its height. On pages 22 and 23 are shown daily costs on THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Truck Sheets.

New York to Philadelphia Haulage Company Also Handles Farmers' Food Products, Dec. 15, 1918, pages 5 to 7. The company of Arrot & Faunce is the haulage company spoken of. It operates a large fleet of trucks between New York and Philadelphia on regular schedule and has its own return loads business department so that it is very seldom that its trucks run empty.

Motor Trucks Making Good Hauling Farm Products into Seattle, Portland and Tacoma, Sept. 15, 1918, pages 24 and 25. In this article the use of trucks on the farms in the Far West is brought out and the profits which their owners have reaped as a result are indicated.

How to Organize a Motor Truck Company for Overland Haulage, April 15, 1918, pages 5 to 7. A close study of this article will undoubtedly help you.

In the matter of determining rates, it is usual for companies doing public haulage business to approximately double the actual cost of truck operation in order to insure themselves of a profit of from 10 to 15 per cent after all charges for overhead, maintenance, such as office rent, office help, telephone, advertising, cost of getting business, etc., have been considered.

1920 Show Buildings Widely Separated

New York and Chicago Exhibitions of Trucks and Cars Two Weeks Apart

NEW YORK, Aug. 18—The 1920 truck and passenger car shows at New York will be held simultaneously, but in widely separated buildings. The same holds true at Chicago, but at a later date. This is a radical departure from the plans of last year. The National Automobile Chamber of Commerce will supervise the showings again after a lapse of 2 years. The exhibitions will be held under the following schedules:

The New York shows will be held from Jan. 3 to 10 and the commercial vehicles and accessories will be shown at the Eighth Coast Artillery Armory and passenger cars and accessories at the Grand Central Palace.

The Chicago dates are from Jan. 24 to 31. Commercial vehicles and accessories are to be seen at the International Amphitheater and passenger cars and accessories at the Coliseum and First Regiment Armory.

These dates and places, as well as the plans for the management of the show and for the showing itself, constitute a wide variation from those of last year. Then, both shows were held under the direction of the dealers' associations of the two cities and the exhibition of the trucks came the week after that of the passenger cars, although in the same buildings. This winter, the two shows will be under the management of the national association and the passenger car and truck divisions will be separated only as regards place and not time.

This was decided upon so that visiting representatives might kill two birds with one stone, not causing them to remain in the city from one week to another to view both showings. As many did not stay over the week-end last year, thus missing the truck show, it was thought this plan would make the showing more national in scope, with a much increased attendance for both divisions.

The truck show in New York, however, is far up town, the Eighth Coast Artillery Armory being located at 193rd Street and Jerome Avenue, Bronx Borough. It is 30 minutes by subway from the Grand Central station. The show officials state that this armory is almost the only place available for those dates. The building is claimed to be the largest of its kind in the world without interior posts. The main hall is 300 by 600 ft., with a lower room nearly half as large, in addition to large company rooms, a gymnasium and spacious mess hall that, by the way, probably will be used as a restaurant.

The Chicago truck division will go to the stockyards district and take over the building used for the annual stock and horse shows and similar events. Plans call for the utilization of about 120,000 sq. ft. of space. It may be reached by elevated, being, probably, 20 to 35 minutes from the center of the city.

NEW TRUCK SCALE

PHILADELPHIA, PA., Aug. 19—Pennsylvania is about to introduce something essentially new for a Highway Department relative to motor truck regulation. The State Highway Dept. is arranging to try out a machine designed to weigh motor trucks and their loads, with a view to seeing to it that the new State law is kept.

Wherever possible, every principal State highway, known as an arterial road, is being constructed of reinforced concrete. Heavy motor trucks are supposed to injure these roads by causing a certain amount of vibration in the body of the cement, tending to disintegrate it. To prevent such contingency, Commissioner Sadler had the new motor car law fix the maximum weight of trucks, if intended for use on State highways, at a maximum weight of 26,000 pounds. With weighing machines of the proposed type there will be no guessing as to weight.

If the machine test proves satisfactory, no less than forty of the weighing machines will be manufactured and distributed at various points in the State. They will be of peculiar construction, portable and easy of operation, but beyond this information the department will maintain reserve until after the test.

OHIO LIMITS TRUCK WEIGHTS

COLUMBUS, OHIO, Aug. 26—During are to be seen at the International Am- General Assembly, Representative Cable introduced a bill which would prohibit the use of trucks weighing more than 10 tons when loaded.

It also would legislate off the roads any trucks which are wider than 7 feet when loaded or unloaded. The bill provides that before any arrests may be made for violating the terms of the act, the truck with its load must be taken to the nearest scales and be weighed. Proposed punishment consists of a fine of not less than $25 or more than $50 for the first offense and not less than $50 or more than $100 or imprisonment for not more than 6 months or both for a second offense.

No report has been made on the bill and no amendments have been offered, but the bill is being held until December, when the General Assembly will meet again.

THREE COMPANIES MERGE

JACKSON, MICH., Aug. 28—A $5,000,000 truck and passenger car company has been formed in Jackson, Mich., through the merger of the Jackson Motor & Mfg. Co., Jackson Automobile Co., and the Four-Wheel Drive Corp. of Chicago and Port Jefferson, L. I. The new corporation will be known as the Jackson Motors Corp. It will manufacture both trucks and automobiles, proposing to produce during the next twelve months 1200 four-wheel drive trucks of 3½-ton capacity and 4000 automobiles.

Farmer Shown Truck Work on Big Tour

Other Tests Made Along Route To Prove Worth of Motor Truck Transportation

CHICAGO, Aug. 23—Motor trucks for use in dairy farm work are proving a source of great interest to farmers along the line of march of the national motor truck development caravan which left Chicago Aug. 4 on a 3000-mile trip through Illinois, Iowa, North and South Dakota, Minnesota and Wisconsin.

Elgin, Belvidere and Rockford, Ill., were visited in the order named after the trucks left Chicago, and the interest evinced in the demonstration and lectures have proved highly gratifying to the officials in charge. Rockford particularly showed great enthusiasm and after the demonstration by the trucks, several of the local truckmen requested a special demonstration in Rockford after the completion of the tour in order to further educate citizens on the practicability of motor trucks.

The first demonstration of farm work occurred at Freeport, Ill. The Selden, Atterbury, Republic and Service trucks were driven out into the fields and put to work hauling sheaf oats. The trucks completed the performance without a hitch, although the roads were extremely soft and the fields soggy, due to heavy rains.

The next stop, according to schedule, was Galena, but the residents of Hazel Green, Wis., put in a strong petition that the route be changed and the trucks sent to their town in order to participate in a homecoming reception for the soldiers and sailors. Residents of Galena consented to the change on condition that they be given time to arrive at Hazel Green to see the homecoming demonstration.

From Galena the trucks traversed a hilly stretch leading to Dubuque, Ia. Opportunities for traction tests with and without chains were presented by the heavy roads, but after so equipping one truck, it was found that the existing conditions did not impair the progress of the caravan and the idea was abandoned.

In Dubuque several discussions arose over the advisability of pneumatic tires for trucks instead of solid tires. A local hauling company which was using solid tires was consulted and a comparison of gasoline-mileage figures showed a decided margin in favor of the air-filled truck tires.

After leaving Dubuque the trucks moved into the middle of Iowa's farm district, where further demonstrations were given.

TESTING GERMAN TRUCKS

WASHINGTON, Aug. 23—The Motor Transport Corps has begun its work of examining and testing the forty-seven German trucks which have been shipped to this country.

N. Y. Trucks Increase 13,916 in ½ Year

83,076 Registered—Number of Buses Increased 2,197—Trailers Decrease

ALBANY, N. Y., Aug. 23—Truck registrations in New York State during the first 6 months of this year, ending Aug. 1, show an increase of 13,916 over the corresponding period in 1918. Truck registrations up to Aug. 1, 1919, totalled 83,076, as compared with 69,160 for the 1918 period. The last 6 months, as compared with all of last year, show an increase of 7767 trucks.

The number of buses in the 6 months ending Aug. 1, 1919, show an increase of 2197, there being 19,056 of that type of vehicle. Trailer registrations decreased 254, the registration figures showing 1633 for the 6 months ending Aug. 1, 1919, as compared with 1887 for the corresponding period in 1918.

CALIFORNIA ROAD BONDS

LOS ANGELES, CAL., Aug. 20—California has voted in the ratio of 7 to 1 in favor of a good roads bond issue of $40,000,000. This is approximately $80,000,000 worth of state bonds that have been issued for road extension in this State within the last eight years. The appropriation will include funds for completing gaps on several highways.

California is the second State in area in the United States and has a population of approximately 3,000,000. For a population as small as this to assume the responsibilities of $80,000,000 in bonds shows how anxious its citizens are for the State to excel in permanent highways. The highway system of the State calls for the two main arteries north and south from Oregon to Mexico with numerous crossroads. When ultimately completed, the State's roads will resemble an immense ladder. All of the larger cities will be on or in close proximity to one of the main highways or intersections.

LOUISVILLE BIG TRUCKING CENTER

LOUISVILLE, KY., Aug. 23—Forty-seven different truck routes lead out of Louisville. Eighty-six different truck-transportation companies are operating trucks over these forty-seven routes.

These forty-seven truck routes connect Louisville with all the smaller cities and towns of central Kentucky and southern Indiana. Most of the truck lines operate out of the smaller cities into Louisville. The big business is the hauling of stock to the stockyards for the farmers in these various districts. Almost any morning at the stockyards one can see a long line of these trucks waiting to unload their stock and start back home.

Nor are they going back to their home town with an empty truck when they can haul a load out of Louisville. Towns in their districts must be supplied and the trucks might as well do the hauling. Shippers in Louisville would be glad of the opportunity to ship by truck if they knew how to get in touch with these truck owners. The trucks have no central point in Louisville where they can receive freight or receive telephone calls. They make their headquarters in different places and pick up whatever return loads they can at random.

IMPACT TESTS

WASHINGTON, D. C., Aug. 24—Preliminary road impact tests made by the Bureau of Public Roads indicate that the impact pressure exerted by a motor truck in motion is about six times that of a truck at rest. The tests were conducted with a Class B government truck loaded up to 5 tons, running up to 15 m.p.h. and allowed to fall from varying heights on the impact measuring apparatus. These tests will be continued with trucks ranging from the lightest weight to the heaviest until complete data are obtained.

The question of the relative impact exerted by trucks with solid giant pneumatic tires will also be investigated. Definite arrangements have been made to secure a Packard 3-ton truck with requisite tire equipment for these tests and a loan of other units would be welcomed by government officials.

By measuring the amount of impact actually delivered by the motor trucks to roads and by proceeding further in testing the destruction of actual road slabs subjected to impact, government officials hope to obtain very definite information which will permit them to design a high type pavement or high types that will resist definite traffic conditions.

$4,000,000 FOR OHIO ROADS

COLUMBUS, OHIO, Aug. 23—The new road bill in Ohio which went into effect recently provides for a levy of 5/10 of a mill on the entire state duplicate instead of 3/10 of a mill as in the previous law. This will mean about $4,000,000 for road improvements next year. The law provides that the various counties must put up 50 per cent and in many cases more. About $12,000,000 comes from that source. Including the federal aid funds it is estimated that $20,000,000 will be available.

PROFIT SHARING SYSTEMS

TROY, OHIO, Aug. 19—The Troy Wagon Works Co. has published a booklet on "Profit Sharing and Bonus Systems as applied to trucks, trailers, taxi and bus lines", composed of authoritative articles on the subject by executives of companies where such systems are in effect.

COL. GREENE NOW GENERAL MGR.

NEW YORK, Aug. 26—Colonel G. A. Greene, formerly chief engineer and superintendent of the Fifth Avenue Coach Co., has become general manager.

Better Fuel Wanted From Producers

Joint Meeting Held to Discuss Problem and to Attain Closer Union

NEW YORK, Aug. 23—Fleet owners will be interested to learn that the automotive industry, including the motor truck division of it, and the oil producers are co-operating to effect a solution of the present day gasoline problems from both sides of the fence. The truck industry on its part is telling the producers the kind of engines the motor trucks in the next few years will use and how many will be built. On the other hand, the producers will be able to gauge their production accordingly and will tell the truck engineers the grade of gasoline they will be able to supply in the volume desired.

The first meeting of the two industries took place August 21, when representatives of the National Automobile Chamber of Commerce, the Society of Automotive Engineers and the Motor and Accessory Manufacturers' Assn. met those of the American Petroleum Institution to discuss the fuel problem.

MIRRORS ON N. Y. TRUCKS

NEW YORK, Aug. 26—Every motor truck, bus and all commercial vehicles of 1-ton capacity or more, operating upon the public highways outside of cities of the first and second class, shall be equipped with a mirror or other reflecting device so adjusted or adjustable that the operator of such truck shall have a clear and full view of the road and condition of traffic behind such truck. This act will take effect September 1, 1919.

From the wording of this law, trucks operated in cities of the first and second class, or in other words, cities with a population of 50,000 or over, at the time of the last census, will not have to be equipped with mirrors, unless they are to be operated outside of the city.

ALABAMA TO VOTE ROAD BONDS

MONTGOMERY, ALA., Aug. 16—The Alabama legislature at its next session will submit to the electorate of the state the question of issuing $25,000,000 bonds for the improvement of existing roads and the construction of new model highways in various parts of the state. Instead of leaving the road problem up to the various counties, as has been done with extremely unsatisfactory results, the state will vote on the bonds, and the work resulting will be distributed in all parts of Alabama.

One of the principal roads to be constructed will be a wide concrete or brick highway from the Birmingham steel district to connect with the barge line on the Warrior river. This road will be for heavy duty especially and will be built to accommodate truck trains to deliver pig iron and steel to the barges for shipment to Mobile and New Orleans.

N. Y. to Help Farmer Market Produce

Rural Truck Routes Needed to Expedite Short Haul Shipments

ALBANY, N. Y., Aug. 26—The establishment of motor truck express lines through the rural sections of the state where farmers are having the most difficulty in getting their perishable produce quickly to markets is to be sponsored by a commission appointed August 23 by Governor Smith. Former Representative Peter G. Ten Eyck of Albany is chairman.

The Governor's Reconstruction Commission found that in many cases farmers were unable to get their goods to New York markets as quickly as Florida shippers who had the benefit of direct express service. It was stated that the railroads have little interest in local freight business, and that farmers with small shipments for short hauls found their goods delayed. The commission estimated that 50 per cent of the perishable produce grown in the State does not get to market.

The committee will work through farmers' organizations and municipal officials to encourage the opening of truck routes. No state appropriation will be asked for the present. With Mr. Ten Eyck on the committee are Frederick S. Green, State Commissioner of Highways; Prof. Boyle of the State College of Agriculture; William E. Dana, chairman of the Council of Farms and Markets, and F. W. Fenn of the National Automobile Chamber of Commerce, all serving without salary.

RURAL EXPRESS EXHIBIT FOR N. Y.

NEW YORK, Aug. 25—The rural motor express idea is to be given publicity by the state of New York at the state fair at Syracuse the week of September 8. A rural motor express exhibit will be included in the display of the Bureau of Farms and Markets.

TRUCK TRAIN IN NEVADA

NEW YORK, Aug. 27—Fighting the sands and dreariness of the Great Salt Lake Desert, the transcontinental train of the Army's Motor Transport Corps negotiated last week the 250 miles between Salt Lake City, Utah, and Ely, Nev. The stretch then negotiated was the most dreaded, perhaps, of the cross-country route, according to information reaching here, and was made only after passing tremendous difficulties.

As described by men on the trip, it was made through clouds of low-hanging, penetrating dust and extreme heat, over a deplorable desert trail, with alkali dust and fine sand up to two feet deep on the level, but with numerous hidden holes in a country that has had no rain for more than four months. Drivers were able to find no material, except sage brush, with which to make wheel paths and the personnel was kept busy jacking up and digging out the vehicles that sank into the sand, at places to the understructure, leaving the wheels free.

The next objective is Eureka, Nev., and it is expected that good roads will prevail to the Coast.

TRUCK TRIP CUTS COST OF HAULAGE

DETROIT, Aug. 23—As an instance of the possibility of lowering living costs through truck haulage is the fact that huckleberries were brought from the western part of Michigan last week, a distance of 75 miles, in two trucks, at a saving of $1 per bushel. The work was done by the Signal Motor Truck Co. as a demonstration.

UNLIMITED GUARANTEE ON GOODYEARS

AKRON, OHIO, Aug. 25—The Goodyear Tire & Rubber Co. is now placing an unlimited guarantee on both solid and pneumatic tires made by that company, with all tires guarantee perfect during their entire life without limitation as to mileage or length of service. It was originally the Goodyear custom to fix a certain definite mileage guarantee, but as tire manufacture has become more efficient, the company now believes it should become a policy to stand behind its product during its entire life.

Coming Events

1919

Aug. 23 to Oct 6	Toronto, Can., Shows of Cars, Trucks, Tractors, Airplanes and Motor Boats, in conjunction with Canadian National Exhibition.
Aug. 31 to Sept. 5	Lincoln, Neb., State Fair.
Sept. 1	Hartford, Conn., State Fair, Charter Oak Park.
Sept. 1-5	Wheeling, W. Va., State Fair.
Sept. 1-6	Spokane, Wash., State Fair.
Sept. 3	New York City, Meeting of Automotive Service Assn. of New York, at 8 o'clock.
Sept. 8-13	Topeka, Kan., State Fair, Motor Hall and Machinery Field.
Sept. 8-13	Huron, S. D., State Fair.
Sept. 8-13	Helena, Mont., State Fair.
Sept. 8-13	Syracuse, N. Y., State Fair.
Sept. 9-13	Douglas, Wyo., State Fair.
Sept. 12-20	Peoria, Ill., State Fair.
Sept. 13-20	Hutchinson, Kan., State Fair.
Sept. 14-20	Sioux City, Ia., State Fair.
Sept. 15-20	Yakima, Wash., State Fair.
Sept. 15-20	Springfield, Mass., State Fair.
Sept. 16-19	Billings, Mont., State Fair.
Sept. 20-27	Memphis, Tenn., State Fair.
Sept. 20-27	Oklahoma City, Okla., State Fair.
Sept. 22-24	Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.
Sept. 22-27	Pueblo, Colo., State Fair.
Sept. 22-27	Salem, Ore., State Fair.
Sept. 24 to Oct. 3	New York City, N. Y., Electrical Exposition, Grand Central Palace.
Sept 24 to Oct. 4	Kansas City, Kan, State Fair.
Sept. 29 to Oct. 4	Muskogee, Okla., State Fair.
Oct. 6-19	Dallas, Tex., State Fair.
Oct. 20-25	Raleigh, N. C., State Fair.
Oct. 22-27	Shreveport, La., State Fair.

1920

Jan. 3-10	New York City, Motor Truck Show, 8th Coast Artillery Regiment Armory, 193rd St. and Jerome Avenue.
Jan. 24-31	Chicago, Ill., Motor Truck Show, Drexel Pavilion
Feb. 9-14	Louisville, Ky., American Good Roads Congress.

Truck Trailers Show Large Increase

Figures from Four States Show Growth of 50 to 170 Per Cent

NEW YORK, Aug. 23—That the use of trailers is growing fast is shown by registration figures in the few states where there is separate registration of trucks, trailers and passenger cars.

In New York State, the number of trailers increased 125 per cent, or more than doubled, during the year ended Jan. 31, 1919. In the registration year ended Jan. 31, 1918, there were 985 trailers, and 1 year later there were 2218 trailers.

In Pennsylvania, trailer registrations increased 164 per cent during 1916; 72 per cent in 1917, and 50 per cent in 1918. Trailers increased 82 per cent in New Jersey last year.

There was an increase of 170 per cent in trailers in 1 year in California from 353 on June 30, 1918, to 956 on June 30, this year.

The following table shows the trailer registrations and the percentage of increase in the four states:

Year	Number Registered	Increase, Per Cent
NEW YORK STATE		
1917	985	...
1918	2,218	125
PENNSYLVANIA		
1915	188	...
1916	496	164
1917	854	72
1918	1,284	50
NEW JERSEY		
1916	315	...
1917	321	2
1918	585	82
CALIFORNIA		
1918	353	...
1919	956	170

PANHARD NOW APEX

GRAND HAVEN, MICH., Aug. 15—The Panhard Motors Co. has changed its name to the Hamilton Motors Co. and its product will be known as Apex trucks. The change was made at the request of Panhard-Lavassor Co., Paris, France. The 2½-ton model, formerly $2,350, has been raised to $2,475.

JERSEY SAFETY LAW

TRENTON, N. J., Aug. 23—Chapter 168 of the New Jersey laws which became effective on July 4, 1919, will aid materially in reducing the chances of stealing trucks. According to this law it is an offense to sell or purchase a motor truck unless it has the manufacturer's number on it and this number must not be obliterated, erased or mutilated. In all sales made either direct by the manufacturer or through an agency the purchaser shall receive the manufacturer's bill of sale containing the manufacturer's number on the engine of the vehicle sold. In all other sales the original bill of sale must be assigned by the seller to the purchaser. A fine not to exceed $2,000 or imprisonment not to exceed 2 years or both are the punishments for violation of this act.

The Commercial Vehicle

Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher.
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A. B. Swetland, General Manager
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The Commercial Vehicle.
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"NORMA"
PRECISION
BALL BEARINGS
(PATENTED)

Conservation of resources, thrift in matters of saving and spending are still of prime importance to the nation's welfare. To spend only where necessary and, above all, to spend wisely—these are still obligations of good citizenship. Be sure that what you spend buys the utmost in service.

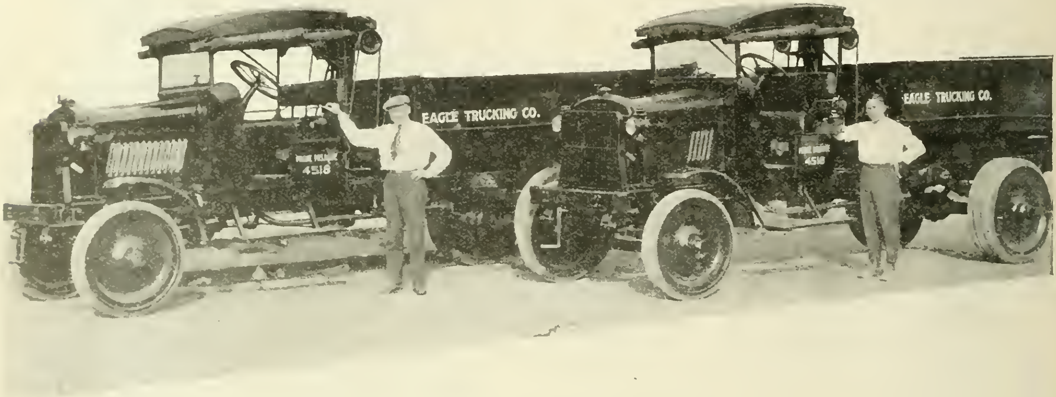
Cars, trucks, tractors, power boats are necessities—their purchase, when wisely made, is not an extravagance. And it is a fact which a little investigation will emphasize that the automotive units which today best exemplify the ideal of thrift are those carrying "NORMA" equipped magnetos and lighting generators.

Be SURE—See That Your Electrical Apparatus Is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA
1790 BROADWAY NEW YORK

Ball, Roller, Thrust and Combination Bearings

DENBY
MOTOR TRUCKS



THE big Denby 5-tonners are very popular with contractors because they can handle work unaided that is beyond the ability of the ordinary truck.

Carrying capacity loads, they easily pull out of excavations under their own power when other trucks must be helped.

This ability to meet the hardest work successfully is typical of the Denby line. Each model—and there is one for every trucking need—is built to meet any service that a truck of its capacity may have to.

Back of this greater performance ability is a fuel economy that is unusually low. The result is a hauling cost that increases profits.

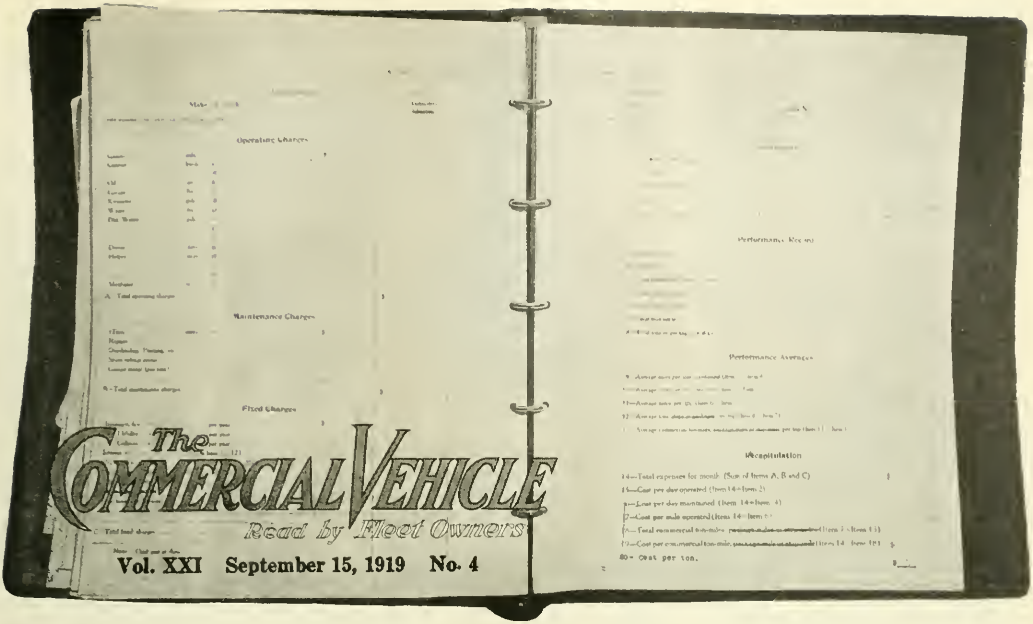
DEALERS!

There are big opportunites in merchandising Denby trucks; maybe there's some open territory in your section. A letter to the factory will post you.

(24)

DENBY MOTOR TRUCK COMPANY
DETROIT
U. S. A.

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI September 15, 1919 No. 4


Operating Charges
Maintenance Charges
Fixed Charges
Performance Record
Performance Averages
Recapitulation
20– Cost per ton.

How to Keep
MOTOR TRUCK COSTS

WHAT KNOWING COSTS HAS MEANT

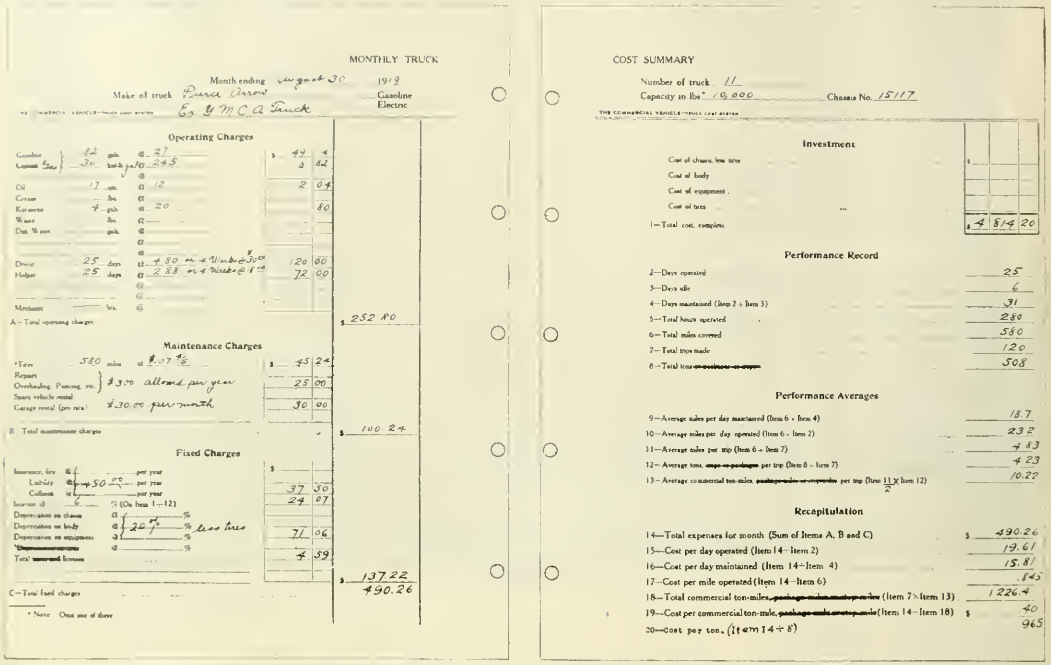
ENABLED company to discover it could do its work by its own vehicles at half the cost of hired trucks. It permitted the company to have check on the comparative efficiency of different vehicles in its fleet. It resulted in the increase of the fleet from two of its own trucks in 1916 to eleven in 1919

KEEPING an accurate record of the cost of operation of its own trucks has enabled Rockwood & Co., cocoa manufacturers, Brooklyn, N. Y., to discover that it can do its own hauling at half the cost of hired trucks. This discovery has meant thousands of dollars saved every year and has been responsible for the increase of the Rockwood fleet from two vehicles in 1916 to eleven in 1919.

Besides the saving which the use of an accurate cost system has made possible, the cost figures so obtained have also served to indicate the degree of efficiency with which the Rockwood trucks are operated in comparison with other trucks of the same general character and employed in the same kind of work.

The Rockwood company manufactures cocoa, bar chocolate and other similar products. Its transportation problems consist of hauling the whole cocoa beans from the ship wharves in New York harbor to its plant and of then hauling the various manufactured products to other wharves for shipment abroad or to coast points and to railroad terminals for shipments inland. On occasion, it also has to haul boxes and barrels and paper wrappers and containers from the nearby plants at which these products are manufactured.

Way back before 1916, the company used hired vehicles exclusively, this method relieving it of all the worries incident to the organization and maintenance of an efficient delivery equipment. Not entirely satisfied with the service which these hired vehicles sometimes rendered, it decided to purchase one or two trucks of its own. These trucks, under the direct supervision of its delivery superintendent, were always available for the most important work to be done. The exact



MONTHLY TRUCK

Month ending August 30 1919

Make of truck Pierce Arrow Gasoline Electric

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM Ex Y M C A Truck

Operating Charges

Gasoline } 82 gals. @ .27 $ 49 4
Gas } 30 gals. @ .245 8 82
Oil 17 gals. @ .12 2 04
Grease lbs. @
Kerosene 4 gals. @ .20 80
Waste lbs. @
Dist. Water gals. @
Driver 25 days @ 4.80 or 4 Weeks @ 30.00 120 00
Helper 25 days @ 2.88 or 4 Weeks @ 18.00 72 00
Mechanic hrs. @
A – Total operating charges $ 252 80

Maintenance Charges

*Tires 580 miles at $.07 4/5 $ 45 24
Repairs
Overhauling, Painting, etc. } $300 allowed per year 25 00
Spare vehicle rental
Garage rental (pro rata) $30.00 per month 30 00
B Total maintenance charges $ 100.24

Fixed Charges

Insurance, fire @ } $450.00 per year
Liability @ per year
Collision @ per year 37 50
Interest @ 6 % (On Item 1÷12) 24 07
Depreciation on chassis @ } 20 % less tires
Depreciation on body @ %
Depreciation on equipment @ % 71 06
~~Depreciation on~~ @ %
Total ~~taxes and~~ licenses 4 59
C—Total fixed charges $ 137.22
490.26

* Note Omit one of these

COST SUMMARY

Number of truck 11

Capacity in lbs* 10,000 Chassis No. 15117

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires $
Cost of body
Cost of equipment
Cost of tires
1—Total cost, complete $ 4 814 20

Performance Record

2—Days operated 25
3—Days idle 6
4—Days maintained (Item 2 + Item 3) 31
5—Total hours operated 280
6—Total miles covered 580
7—Total trips made 120
8—Total tons ~~or packages or stops~~ 508

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4) 18.7
10—Average miles per day operated (Item 6 ÷ Item 2) 23.2
11—Average miles per trip (Item 6 ÷ Item 7) 4.83
12—Average tons, ~~stops or packages~~ per trip (Item 8 ÷ Item 7) 4.23
13—Average commercial ton-miles, ~~package-miles or stop-miles~~ per trip (Item $\frac{11}{2}$ X Item 12) 10.22

Recapitulation

14—Total expenses for month (Sum of Items A, B and C) $ 490.26
15—Cost per day operated (Item 14÷Item 2) 19.61
16—Cost per day maintained (Item 14÷Item 4) 15.81
17—Cost per mile operated (Item 14÷Item 6) .845
18—Total commercial ton-miles, ~~package-miles or stop-miles~~ (Item 7×Item 13) 1226.4
19—Cost per commercial ton-mile, ~~package-mile or stop-mile~~ (Item 14÷Item 18) $ .40
20—Cost per ton, (Item 14÷8) 965

A typical monthly cost sheet for a 5-ton Pierce-Arrow truck as set down on The Commercial Vehicle *system. Note the cost per commercial ton-mile of 40 cents and the cost per ton moved of 96.5 cents*

manner in which these trucks are operated and maintained will be told in another issue of The Commercial Vehicle, this article dealing exclusively with the manner in which the Rockwood company now keeps an accurate cost of its vehicle operation and what these cost figures have meant to the company in dollars and cents saved.

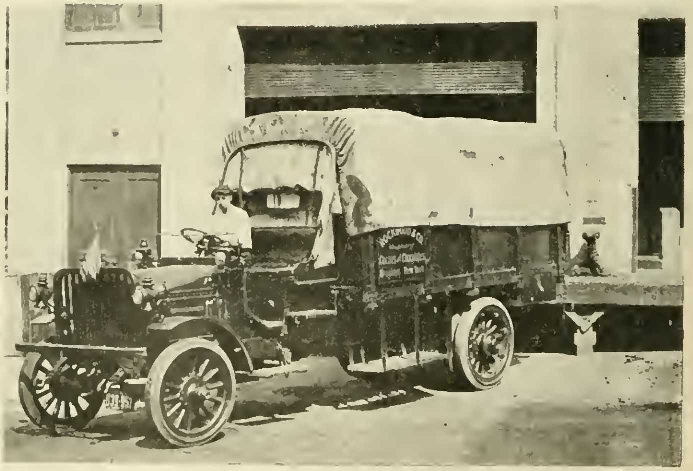
No Costs Before 1919

While the two trucks purchased in 1916 and three others bought in 1918 rendered satisfactory service, it was not until June, 1919, that the Rockwood company made any determined effort to ascertain just what its trucks were costing to operate per mile or to deliver a ton. At that time it introduced The Commercial Vehicle Standard Cost Keeping System for Motor Trucks as published by this magazine for use by all fleet owners, no matter in what business they are engaged.

The use of this system provided the Rockwood company with the first real and accurate cost figures which it had been able to procure. It replaced guesswork by certainty. By the use of this system, the Rockwood company was surprised to learn that the average cost per ton of goods moved into and out of the plant was $1.20 a ton, and that the cost of doing the same work by means of hired trucks was nearly $2, or almost twice as much.

Just how The Commercial Vehicle Standard Cost Keeping System for Motor Trucks is used by the Rockwood company and the cost figures obtained are told by word and picture in this short three page article.

In the first place, the compilation of the cost figures was intrusted to one man, L. C. Wright, who is held responsible for the preparation of the cost data and who must make monthly and sometimes weekly reports as to just what the company's transportation is



The 5-ton Pierce-Arrow bought from the Y. M. C. A. and the monthly cost of operation of which is given in the sheets reproduced at the top of this page costing by its own vehicles and by others hired from outside concerns upon emergencies.

As previously told, THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks consists of but two forms. These are the *Drivers' Route Card and a Monthly Summary Sheet.*

Time Clock an Innovation

One of the innovations put into use by the Rockwood company was a time clock which each driver uses to accurately stamp the time of the beginning and end of each trip. This time clock is made by the International Time Recording Co., New York City, and is shown in actual operation in the illustration at the bottom of page 123. The clock is used for no other purpose than for stamping the drivers' daily route cards and its use insures a degree of accuracy which cannot be obtained by any other method.

The procedure taken by each truck driver is as follows:

Upon arriving at the truck garage in the morning, he is given a drivers' route card for that day's work. He drives his truck a few hundred feet up the street to the Rockwood loading platform. Directly in back of the loading platform is the dispatcher's office in which the time clock is hung. Each driver upon arriving at the platform goes into the dispatcher's office and places his card edgewise in a slot at the bottom of the clock. A guide is provided as shown in the illustration at the bottom of page 123 for the purpose of lining up the time as stamped by the clock with the blank space on the drivers' route card to correspond with the space in which the driver will write down the information on his first trip. The small figures preceded by the letter W along both edges of the drivers' route card reproduced on page 123 indicate the times of starting and stopping of each trip as set down on one horizontal line on the card. The letter W indicates that the day of the week is Wednesday. Similarly, the letters M, T, etc., are printed for cards used on Mondays and Tuesdays.

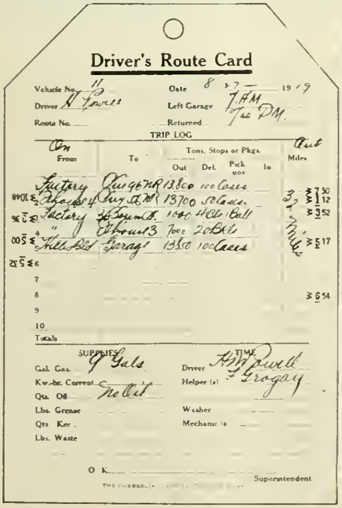
L. C. Wright, who keeps the operating cost of the Rockwood trucks on THE COMMERCIAL VEHICLE *Standard Cost Keeping System for Motor Trucks*

Special Scale Provided

After the truck is loaded it is driven further down the street to a scale where the net weight of the load is called out to the driver by the weighmaster. The driver enters this on the drivers' route card as shown, and also indicates whether the load is made up of barrels or cases. This operation is gone through for each trip. Each driver turns in his card at night, hanging it on a special hook in the dispatcher's office. The amount of gasoline and oil taken from the garage in the morning or during the day is also put down on the card. In case any repairs are necessary to the truck, these are indicated on the back of the card.

The cards of all the drivers are collected every morning by Mr. Wright who compiles the data shown into figures on the monthly summary sheet as reproduced at the top of page 122. The weights as indicated on the drivers' daily cards also serve as a check against the warehouse records.

A close study of the typical monthly cost sheet covering a 5-ton Pierce-Arrow truck as shown at the top of page 122 is interesting in that it gives a cost per commercial ton-mile of 40 cents under the conditions of load and length of haul as indicated in Items 9 to 13 under the heading of Performance Averages. As explained previously in THE COMMERCIAL VEHICLE, the commercial ton-mile is obtained by multiplying the total tonnage carried on any trip by the mileage of that trip divided by 2. The cost per ton moved under the conditions indicated is 96.5 cents as compared with a cost of about $2 with trucks hired at the rate of $28 a day.



Driver's Route Card

Vehicle No. 11
Driver [illegible]
Route No.
Date 8 27 1919
Left Garage 7 AM
Returned 7[illegible] PM.

TRIP LOG

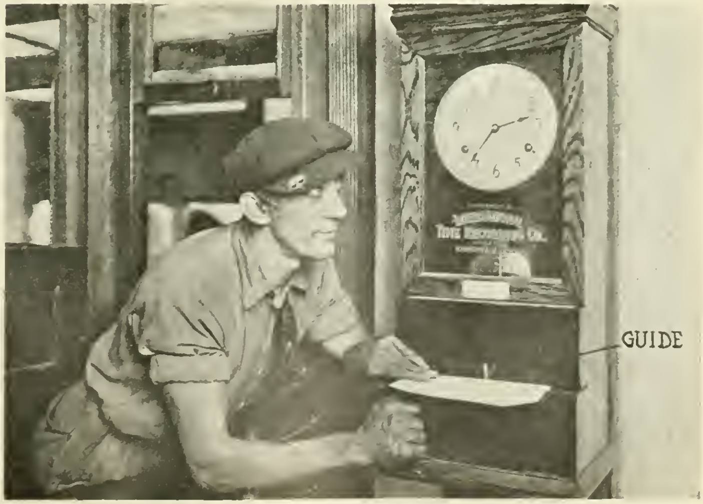
	From	To	Out	Del.	Pick up	In	Miles	
	On		Tons, Stops or Pkgs.				Out	
1	Factory	[illegible]	13800	100 Cases			37 Miles	W 7 30
2	[illegible]	[illegible]	13700	50 Cases				W 1 12
3	Factory	[illegible]	1000	4 Bbls 1 Ball				W 3 52
4	"	[illegible]3	7000	20 Bbls				
5	[illegible]	Garage	13350	100 Cases				W 5 17
6								
7								
8								W 6 54
9								
10								
Totals								

SUPPLIES
Gal. Gas 9 Gals
Kw.-hr. Current
Qts. Oil No Oil
Lbs. Grease
Qts. Ker.
Lbs. Waste

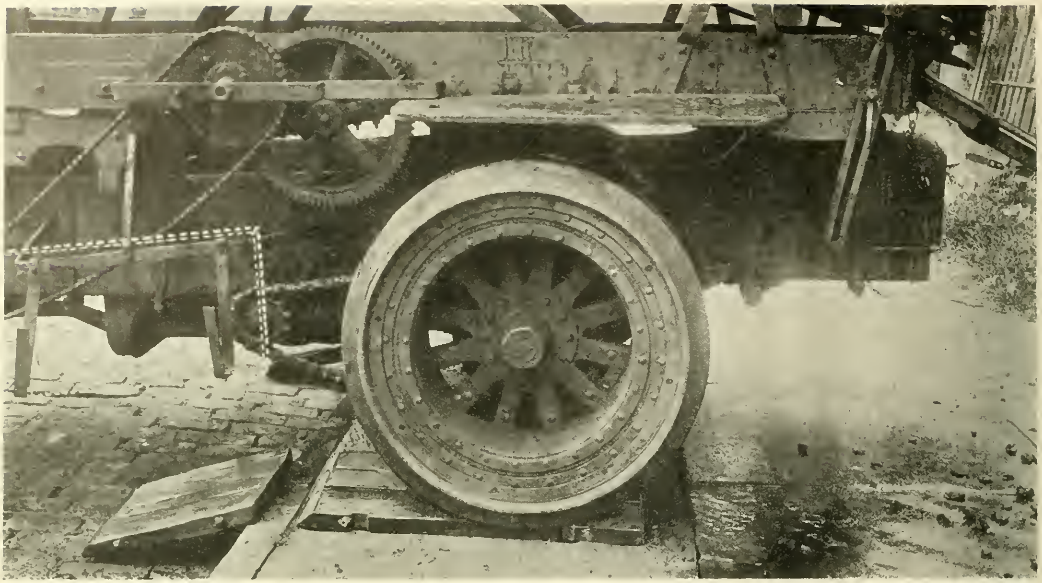
TIME
Driver [illegible]
Helper (s) [illegible]
Washer
Mechanic (s)

O. K. ____ Superintendent

Reproduction of a driver's route card as filled out to cover a day's work



The time clock which prints the times on the card shown at the left. The guide serves to line up the time with the trip data on the card



Any Fleet Owner Whose Trucks Must Back Up Over Sidewalks to Make Deliveries Can Use the Home-made Devices Described on These Pages

SKIDS TO SAVE TIRES and Prevent Excessive Chassis Strains

This Story Is of Particular Interest to Contractors and Coal Retailers Using Heavy Motor Trucks

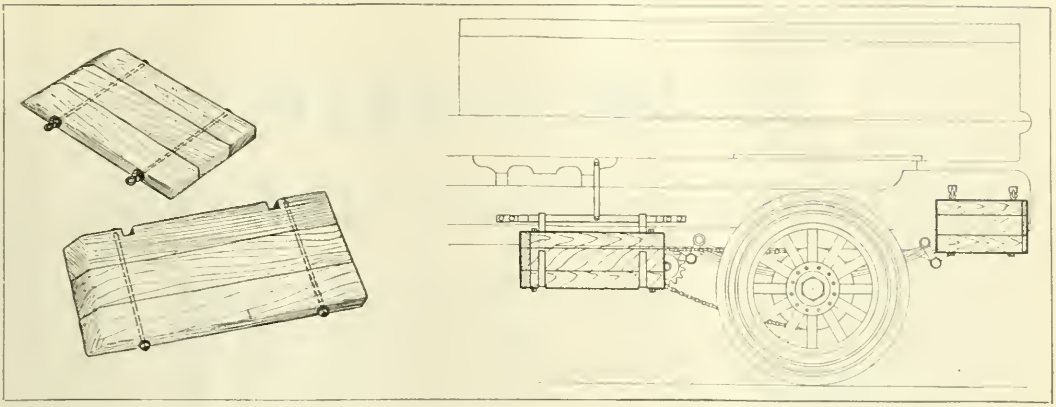
How to Make Skids and How Much They Cost Are Told in This Short Article

ALL truck owners whose vehicles have to back up over the sidewalk to make deliveries should be interested in the home-made skids described and illustrated on these two pages. These skids are designed to prevent undue strain upon the truck chassis; eliminate damage to the rear tires and protect the sidewalk from the heavy concentrated weight over the rear truck wheels.

When the weight of the truck plus that portion of the load concentrated over the rear wheels when trucks are backed over a curb are considered, it is manifest that the strain on the axle will be tremendous and that the wear and tear on the tires and wheels will cut short their usefulness. Take, for instance, one of the 6-ton Saurer trucks used by Olin J. Stephens, Inc., a large coal dealer in New York City. Its weight when empty is 11,200 pounds. When loaded to capacity, the total weight is brought up to 23,200 pounds. The strain put on the rear axle, springs, etc., of that truck with its 23,200-pound weight is immeasurable when the driver tries to surmount a 6-inch curb. The speed of the truck in backing up on a curb must also be taken into consideration in determining the impact. In a majority of cases, the two rear wheels do not hit the curb at the same time. In that case, the whole force of the impact is centered first in one wheel and then in the other.

Realizing the injury that results from this practice, Olin J. Stephens, Inc., has equipped its trucks with four wooden skids, two of them for backing up onto the curb and two for distributing the weight of the truck when it is standing on the sidewalk.

The two skids used at the curb bridge the gap between the level of the curb and the street and enable the truck to back up easily onto the sidewalk. These skids, which are made of oak, are each 20 inches wide, 24 inches long and 3 inches thick, and are made



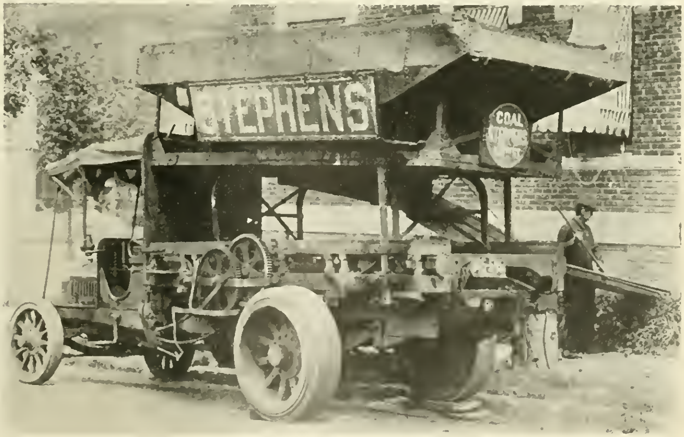
At the left are shown the two skids, that at the top the one used to bridge the gap between the street and the top of the curb, and, below it, the one placed under each rear truck wheel to distribute the load over a larger area of the sidewalk to prevent cracking it. At the right is shown the method by which the two skids are carried on each side of the truck frame

up of three equal widths held together by two bolts running the width of the skid. The skid is beveled at the end which is placed on the street so that the truck may ascend the small incline at a minimum of effort. The cost of a pair of these skids is $5, including the wood, bolts, etc. The skids are hung on each side of the truck frame at the rear. This is accomplished by means of two hooks and eyes, the former being bolted into the side frame member and the eyes being screwed on one end of the bolts through the skids.

The two skids that are used for reinforcing the sidewalk, by distributing the weight of the rear end of the truck, are larger models of the two skids used at the curb. They are 2 feet wide, 3 feet long and 3 inches thick. As in the case of the smaller skids, these are made up of three equal widths of oak, bolted together. As the skids each have a bearing area of 3 x 2 feet or 6 square feet the weight of the truck and the load is distributed over an area of 12 square feet, 6 on each skid, instead of at two points, as would be the case if the skids were not used. It has been estimated that about 80 per cent of the entire weight of the truck and its load is carried at the rear during the unloading period while the body is tilted about its rear end, and when the coal has shifted to the rear end. In the case of the fully-loaded 6-ton Saurer with its total weight of 23,200 pounds, the weight carried by each wheel would be 9,280 pounds. It is apparent that few cement sidewalks would stand that weight. The use of the 6-foot square skids has reduced the pressure to 1,546 2/3 pounds per square foot.

The two sidewalk skids serve a dual purpose, that of distributing the weight on the sidewalk and protecting pedestrians from the driving chains when the truck is in motion. The latter is accomplished by means of the position of the skids when they are fitted into their cradles on the sides of the truck. The cradles are placed a little in front of the chain sprockets on either side of the truck. As a result, when the skids are in the cradles, they extend far enough out on the side to cover the sprockets, thus preventing pedestrians from being injured. The skids are held in place in the cradles by two grooves, into which the cradle pieces fit snugly. The cradles, bolted to the frame at three places, consist of four pieces of soft steel, heat-treated and hammered. One piece, which is V-shaped, is bolted at both ends to the frame. This piece forms a support for two hooked pieces which hold the skid. The V-shaped member is held rigid by means of a top brace, which is bolted at the top to the wood sill above the frame and at the bottom to the center of the V-shaped member. These pieces are 1½ inches wide and ½ inch thick. A pair of these skids and cradles cost about $20 to make.

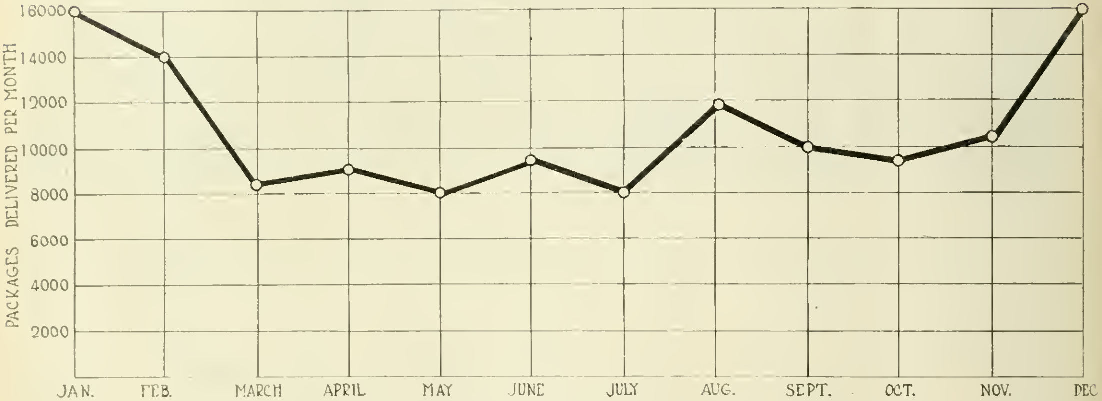
These skids may also be used for leveling the truck when it is standing on a crowned road, as illustrated. In this case, the truck was run alongside of the curb, the wheels being below the level of the outer wheels, thus lowering the chuting height of the body



A good example of efficient side unloading, showing how the skids are employed under the rear wheel nearest the curb to level up the truck body, which would otherwise be tipped toward the curb on account of crown of the roadway to give proper drainage

How to Handle PEAK LOADS *in Department Store Deliveries*

Charting Deliveries by Months as Shown Below Will Aid Delivery Superintendent to Meet Conditions in Seasonal Rush Periods Each Year



This is a peak loads chart. By such a chart, the department store delivery superintendent can visualize his delivery conditions during each month of the year and so regulate the truck repair work and body painting that the required number of trucks will be available for the work in hand. Such a chart also indicates when vehicle operation must be speeded up to meet the rush conditions

THE delivery superintendent of a department store should know what is his busiest month and which one is the dullest so far as the number of deliveries is concerned. Too often he assumes that he knows this and relies upon guesswork rather than upon actual facts. He says offhand that December and January are his busiest months on account of the holiday season and Christmas and New Year's purchases. In this he is generally correct. But does he know how the number of packages delivered in each of these months compares with those delivered in May or June?

One of the easiest methods of determining the relative number of packages which must be delivered in any given month is to take the records of the previous year and put them down in the form of a simple chart similar to that shown above. The months are arranged along a horizontal line and the number of packages along a vertical line. The number of packages delivered in any one month marked on the vertical line representing that month will result in a series of points, which, joined together, will give a continuous curve similar to the heavy black line shown in the chart above. This, then, is a graphic picture of some of the delivery conditions which the vehicle superintendent of a department store must solve.

What Analysis Shows

An analysis of the chart printed above, which was made up from figures obtained from one of the large department stores in New York City, shows some very interesting facts. For instance, it indicates that the number of packages delivered in December and January is twice the number which must be delivered in March, April or May. The former months are the periods of peak loads. These are the periods when the success or failure of a department store delivery superintendent is in the balance. If he so manipulates his equipment as to take care of the rush business in a manner satisfactory to the store's customers, he is a success. If on the other hand, he allows the greatly increased volume of business to disarrange his delivery schedule, he is a failure, and by the time the next season rolls around will probably be looking for a new position.

A further analysis of the peak loads chart shown above brings to mind the three great problems which the department store delivery superintendent must solve in handling peak loads. These are: 1—How to increase the number of trucks in service to take care of double the number of deliveries. 2—How to obtain efficient help to operate the increased number of vehicles; and 3—How to increase the number of packages delivered by each vehicle.

These three problems are very intimately connected, one with the other, although they can be discussed separately, since each problem is one in itself.

The most general method employed to increase the number of vehicles in operation during the peak loads period is to purchase sufficient trucks to handle about three-quarters of the maximum amount of business expected. This means that all of the trucks are not employed during the non-rush period. While this at first thought seems a transportation or delivery extravagance, it is in reality good delivery insurance, since even the best and most modern motor trucks yet designed or to be designed in the future will need to be repaired and will have to be laid up and taken off the routes for this overhaul work.

During the slack periods of the year, as shown by the chart, the vehicles are taken into the shop in rotation for their general overhaul and body painting when necessary. The vehicles then remaining on the routes are sufficient to handle the number of deliveries during the non-rush period. By exercising good judgment in bringing the trucks in for repairs, all of the vehicles can be put in first-class shape to give satisfactory service continuously during the rush holiday season or any other period during which the records of the company show that a large increase in deliveries is likely to be expected.

When all of the vehicles are in use, they can handle about three-quarters of the maximum business when operated under average conditions. Therefore, under peak-load conditions, the operation of each truck must be speeded up to take care of the one-fourth of the maximum business unprovided for under normal conditions.

The problem of providing for this one-quarter of the maximum business is one which is closely linked up, not alone with the truck itself, but also with the operating personnel. This brings us to the second of the three problems, namely, that of providing extra vehicle operators of the proper qualifications.

Promoting Helpers

One of the most common methods of solving this problem is to use helpers on each of the trucks during the non-rush season and to promote the best of these helpers to drivers in the rush season. These men are thus potential drivers to take charge of the trucks which during the non-rush season are undergoing repairs.

To make this plan feasible, pains must be taken to train the helpers to become efficient drivers while they still remain helpers. One of the best methods of accomplishing this end is to place the more promising helpers with the best drivers who can afford to take the time to train the helpers during the ordinary course of business without affecting the speed of delivery on the various routes. The helpers should obtain their drivers' licenses while still acting as helpers, so that they can be placed in charge of the trucks when the rush season emergency exists or when drivers are absent for sickness or any other cause. One other incentive which makes good drivers out of helpers is a higher wage of 50 cents to $1 a day. This gives each helper something to work for. When the helper is actually driving a truck during the rush season, he should be paid a full driver's salary.

This method of promoting promising helpers to drivers has given greater satisfaction than attempting to operate a fleet only sufficient to take care of minimum deliveries and of then hiring outside vehicles during the rush period. The reason for this is that the former helpers are better acquainted with the various routes and the street addresses along these routes than are new men placed on the route for the first time during a rush period.

The best of the helpers are graded in some instances according to seniority and are bonded as drivers as soon as they have become proficient enough to secure drivers' licenses. When the rush season is over, they are sent back as helpers or into the shop to assist in making repairs. They always form a nucleus about which a new driver personnel may be built and, when this is done, always have before them the incentive of promotion and the higher drivers' wages.

Doubling the Deliveries

In most cases the problem of increasing the number of deliveries per truck in the rush season is one of delivering 300 to 400 packages a day as compared with an average of 200 packages a day during the slack months of the year. This end may be accomplished by operating the trucks from 3 to 4 hours longer each day and also by employing two instead of one helper on the routes which are especially congested. This may also occasion a certain rearrangement of the routes usually followed during the non-busy period. No definite rules can be given as to the best methods of rerouting until an analysis is made in each particular case.

The store supplying the data from which the accompanying peak loads chart was made follows the practice of having each truck make only one trip a day in both the busy as well as the slack season. It has found that this method is advantageous when the number of packages carried per load can be doubled. The increased number of packages can be delivered more quickly on one trip of 2 hours' greater duration than on two separate trips, since the idle mileage from the store to the first delivery and the last delivery to the store is less on one trip than on two.

When any one of the routes has to be divided into two routes or two routes made into three during the busy season, it has been found the best practice to put the helpers used on the original routes in charge of the new trucks introduced to take care of the extra number of packages. This plan should be followed wherever possible, since such drivers are naturally better acquainted with the routes on which they served as helpers than they are with an entirely different route in another part of the city.

Good Judgment Necessary

Even this rearrangement of routes must be tempered with good judgment and a good understanding of the physical conditions of each route and the character of the patrons served. For instance, it may take twice as long to deliver 200 packages in one section of the city or its suburbs than in another. This may be due to congested streets, many hills, or to the character of the houses in the territory served by either route. In some sections of the delivery area, the majority of customers may have all of their goods sent C. O. D., while in another section, the bulk may be Paids or Charges. This small difference in the buying characteristics of customers in one section as compared with another may make a tremendous difference in the time of delivery in those respective sections.

For instance, one large department store in New York City has found that it can make deliveries to customers in New Jersey, approximately 10 miles from the store, in about half the time that it takes to deliver the same number of packages in New York City proper, only 5 miles away from the store. This paradoxical situation is due to the fact that in New Jersey the majority of the deliveries are Paids. Those customers who order C. O. D. generally are waiting for the truck to arrive with the correct amount of cash in their hands. This makes for quick deliveries. In the New York territory, however, many of the customers are out when the driver calls. If they are in, they insist on opening and examining the contents of packages before they make their payments to the drivers. This holds up the speed of delivery and increases the time required per unit delivery.

These facts sound like an unimportant distinction, but the personal peculiarities of the customers in the two communities increase or decrease the efficiency of the trucks serving them.

HOW ONE FLEET OWNER

Saved $6000 in Gasoline in 10 Weeks

Results Obtained Through Contest Made Up in Form of Baseball Game to Get and Hold Drivers' Interest

Small Saving of 32 Cents a Day Equivalent to $31,000 for 300-Operating Day Year on 265 Motor Trucks

COMPLETE RULES AND FORMS GIVEN IN THIS ARTICLE, SO THAT OTHER FLEET OWNERS MAY UTILIZE EXPERIENCE IN THEIR OWN BUSINESSES

THINK of saving $6,000 in gasoline in 10 weeks! Seems incredible, does it not? Yet this is the record which the Fifth Avenue Coach Co., operating 265 buses over New York City streets, has just made and of which it is justly proud. The actual figure is $5,962.50. This is equivalent to $596.25 per week or $85.25 per day for 265 buses, or 32 cents a bus a day. The real lesson of these figures is that a very small saving per day per bus amounts to a very large total per year. For instance, the small saving of 32 cents a day is equivalent to $31,000 a year of 300 operating days. This is equal to the cost of five or six new buses or to the interest of 6 per cent on an investment of $516,600!

Just how this saving was made by a baseball contest is told in the accompanying article, which also reproduces the forms used in keeping the records so that other large fleet owners may adopt the practice in order to cut down the cost of their truck gasoline. Just because a fleet owner does not own more than 200 trucks is no reason why he cannot take advantage of the Fifth Avenue Coach Co.'s methods to help reduce his operating costs. If $31,000 can be saved in a year when operating 265 buses, it is equivalent to $3,100 for twenty-six trucks—and $3,100 will buy a 2- to 3-ton truck, so that it is an economy which no fleet owner can ignore.

One of the Fifth Avenue Coach Co.'s buses which helped to save $6,000 in gasoline in 10 weeks by a contest made up in the form of a baseball game

The gasoline saving contest is not new with the Fifth Avenue Company, for as told in THE COMMERCIAL VEHICLE for June 1, 1919, it conducted a similar gasoline-conservation competition under a so-called Ace plan, in which the winning drivers were called Aces, after the manner of rating airplane pilots during the war. That contest saved the company about $6,000 on its gasoline bill; but at its conclusion the gasoline consumption increased again, because, with the element of competition gone, the drivers lost interest.

The big lesson to be learned from the Fifth Avenue Coach Co.'s experience is that drivers' and mechanics' interest must be maintained. When the Ace-flag plan was finished the company had to devise some new form of contest and, being about the time of the start of the baseball season, decided to rate the competing drivers somewhat after the fashion of a baseball game, with innings, runs, hits and errors.

In formulating the rules governing the Gas Saving League, the transportation foremen were selected as managers, because they have control of the men and are in constant touch

RULES GOVERNING GAS LEAGUE

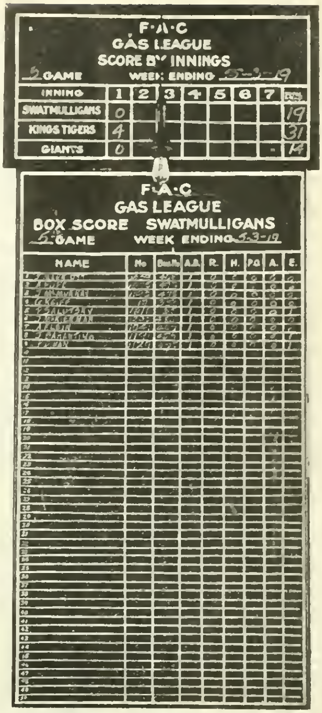
Managers	Transportation foremen.
Coaches	Mechanical foremen.
Teams	No. 3 Garage, Nos. 2 and 4 Garages, No. 5 Garage.
Players	Drivers of buses having nine highest gas averages.
Pennant Race	Series of ten games lasting ten weeks.
Innings	Each day equals one inning.
Game	Seven innings equal one game. Seven days per game.
At Bat	Number of innings or days player makes team.
Hits	"A" Type—1 base hit, 8.5 miles per gallon.
	2 base hit, 9.0 miles per gallon.
	3 base hit, 9.5 miles per gallon.
	Home run, 10.5 miles per gallon.
	Other Types—1 base hit, 8.0 miles per gallon.
	2 base hit, 8.5 miles per gallon.
	3 base hit, 9.0 miles per gallon.
	Home run, 9.5 miles per gallon.
Runs	Sum of base hits divided by four.
Put Outs	Leader of whole team for each day or inning.
Assists	One assist for each man who has a bus which is driven by a night crew.
Errors	Number of times player falls below average of nine men on team.
Bat. Average	Number of hits divided by number of times at bat.

with them. The mechanical foremen became the coaches, because it is their duty to make all carbureter, brake, and other adjustments necessary in fuel economy. The teams were composed of the drivers operating buses from each of the three garages. To add interest to the pennant race the teams were called, respectively, the Giants, Swatmulligans, and Kings Tigers.

The players consist of nine drivers showing the best bus averages from each garage, the make-up of the team being known at night after the score has been worked out. Though it was possible for a driver to make the team 7 days of the week, this was an exception. As a rule the best drivers could make the team 4 or 5 days a week.

The series comprised 10 weeks, or ten games. Each day represented one inning, there being seven innings or seven days to a game. In makng up the box score the number of times a driver appeared at bat equalled the number of innings or days a player made the team in one game. The hits were figured out on the basis of so many miles per gallon for a single hit, two base hit, up to a home run, the exact figures being given in the accompanying rules. These figures permitted taking into consideration all types of buses, these averages being individual ones and therefore much higher than the total averages allowed in the Ace-flag contest, which was discussed in the June 1, 1919 issue of THE COMMERCIAL VEHICLE. A fleet owner, following out this scheme, must set a standard for each make of truck operated, based on its previous performance and road and seasonal conditions.

The runs are the sum of the base hits, which are calculated by the number of miles per gallon averaged by each bus making up a team, divided by four. A put-out shows opposite the name of the leader of the whole team for each day or any day. It was only possible to have one put-out for each team per day, or seven put-outs per game. An assist was given each man who drove a bus which was also driven by a night crew. The reason for this arrangement was that both men contributed to the high average obtained, and, as a result, both drivers received credit. In other words, if all buses making a team were operated day and night, there would be eighteen men making a team each day.



Reproduction of the gasoline scoreboard set up in each garage where every driver could learn how he and his team stood in the contest

A miles-per-gallon average was taken of the nine buses making the team. Each time a player fell below this figure he was credited with an error.

(Continued on page 146)

Box Score of 1 Inning or 1 Day

Name	Bus No.	Average M.P.G.	Runs	At Bat	Hits	Put outs	Assists	Errors
1......	500	11.0	1	1	1HR*	1	0	0
2......	326	10.6	1	1	1HR	0	1	0
3......	326	10.6	1	1	1HR	0	1	0
4......	450	9.7	0	1	3BH†	0	0	0
5......	355	9.3	0	1	2BH	0	0	0
6......	470	8.9	0	1	1BH	0	0	1
7......	356	8.9	0	1	1BH	0	0	1
8......	356	8.9	0	1	1BH	0	1	1
9......	426	8.4	0	1	0	0	1	1
10......	392	7.9	0	1	0	0	0	1
11......	301	7.8	0	1	0	0	0	1

102 ÷ 11 = 9.2‡

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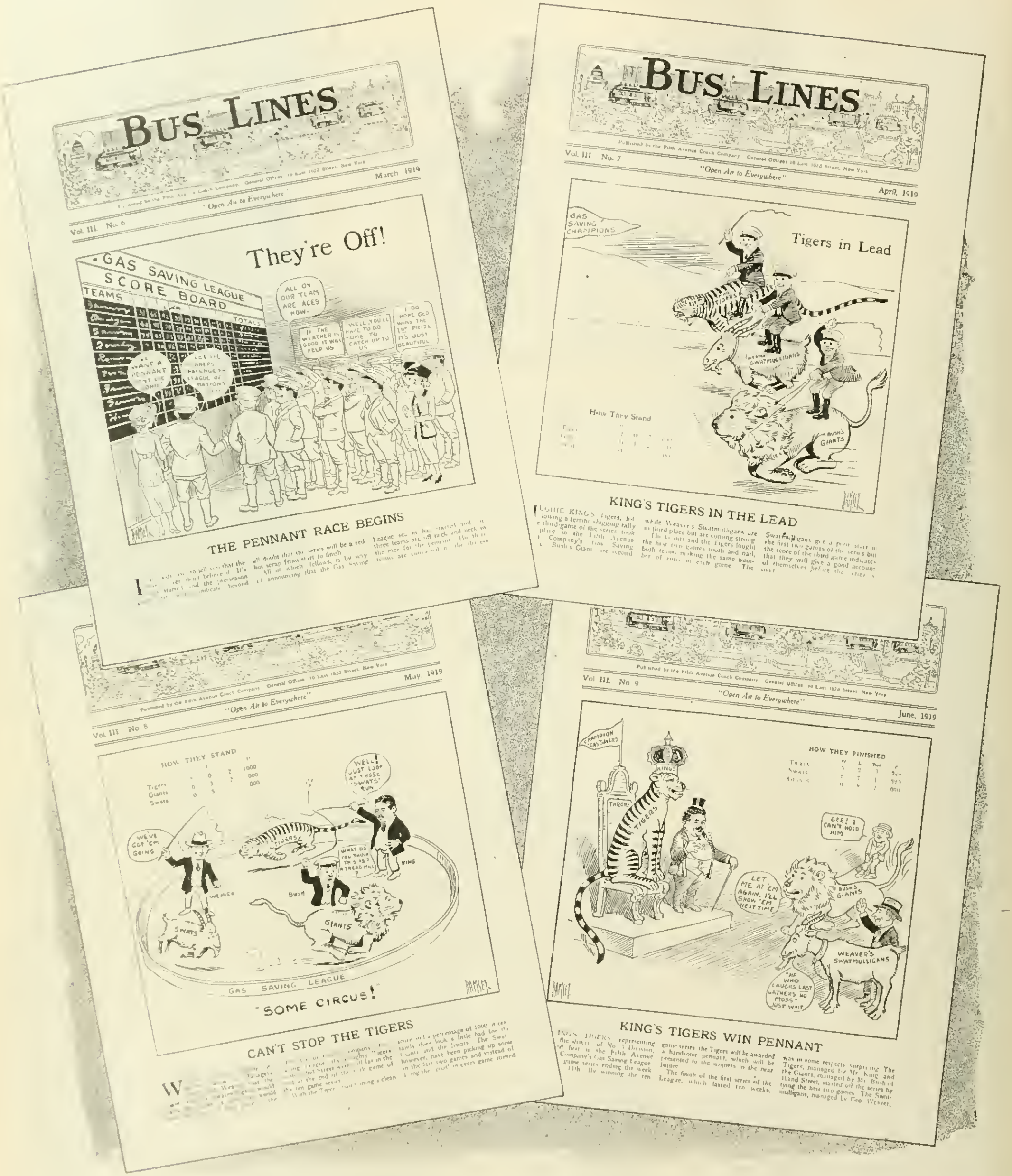
*Home run. †Base hit. ‡ = Average miles per gallon for the team.



BUS LINES
Published by the Fifth Avenue Coach Company General Offices 10 East 102d Street, New York
"Open Air to Everywhere"
Vol. III No. 6
March 1919

They're Off!
GAS SAVING LEAGUE SCORE BOARD
TEAMS
TOTALS
ALL OF OUR TEAM ARE ACES NOW.
IF THE WEATHER IS GOOD IT WILL HELP US
WELL YOU'LL HAVE TO GO SOME TO CATCH UP TO US
I DO HOPE GEO WINS THE 1ST PRIZE IT'S JUST BEAUTIFUL
WANT A PENNANT
LEAGUE OF NATIONS

THE PENNANT RACE BEGINS

BUS LINES
Published by the Fifth Avenue Coach Company General Offices 10 East 102d Street, New York
Vol. III No. 7
"Open Air to Everywhere"
April, 1919

GAS SAVING CHAMPIONS
Tigers in Lead
KING'S TIGERS
WEAVER'S SWATMULLIGANS
BUSH'S GIANTS
How They Stand

KING'S TIGERS IN THE LEAD

Published by the Fifth Avenue Coach Company General Offices 10 East 102d Street, New York
May, 1919
"Open Air to Everywhere"
Vol. III No. 8

CAN'T STOP THE TIGERS

Published by the Fifth Avenue Coach Company General Offices 10 East 102d Street, New York
Vol. III. No. 9
"Open Air to Everywhere"
June, 1919

KING'S TIGERS WIN PENNANT

How the Drivers' Interest Was Maintained

The success of any contest among motor truck drivers depends upon the extent to which the drivers' interest is first secured and then held at high pitch until the competition is closed. The Fifth Avenue Coach Co. was very fortunate in this respect in having a company house organ, the covers of several issues of which are reproduced to show how cartoons were employed to stimulate and hold the interest of every contestant

PRIVATE TELEPHONE

Saves Drivers' Time

New York Coal Dealer Installs Private Garage Wire Costing $45 a Year and Saves Many Times That Amount Otherwise Wasted by Drivers Calling for Help or Additional Unloading Instructions

HOW many times have your truck drivers fussed and fumed trying to get into telephone connection with the repairshop? Have you figured up the time wasted by the drivers on their routes because of the long delay in getting help from the garage during an accident or breakdown? Hasn't this been particularly so during the busy season of the year, when customers' calls are crowding the wires at the main office? Calls for help from the drivers may be often held off from 20 to 30 minutes because the main office lines are used primarily for customers.

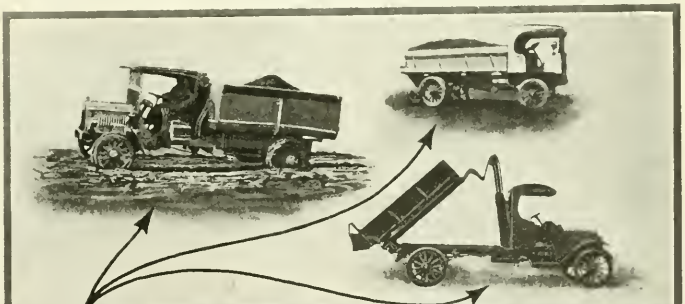
Costs $45 a Year

A simple solution of this problem is to install a private line to the garage, thus eliminating the delays in getting in touch with the shop by unnecessary relays at the switchboard at the main office. Olin J. Stephens, Inc., a New York City coal dealer, has found that the private garage line, which costs $45 a year, has paid for itself many times over.

One example of the efficiency of the private garage line is shown in the case of a driver whose truck has broken down after the office has closed for the day. Nine times out of ten, the switchboard operator has forgotten to leave in the plug that connects the garage. That means that the driver must walk or get to the garage in the best way possible in order to procure help from the night repairmen. Were the private wire installed, the driver would have been immediately connected with the shop.

Occasionally, a driver will want further instructions as to the unloading of his coal. By using the private wire to the garage he can have one of the repairmen run over to the main office, a matter of a minute or so, and get the information for him.

The use of a private telephone wire for truck drivers is a new idea but one which has many advantages, and these advantages increase as the size of the fleet is enlarged. The case cited on this page is but one concrete example of how the idea may be worked out with good results. If the fleet is large, the private telephone is just as advantageous to the owner of small ¾-ton trucks in department store or other package delivery work as big 6-tonners used for coal delivery.



Ross E. Brown, the maintenance superintendent for the coal trucks of Olin J. Stephens, Inc., New York. He is shown at his garage desk with the private telephone at his elbow. This costs only $45 a year, but has saved many times that amount in the time of the drivers, who, no matter where they are, can get into immediate communication with him

Modern Laundry

USES BY-PRODUCTS *of* *Electricity and Steam*

To Cut Maintenance Cost of Fleet of Electrics

Current Provided to Operate Laundry Machinery Also Employed to Charge Vehicle Batteries and Condensed Steam to Give Distilled Water for Battery Flushing

STEAM laundries which collect and deliver wash within a radius of 12½ miles can reduce their delivery costs to a minimum by the installation of electric trucks using the by-products of the laundry machinery.

These by-products consist of electricity and steam. The electric generators which produce the current employed to operate the washing machines, power and hand-ironing apparatus and electric driers may also be utilized to supply the current used for charging the electric vehicle batteries. The steam plant installed for heating the laundry building and for supplying steam for drying purposes may also be utilized to furnish distilled water for the vehicle batteries by collecting the condensed steam from the ironing apparatus.

It was the knowledge that these by-products could profitably be employed in the maintenance of electric trucks which led the Brunswick Laundry, Jersey City, N. J., to install electric trucks when it first determined to replace its horse wagons 7 years ago.

Saving $4590 a Year

Instead of paying the Public Service company 6 cents per kilowatt for current, the Brunswick Laundry saved itself 4¼ cents per kilowatt by generating the current itself, the cost being 1¾ cents. Figuring on the basis that the battery consumption per day is 12 kilowatts and multiplying this figure by thirty, representing the number of trucks on the road each day, and by 300 working days, the total kilowatt consumption for a year is 108,000. At 6 cents per kilowatt, as charged by the Public Service company, the Brunswick Laundry would be paying $6,480 for the service. At 1¾ cents, the cost of generating a kilowatt in its own plant, the total for the year for the 108,000 kilowatts is reduced to $1,890, a saving of $4,590.

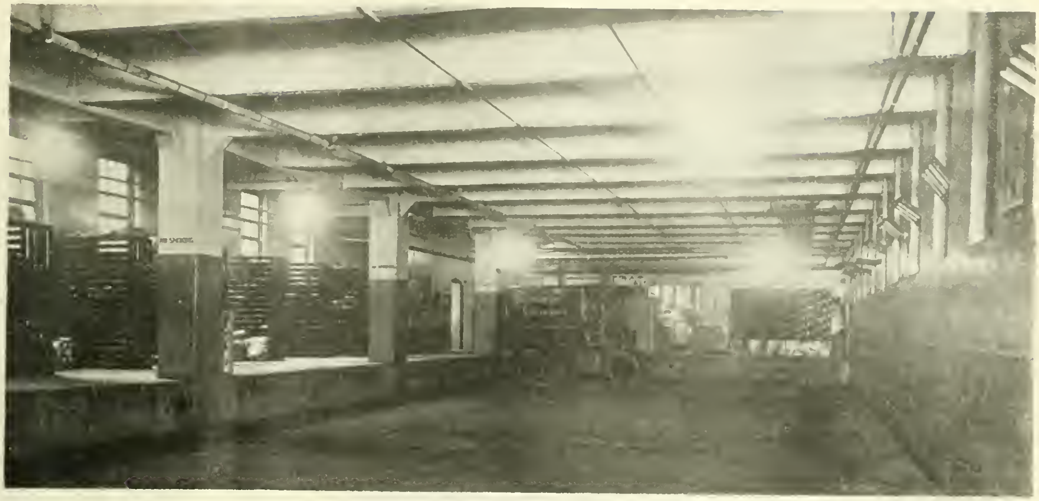
Distilled Water a By-Product

The Brunswick company, however, is regularly furnished current by the Public Service company during the rush hours of finishing the week's work on Saturday afternoons. This service, which costs the Brunswick company about $30 a month, is as important to that laundry as insurance, as it makes it possible to meet any emergency. The use of the Public Service current also permits the laundry to charge the vehicle batteries on Sunday nights for Monday's operation without starting up its own steam plant and current generators for that work alone.

The distilled water which is used in the batteries is available in any laundry from the condensed steam from the ironing machines. Like the current used in charging the batteries, it is a by-product. The water is collected in a covered barrel placed in a corner of the garage. Water is fed to the barrel through a branch

Garage Has Two Entrances

By the use of electric trucks, the garage and loading platform are combined. The trucks are charged from the front while in their loading positions



One Half of the Combined Garage and Loading Platform

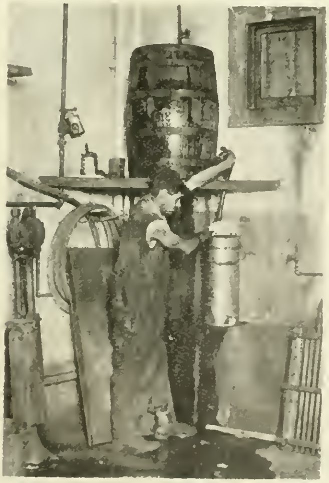
Here is shown the combined garage and loading platform made possible by the use of electric trucks. The charging panel is seen at the rear to the right. The bundles of laundry are held in the route hampers shown until loaded into the trucks

pipe leading from the main line. A small container is used to transfer the water from the barrel to the batteries.

After the use of the by-products was determined upon, an analysis showed that the bulk of the deliveries were made within a 12½-mile radius. With Jersey City as a center, the Brunswick Laundry's collection and delivery service radiates in all directions. It goes as far north as Englewood on the Hudson River, and as far west as Rutherford, taking in all the intervening territory with Bayonne on the south.

To cover that territory it was necessary to make a thorough study of the proper sized truck suitable for that work. This analysis brought out the fact the daily load average of the Brunswick Laundry was approximately 1500 pounds. In order to allow for overloading as well as the haulage of other materials when necessary, that company decided upon a truck ot 1-ton capacity, made by the Lansden Electric Car Co. Though its first two or three electric trucks were of Lansden manufacture, the rest of the electrics were made in the Kelland Motor Car Co.'s plant in Newark, N. J. These Kelland trucks follow the design of the Lansden models, but incorporate a number of changes. The laundry started experimenting with electrics about 1912, after having some 12 years' experience with horse-drawn vehicles with their attending high cost and unsatisfactory operation.

At least sixty-five horses were necessary to take care of the average 1500-pound loads, allowing for emergencies. During the time the company was using horse-drawn vehicles, it was often impossible to give its patrons good service. This was particularly true in the winter, when the horses were incapable of covering their usual routes because of the severe weather and the icy streets. Added to this was the extra loss of time occasioned by the necessity of sending the horses to the blacksmith to be sharpshod. Even with the greatest precautions, accidents were bound to happen on the slippery streets, and especially on the steep grades, all of which was not only a loss to that company financially, and a detriment to its service, but also inhumane.



Distilled Water for Batteries

The water condensed from the steam used in ironing is led to the barrel in the garage. The metal can shown is used to carry it to the vehicle batteries

Under the same conditions the gasoline and electric trucks quickly proved their worth. During inclement weather the only extra precaution necessary is the addition of chains, and each driver can equip his truck with non-skid chains in fifteen minutes.

With the advent of the electrics, the business increased to such an extent that some of the routes extended as far out as 30 miles from Jersey City. As a result, it was necessary to install six gasoline trucks to take care of the deliveries outside of the 15-mile radius. These gasoline trucks consist of four Whites and two Stewarts of ¾-ton capacity. A 1½-ton Packard was also bought to take care of the haulage of coal, ashes, etc. Before it was installed, the company was spending $18 a week for hauling ashes alone, and $10 a week for the haulage of freight from the railroads. At least 50 tons of coal are hauled a week by that truck. It has been figured that all of this short haul work is costing that company about $6 a week for gasoline and oil.

In purchasing the electric trucks, the load, as stated before, had to be considered, and a body of suitable size

One Corner of the Garage Shop

This view shows some of the garage equipment used. Note the distilled water can hung from the truck cab. The truck batteries are removed from the side and are moved about on small wheeled hand trucks

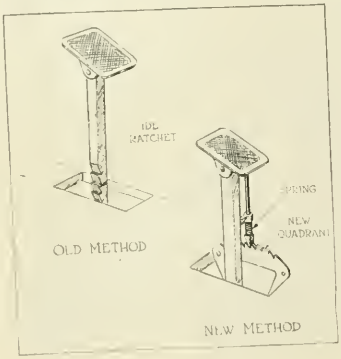
and capacity chosen. The bodies of the Brunswick trucks are 4½ feet wide, 5 feet high and 7 feet long behind the driver's seat, thus giving a capacity of 157.5 cu. ft.

Timeliness Important

The quality of the work, no matter how superior it may be, is of little value to the customer unless the soiled laundry is collected and the laundered material delivered on time and in good condition. The Brunswick Laundry policy is to collect no linen on delivery days, and to deliver no linen on collection days. The trucks go out with clean linen only and make no collections on the trip. A feature inaugurated by that company is the schedule by which laundry collected Monday, Tuesday and Wednesday is delivered Thursday, Friday and Saturday, and the laundry collected Thursday, Friday and Saturday is delivered Monday, Tuesday and Wednesday. This makes a complete week of collection and delivery and accommodates the needs of everybody. No soiled laundry is ever placed with the clean, and no filthy or quarantined laundry is ever accepted under any consideration. With collections and deliveries made on separate trips, the laundry is kept working at capacity all the time, assuring a uniformity of operation with no forced energy one or two days and the resultant waste of time during the rest of the week.

Some of the best drivers deliver as many as 900 bundles per week. At an average of 25 miles per day and a current cost of $4 per month, the current cost per mile is 6/10 of a cent on this basis. Figuring 900 bundles delivered per week, the energy cost of each bundle delivered is about 1/100 of a cent. In other words, the current consumed in delivering 100 bundles costs about 1 cent.

The advertising value of the electric was also considered in the selection of this type of truck. As compared with a horse-drawn delivery wagon, the electric has the advantage of being clean and odorless. The cleanliness is an especially important feature, as any woman in selecting a laundry would be rather skeptical of the efficiency of a company whose men had the disagreeable odor of the horses and stables about them. In addition to the advertising value of the electric trucks, there are no stables to draw flies and collect germs and to constitute a general nuisance on the premises.



An Improved Brake

To prevent accidents due to trucks starting down hill while left standing, the improved method of brake engagement shown above was devised

In electrifying its delivery service, the laundry was not obliged to discharge its former drivers and engage experienced chauffeurs, as the simplicity of the electric trucks enabled the men who had been driving the horses to learn to operate the new vehicles very successfully in a few hours. This saved that company expense and inconvenience, as there is a distinct advantage in employing men who are familiar with a company's patrons and routes as well as its policies. The drivers are selected men who are each assigned to respective territories, so that customers can depend on some one man they know to look after their interests properly. The Brunswick Laundry trucks are distinguished by their color of Brewster green, with the drivers in olive drab uniforms and caps.

A Yearly Overhaul

The electric and gasoline trucks are overhauled once a year, a week being spent on each vehicle to take care of all wear and tear and any needed repairs. As a result of this overhauling policy, about 40 weeks of the year are spent by the men in the garage in doing repair work. In overhauling the trucks, they are completely torn down. In the case of the electric trucks the bodies are taken off and sent to a local paintshop, and the chassis is torn down. At present that company is putting in new springs on all of its electrics, as those that have been on the trucks for the past five years are beginning to give trouble through breakage.

The batteries, which are of the Edison type, are cleaned off once a year with steam and painted with vaseline. The same Edison batteries that were used on these trucks five years ago are still giving good service. Every three months an inspector from the Edison plant visits the garage to make tests on the batteries. He makes a report to the owner and also to the Edison factory. As a result of these reports, the fleet owner can tell whether his batteries are receiving the best of attention from the repairmen.

Most of the wear that occurs in the Brunswick electric trucks is in the driving chains, brakes, controller fingers and battery jumpers. Occasionally the drivers will carelessly forget to start the trucks slowly, and as a result the battery jumpers will burn out. In order that the drivers may not be unnecessarily delayed while on their deliveries through such an occurrence, each truck is equipped with several battery jumpers that can be easily installed to replace the burned-out ones.

When the electric trucks were first bought they were equipped with meters to enable the owners to determine the condition of the battery. Though these meters were of material help to those trucks whose batteries were charged in service stations, there was no need of them where the owner charged his own batteries, because he could tell at a glance what condition his battery was in by simply making a reading at the switchboard. Then, too, there was nearly 30 feet of wire connected with the meters, which meant extra resistance. As a result of these conditions, the meters were taken out and it is stated that at least 10 miles have been added to the driving capacity of the batteries.

Brake Gear Improved

For a time, that company was troubled with smash-ups occurring through vehicles breaking loose while standing on hills. Children or the drivers themselves would inadvertently push the foot brake and it would snap out of place, thus starting the truck in motion down the hill and resulting usually in a bad smash-up. These trucks were equipped with a foot brake only, with a side ratchet engagement. In order to provide for emergencies as outlined in the early part of this paragraph, it was arranged so that the brake would be held tight through the fitting of a regular ratchet quadrant and dog. However, that company was soon convinced that something would have to be done in order to hold the brake pedal tight when it was on. This problem was solved by the installation of a small dog engaging the notches of the new quadrant and creating enough side friction to prevent it from being snapped out of place through carelessness. The dog is connected to the brake foot pad by means of a rod. By pivoting the pad, the dog is engaged or disengaged readily is shown in the sketch on page 134.

The Brunswick Laundry has arranged it so that there are three spare electrics in the garage. One of these is always ready for emergencies; the second one is being painted, and the third one is being overhauled. Thus three out of the thirty-three electrics are required as spare vehicles.

The repair force consists of a foreman and two assistants. The foreman is in entire charge of the maintenance of the electric and gasoline trucks as well as all of the purchasing of materials and trucks. The supervision of the drivers and the routing and loading of the trucks are under another man with the title of superintendent of routes. Both the garage foreman and route superintendent are under the supervision of the secretary and treasurer of the company. He passes on all suggestions made by the men in charge of the maintenance and operation of the trucks.

The Shop Equipment

All of the repair work is done in a small room adjoining the garage. The shop equipment consists of an electric drill made by the United States Electrical Tool Co., Cincinnati, Ohio; a vise made by the Reed Mfg. Co., Erie, Pa.; a chain hoist made by the Reading Block Co., Reading, Pa., and a forge made by the Champion Blower & Forge Co., Lancaster, Pa. The hoist is hung overhead in the garage proper, where it is used in the overhauling work. Other equipment that comes in handy during the repair work consists of a Weaver jack, two 10-ton Barrett jacks, two small wooden horses, and a four-wheeled swivel-caster truck for hauling the batteries.

All repair work is done during the day and charging at night, when all of the trucks are in. The man who washes the trucks at night also fills the batteries with distilled water. The garage consists of two sections, being divided so as to provide for a loading platform in the middle. Fifteen charging plugs are installed in each section, which are 50 feet wide and 140 feet long, providing space for forty-five trucks and room enough for thirty trucks to be loaded at one time. Each section has a loading platform, a feature of the garage, in that the trucks can be parked and loaded at the same time. Loading takes about ½ hour.

The gasoline trucks, as in the case of the electrics, are gone over for needed repairs once a year. They are torn down in the garage, their bodies being sent to a local paint shop. The valves are ground in, the bearings are gone over for wear as are the piston rings, gears, etc. All of the engine and light repair work is taken care of by that company's repairmen. All repairs needing the use of lathes are taken to some neighboring machine shop. It is a policy of the company to sell its gasoline trucks just as soon as they begin to give trouble from wear and tear and to buy new trucks to replace them. In that way, the need of installing an expensive machine shop and equipment has been obviated. The drivers of the gasoline trucks are given full responsibility for the oiling of the trucks.

The Small Garage Shop

Only a small shop is required for minor repair work because most of the fleet is made up of electrics with few moving parts

How a PAVING CONTRACTOR Solved the Problems of

1—Preventing Body Leakage of Hot Asphalt
2—Dispatching His Trucks by Legible Numbering
3—Keeping Drivers' Record Cards Clean
4—Checking Drivers' Cards by Service Records

IN the haulage of paving materials, such as sand or asphalt, one of the biggest problems which the fleet owner must solve is how to prevent leakage of the material out of the body while the truck is in motion. This problem is more difficult of solution in cases where asphalt is handled because it is generally loaded into the truck body at about 400 deg. Fahr. with the truck body at a normal temperature of 65 to 70 deg., or at least 330 deg. less than that of the asphalt. This variance in temperature expands the metal of any ordinary type of latch so that a tailgate which is tight when the truck starts out on its route may be loose before it has covered half the trip to the job, with a consequent loss due to the asphalt leaking out onto the street.

But this is not the only problem. For instance, there is the difficulty of dispatching a large fleet of trucks, some owned outright and some hired for the occasion, when they are numbered by painted letters which often become indistinct by being covered with dust and dirt. Then again, keeping the drivers' route or work cards clean and legible and then checking up on the data on these cards are two problems, the solution of which requires considerable thought and study.

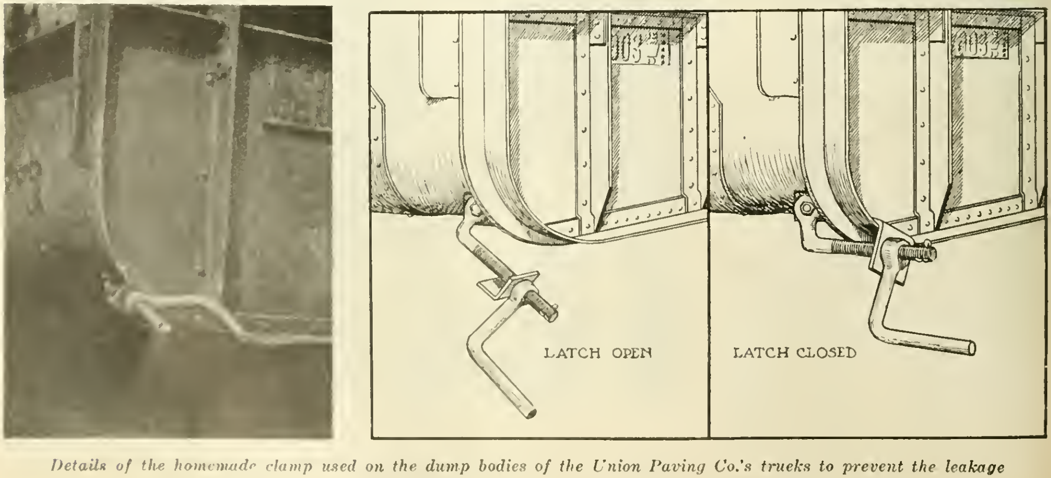
Speed of Delivery Important

Just how these four problems have been solved satisfactorily by a paving contractor operating a fleet of twelve trucks is told in this story of the Union Paving Co. of Philadelphia. That company seven years ago began to use motor trucks in its general contracting business, at least 90 per cent of which is hauling asphalt. Experimentation had shown satisfactorily that more effective service could be had from a few trucks than from many horse teams, and at a smaller expenditure.

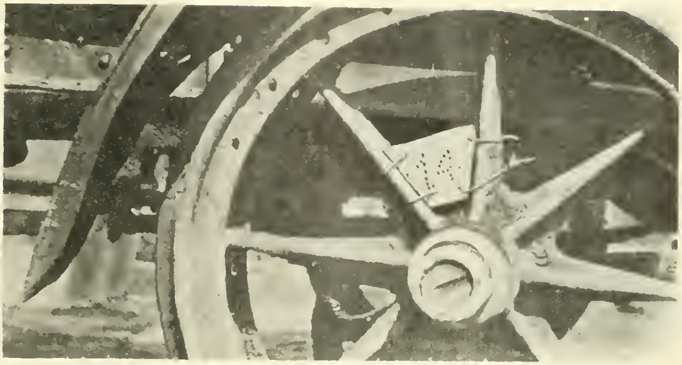
It also found that in a general contracting business speed of operation is a most important factor, a necessity, for the fulfillment of such contracts entails the finishing of each job within a specified time. Motor trucks can take heavy loads rapidly from loading to unloading points, going from one job to another, in the course of a day, when desirable, in a supplementary capacity. This is impossible with teams. While the trucks of the Union Paving Co. do not ordinarily make very long hauls to an unloading point, it was found that, for instance, on a 30-mile haul for a day's work one 5-ton truck, loaded to 6 tons, can make three round trips per day, or carry to the unloading point 18 tons, whereas one team could haul but one 2-ton load over such a route within the day's working time.

Few teamsters would care to make a team carry a load of more than 2 tons for 30 miles, but any 5-ton truck can take a 6-ton load on a 30-mile run, making three such trips in working hours.

The company's present fleet consists of three dump-body Macks, each of 5½-ton



Details of the homemade clamp used on the dump bodies of the Union Paving Co.'s trucks to prevent the leakage of hot asphalt. This was a problem that could not be solved by the ordinary tailgate latch capacity, one of the lot having a Wood body and Wood hydraulic hoist, the other two being equipped with chain-operated Mack hoists; seven White trucks, all 5-tonners with dump-bodies, one having a worm-drive hoist and the rest screw hoists; a 2-ton Autocar with dump-body, convertible into a small platform body with removable sides, and used for moving tools, parts, wheels and small orders; a convertible Locomobile passenger car of 1,500-pound capacity, used as a general service car, in addition to an office fleet of twelve roadsters, divided among Packards, Dodges, Buicks, Peerlesses and Fords.



This truck number plate, made of tin with the number formed by perforations in the tin, is wired to the wheel spokes. It enables the truck dispatcher to tell the truck number at a glance, when a number painted on the body or cab is not distinguishable because of dust or dirt

The Problem of Dispatching

As each truck is numbered and as in road contract work the trucks are often mud-coated, or dust-filmed, it has been a problem for the dispatcher to keep the numbers clean for convenience in recording the incoming and outgoing trucks. But this difficulty has been solved in an entirely original manner by having a metal tag, bearing the truck number in perforations, which cannot become obscured by mud and dust as readily as a painted number, made in keystone shape to fit over the hub between two adjoining spokes of each wheel. This plan, which is just being put in force, is found very satisfactory by the drivers, who say the perforations do not get clogged with mud or dust and if they should happen to, a sharp blow or a quick rub would instantly clear the number and make it legible, while the painted numbers sometimes had to be scrubbed before they could be read. The dispatcher now has no trouble in recognizing each truck by number immediately. These keystone-shaped metal number tags are about 4 inches long and of a width equal to the distance between the spokes of the wheel.

C. B. Montgomery, superintendent of transportation for the Union Paving Co.

Another efficiency device developed by the Union Paving Co. is a sheet tin envelope with a tin slide or case for holding the driver's Motor Truck Daily Time Card. This card will be more fully described later. It is a manila form 5¼ by 8½ inches. The tin slide has its upper and lower edges turned over to hold the card in place. The slide is just the right size to fit into the metal envelope and be withdrawn to write on the card and then slipped back into place so that it is entirely covered. The method of using the device is to withdraw the slide just enough to expose a line of the form at a time; fill in the line and then put it back. This keeps the face of the card protected from the driver's soiled hands and has resulted in economy as well as neatness.

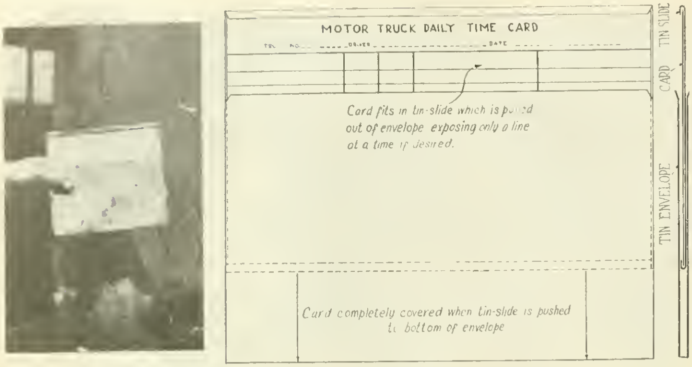
While the driver is using his truck, the card in its tin envelope is hung, in the case of the Macks, on the rear wall of the cab, to the right of the driver, and in the case of the older White trucks, which have waterproof canopy tops instead of cabs, it is usually tucked beneath the leather cushion of the driver's seat.

Service Recorders Used

Each truck also carries a Service Recorder, a clock-driven device whereby the travel of a vehicle and the actual time it has been working are recorded through the principle of sway-motion and needle abrasion on blue paper coated thinly with white wax. The movement is distinct from vibration, the device recording sidesway movement as it occurs. The lack of marking, or gaps in the blue, indicates stops. These instruments are circular, the numbered, wax-coated charts fitting into the mechanism measure or case, which is 4¾ inches in diameter. In the Mack trucks the Service Recorder is placed on the rear wall of the cab, at the right of the driver, a little above the point where the tin envelope with the driver's Motor Truck Daily Time Card is hung. In the White trucks the Service Recorder is placed at the right, immediately below the driver's seat. It is small enough and flat enough not to get in the way of his legs.

In hauling asphalt, sand and other of the finer road-building materials, a difficult problem to solve was the leakage from the tailgate. Especially in the case of asphalt the problem was complicated, as in addition to wastage through the tailgate from ordinary jolting, the high temperature at which it is necessary to carry asphalt for spreading purposes—drawn at about 400 deg. Fahr. and delivered before it falls to 250 deg.—often expanded the rod whereby the tailgate release was controlled from the cab, causing the catch to open and the mate-

One of the trucks leaving the yard. It must pass directly in front of the window in the dispatcher's office in the building seen at the left


MOTOR TRUCK DAILY TIME CARD
Card fits in tin-slide which is pulled out of envelope exposing only a line at a time if desired.
Card completely covered when tin-slide is pushed to bottom of envelope
TIN SLIDE
CARD
TIN ENVELOPE

The tin envelope in which the driver carries his daily report card. How the card is placed in a metal slide that fits into the envelope is shown in the sketch at the right

rial to leak. While drivers appreciate being able to control the tailgate from the cab, it was found advisable to provide some means of checking wastage in that manner as soon as possible. The company's drivers keep to smooth pavements and roadways as far as they are able, and most of their work is done under that condition, yet the loss from leakage increased to such an extent that C. B. Montgomery, superintendent of transportation, and Thomas J. Bowes, superintendent of trucks, decided to offset it immediately.

The Latch Devised

Mr. Bowes, who is of an inventive turn of mind, then devised an original tailgate latch, which, although it cannot be operated from the cab, keeps the gate locked as though in a vise. It can also be adjusted to maintain an opening of a certain width, which is especially desirable in spreading certain materials, the weight of the truck body, when hoisted, feeding the required amount of material through the gate opening.

A round-iron ¾ of an inch in diameter and about a foot long is bent in L-shape, bored at the short angle of the L end with a ½-inch hole, through which a bolt fastens it behind the flange of the body, just where it curves under the tailgate. The long end of the round-iron is threaded and has slipped over it a short angle-iron catch or latch, which extends about 5 inches each way from the center of the round iron. An iron handle, bent in a right angle, looking something like a stove-shaker, also slips over the threaded end of the round-iron.

This handle is a quick-working arrangement and is made to spin, or whirl by hand, the rotary motion making it climb the threaded round-iron till it reaches the angle iron. The operator then lifts the handle so that the round-iron is in a horizontal position, places the angle-iron with his fingers so that it presses against the flange on the outside of the tailgate. whirls the handle tighter and squeezes the angle-iron with it, tight to the outer flange of the tailgate like a tourniquet, and there the handle holds it by pressure until it is rotated by the operator in the opposite direction. There is one of these latches on each side of the body of every truck owned by the company.

The grip of the two sides of the angle-iron, one against the flange of the truck body proper and the other against the flange of the tailgate rim, cannot be broken by jolting, or anything else but the purposeful rotation of the handle in the reverse direction. Not a grain of sand can escape when the hardest grip of the angle-iron device is applied, but by letting the angle-iron slip down the threaded handle to about the limit of the angle-iron's edge, and then revolving the handle upward until it squeezes the angle-iron tight enough to hold it there, an opening very desirable in spreading small stone for roads can be maintained.

Thomas J. Bowes, who devised the special tailgate latch clamp

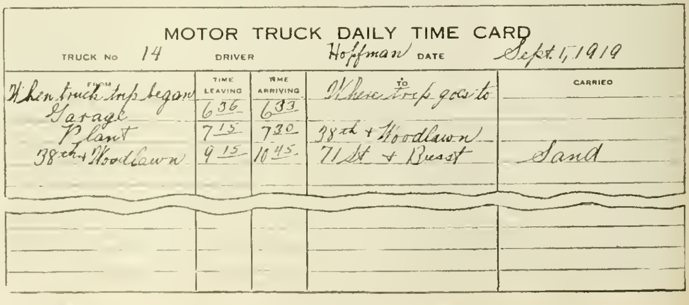
Another means employed by this concern in spreading is to control the tailgate opening by a length of wire. In either case the weight of the load against the tailgate, when the truck body is raised, keeps the proper opening for the discharge of the material.

Latch Cost Only $1.70

This tailgate round- and angle-iron latch device cost the company, for the first one invented and made, just 70 cents in material and $1 for Mr. Bowes' time, yet it has proved invaluable in preventing loss by leakage.

The device has the further advantage of releasing from four to six men for other work when the latch is set, as described, for spreading material, as by its evenness and mechanical steadiness of distribution through the constant opening, regulated by the angle-iron grip on the flanges and the pressure outward of the discharging load to keep the gate at the limit set by the latch, only from three to four shovelers are required to spread the material, whereas under the ordinary method from eight to ten shovelers would be necessary.

Drivers have instructions to carry road spreads at a speed not exceeding 14 miles an hour, for safety and best results with the load. However, the men are not burdened with unnecessary rules, for supervision here is not for the sake of supervising, but to get the best work done in the best way, in the shortest time. Supervision outside of the city of Philadelphia is simplified, or rather eliminated under this concern's sub-contracting system. In addition to its Philadelphia plant at Thirtieth and Locust Streets, the company has permanent plants in Chester, Pa., and Trenton, N. J. It sets up temporary quarters at various points where it has road-making or road-mending jobs, to the extent of sending out miniature asphalt plants mounted on freight cars. But in the dispatching of such equipment and recording its re-

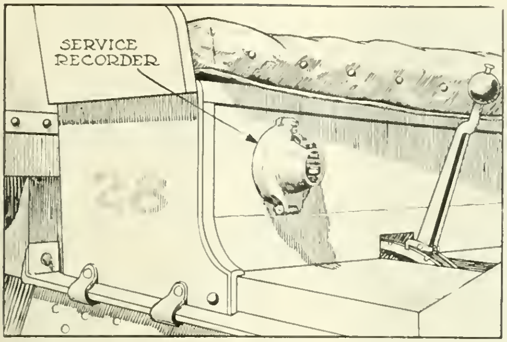


MOTOR TRUCK DAILY TIME CARD

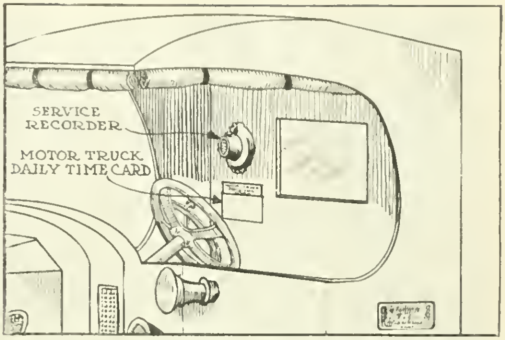
TRUCK No 14 DRIVER Hoffman DATE Sept. 1, 1919

FROM When truck trip began	TIME LEAVING	TIME ARRIVING	TO Where trip goes to	CARRIED
Garage	6^{36}	6^{33}		
Plant	7^{15}	7^{30}	38th + Woodlawn	
38th + Woodlawn	9^{15}	10^{45}.	71 St + Buist	Sand

The driver's work card, by means of which a complete record is kept of the jobs done during the day



The service recorder as mounted on the riser of the driver's seat, where it does not interfere with his operation of the truck



How the service recorder and the metal envelope for the driver's route card are mounted on the inside of the cabs of the Mack trucks

turn, there is no direct vehicle supervision from Philadelphia for such outside jobs.

When a contract for a distant road job is awarded to the company, bids for sub-contracts are asked and the sub-contractor to whom the job is awarded in turn becomes responsible for all trucks which he hires and uses. The Union Paving Co.'s fleet is not used in such cases.

The company's fleet is in use almost all of the time, but the trucks of other responsible concerns, of which the Union Paving Co. keeps a selected list, are hired daily. In 1918 the company averaged sixty-seven trucks daily in work. Sometimes it uses eighty a day. In other words, after a contract for a road job has been assumed by a sub-contractor, beyond delivering the material to the plant, the Union Paving Co. uses no further supervision of trucks. It is up to the sub-contractor, the successful bidder for the contract offered by the Union Paving Co., to get the material to the road.

Supervision does not extend in the transportation department from Philadelphia to the permanent plants at Chester and Trenton. Local hired trucks are used as required. The superintendents of those branches assume charge of such vehicles as are used there. As in the case of the extra trucks hired in Philadelphia, these are placed on the payroll from day to day and paid off on the completion of the work. In the case of the Trenton plant the company dispatches by freight such material as may be required from Philadelphia.

This elimination of supervision of transportation from Philadelphia in the case of outside work, of course, permits such concentration on city problems as has resulted in the devices mentioned, in general dispatching and in cost-keeping methods. With regard to dispatching, a word or two as to yard conditions may not be amiss. The plant occupies buildings on both sides of Thirtieth Street. The rear of one part of the plant is on the Schuylkill River, much material like sand, for instance, arriving by scow and being lifted to the hopper by steam shovels. Considerable material, such as granite block, is hauled to the plant by truck.

The Dispatching Methods

The method of dispatching the trucks is simple and effective. They assemble, according to the work to be done, in front of the main office each morning at 7:30. The dispatcher's office is on the ground floor, a window to the left of the entrance gate, close to the building, being near enough to the line of trucks to enable the dispatcher to see that all is in readiness for the start without his having to leave his office. He gives each driver who enters the office two copies of a Work or Scale Ticket made out in triplicate, retaining the third himself. Each copy has its number stamped on it in red. It is signed by the foreman on the job when he receives the load. The driver returns a copy to the office, where it is filed, as a check to see that the driver has received his load. If the company is selling material being hauled, the checking is especially close. Bills are made out from these Work or Scale Tickets.

The Motor Truck Daily Time Card, already mentioned in connection with its tin envelope, gives the truck number, driver's name, date, time and place of leaving for work, time of arrival at destination, and nature of load carried. Stops are recorded in detail on the reverse side of the form, which otherwise is blank. The driver signs the card, and its recorded stops should tally with those indicated by the Service Recorder in his cab. Any tampering with a Service Recorder means instant dismissal for a driver. At the end of the day the driver drops his card through a slot into a tin receptacle in the locked stockroom of the repair-shop.

The cards are kept for a week and the payroll is made up from them.

BILL TO PREVENT THEFTS

ST. LOUIS, MO., Sept. 8—A bill designed to prevent the thefts of motor vehicles has been introduced in the St. Louis Board of Aldermen by W. F. Niederluecke. The bill provides that all motor trucks and vehicles used for commercial purposes should bear the name and address of the owner in letter three inches high. The increased number of thefts of motor trucks during recent months led to the introduction of the bill.

One of the White 5-tonners, showing the type of dumping body and the clamp tailgate latch

How a Lumber Merchant in a Small Town

GOT RID OF HIS HORSES *and*

1—Increased His Business 40 Per Cent
2—Decreased His Unit Delivery Cost
3—Gave Customers Better Service

1-Tonners Found Best for Lumber and Building Material Deliveries and 2-Ton Trucks for Coal Deliveries in Outlying Country Territory

"FATHER, I feel certain we can increase our business if we replace some of our horses with a small motor truck. This will enable us to increase our delivery area and thereby secure a greater number of customers. Summit, N. J., has a population of 10,000. Here we have only 500 customers. With a truck we can increase our delivery radius from 3 to 8 miles. Instead of John Smith having to drive in with his own horse wagon for his lumber, building supplies and coal, we can deliver it to him by our trucks and get paid for the deliveries. Besides, he is very liable to buy more often because he does not have to stop his own work and take a half day to get his material. Again, we can be more certain of our deliveries. Last week we had to delay for several days the delivery of one order, to be sent 8 miles out, because it was too long a pull for the horse teams on account of extremely hot weather and the hilly country which had to be covered."

These were the arguments expressed 5 years ago by Henry Muchmore to his father, who was then delivering his coal, lumber and building materials entirely by horse vehicles. Up to that time, most of the business of that merchant was centered in Summit, few deliveries being made outside of the town limits. The horse vehicles were falling down on deliveries in the surrounding country districts on account of the steep grades encountered. This was especially so in the extremely hot summer days and also during the winter months when the snow was on the ground.

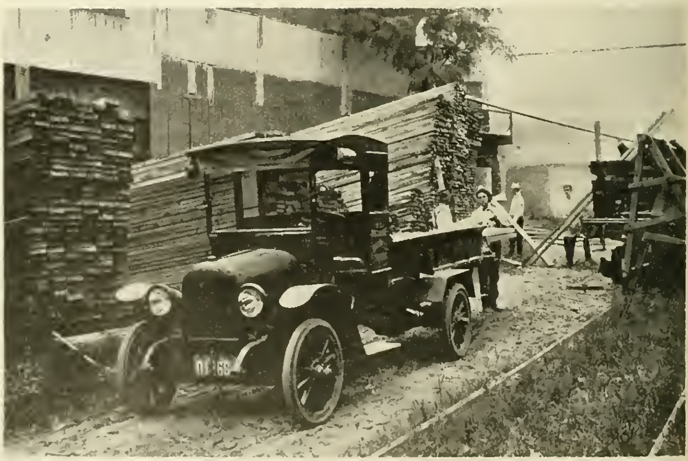
As a result of these conditions and the arguments put forth by the son of George V. Muchmore, the latter was persuaded to purchase a 1-ton truck. A year's trial proved such a success in increasing the business and the delivery zone that another 1 tonner was installed. The business had been increased about 10 per cent and the delivery zone from 3 to 8 miles with the first truck.

First Truck Begets Another

Not only did the second truck duplicate the record of the first, but it showed the doubtful father that he was at last on the right path toward the coveted territory outside of the town limits of Summit. Likewise, he was finding out that horse vehicles were not on the road as much as before, because the two trucks were not only taking care of the outside territory, but also much of the short-haul work. At that time he had fifteen horses and ten wagons.

As a result of the inactivity of some of his horse vehicles, it was natural that he should turn his attention toward their disposal. After a careful study of the situation, it was decided that each of the 1-ton trucks could replace five horses used to make two double teams and a single one. This also meant the elimination of two drivers.

The elimination of the horses, wagons and drivers was a step toward the purchase of two more



The 1-ton Maxwell being loaded with lumber from the storage pile. Note the type of ordinary flareboard express body fitted with the side chute on the right to permit coal to be carried. This combination body is most important because it enables both coal and building supplies to be carried according to the season of the year

The 2-ton Garford, the largest truck of the fleet, is permanently fitted with the dump coal body shown. This one truck is sufficient to take care of all the coal deliveries in the slack season. When the rush begins, the 1-ton and 1½-ton trucks with the combination bodies are pressed into service

1-tonners during the third year and the disposal of all of the horses and wagons.

After 3 years' experience with motor trucks, it was found that the small capacity vehicles were the most economical to run in the country districts. Orders for coal for the major part were for 1 and 2 tons. Lumber and building material orders showed no necessity for the use of large capacity trucks. In addition to these facts, the speed of the smaller trucks was such as to enable quicker deliveries as well as to overcome the steep grades encountered.

Combination Bodies Used

The trucks were making ten to twelve trips a day out into the surrounding territory, averaging about 30 miles each for the day. The business grew to such an extent that it was deemed wise to install two more trucks. These were 1-ton Maxwells. The other three were disposed of and three Garfords of 1-, 1½-, and 2-ton capacities were purchased to replace them. The installation of the 1½- and 2-ton trucks permitted the number of trips per day on the long hauls to be reduced by taking care of two or more orders on one trip.

The three 1-ton and one 1½-ton trucks are equipped with an ordinary flareboard express body, fitted with side gates for the discharge of coal and sand. The 2-ton Garford is equipped with a coal body, fitted with a hoist made by the Rodenhausen's Excelsior Wagon Works, Philadelphia. The coal is chuted from the rear end of the truck. Provision is made for chuting the coal to the side while the truck is standing alongside the curb. Two 10-ft. chutes are used for unloading the coal.

The four trucks equipped with the express bodies serve a dual purpose. These are used to take care of the small coal orders, as well as the lumber and building materials. During the months of July and August, when the slack period for coal orders has set in, the coal truck is used for hauling brick, sand, etc. In November and December, when the slack period for lumber and building materials begins, and the demand for coal has been resumed, the express bodies with their side chutes are used to expedite deliveries.

Business Increased 40%

Not only have the five Muchmore trucks accomplished an increase in the delivery zone from 3 to 8 miles, but they have increased the business about 40 per cent. Deliveries are now made to farmers in the outlying territory that were formerly handled by the farmers themselves, when the deliveries were taken care of by the company's horse vehicles. By delivering coal, lumber and building materials to the farmers, the latter are saved anywhere from 2 to 4 hours' time. As a result, this service has been instrumental in increasing business, as well as keeping a satisfied patronage. Deliveries in Summit are also taken care of more quickly than was possible with horses.

The trucks were kept in a garage built by that company on the premises at an expense of $3,000. The drivers are competent enough to take care of all small repairs. Heavy repairs are taken care of by a local garage. The trucks are gone over once a year for wear and tear.

The yards are laid out so that there will be a minimum of congestion during loading. The lumber building is separated from each of those used for the coal and builders' supplies. Each building has its own entrance and exit. Railroad facilities are such as to allow the unloading of the building materials and lumber in back of the buildings. The coal cars are run on elevated tracks into the coal shed, dropping their loads through openings in the floors. The coal pockets are built high enough to accommodate the high body of the 2-ton Garford, the express bodies being little higher than those of the horse wagons. The trucks are loaded with coal without the necessity of backing up under the pockets, thus saving much time. Little maneuvering is necessary at any of the buildings.

The weighing scales are out on the street, next to the curb and in front of the office. The reason for this location is that the coal pockets are so situated that the exit from them is on the street below the offices. In order to save time in weighing the coal, the trucks, as well as any other vehicles that carry away materials, are weighed in front of the office.

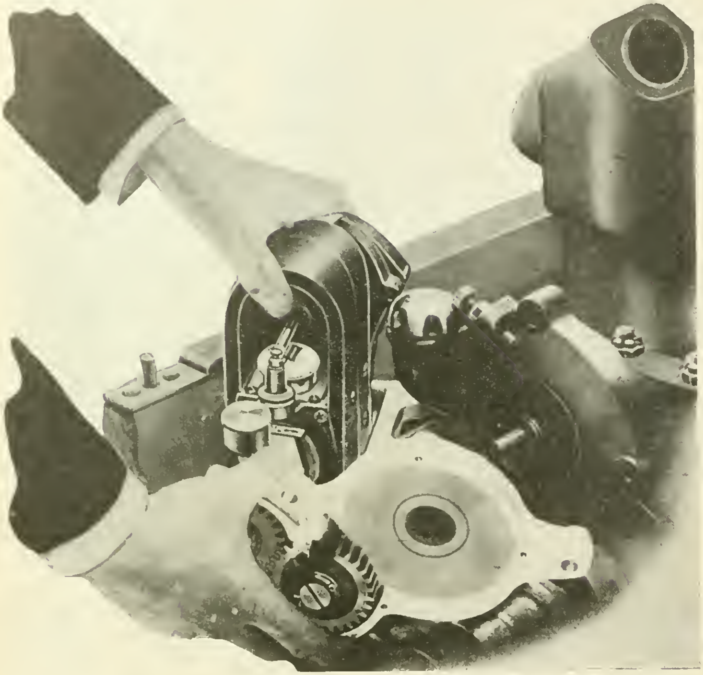
Deliveries start at 7 a. m. and stop at 5 p. m. All orders that come in late in the afternoon, when the trucks, as well as any other vehicles out so as to be quickly loaded the next morning. The routing and loading of the trucks are in charge of Mr. Muchmore's son.

The operation of the fleet of trucks has been such a success to the company that it decided to sell trucks in that territory. That company is now agent for the Maxwell trucks and cars in Union and Morris counties. Last year it sold thirty trucks to the farmers in that territory on the time-payment basis. Henry Muchmore, the son, is in charge of this agency. He has a man out on the road to take care of the sales and a mechanic at the service station, located on the premises, to take care of the repair work.

Saving 17 Cents a Day in Gasoline

On the Ford 1-Ton Truck

Bosch Magneto Costs $65 and Comes Complete, Ready to Install



Putting the magneto assembly in place

If you operate a Ford 1-ton truck in any kind of service, you will be interested in this story of how George Heron, Maintenance Superintendent of the Boston Store, one of the large department stores in Chicago, saves 17 cents a day in gasoline on every one of his eleven Ford 1-tonners. While this saving seems small at first thought, it amounts to $583.44 a year, or almost as much as the cost of the equipment which made the saving possible. In these days of rising costs in truck operation, a saving of close to $600 a year in gasoline alone is not to be ignored.

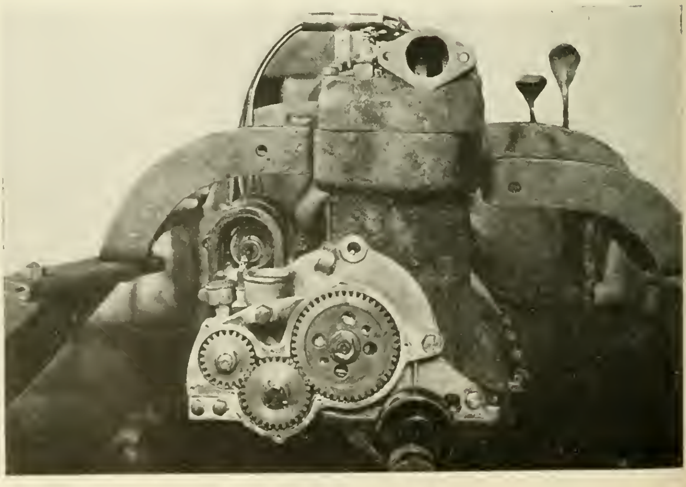
In the operation of his Ford trucks, Heron found that the ignition system gave the most trouble. Whenever anything went wrong with the Ford engine, it was the ignition, and if the trouble occurred on the road, men had to be sent out from the shop to overcome the trouble.

Heron heard of the special Ford magneto assembly sold by the American Bosch Magneto Corp., Springfield, Mass., and installed one of the outfits. This increased the miles per gallon of gasoline from 18 with the ordinary Ford flywheel magneto to 25 with the new magneto. At 23 cents a gallon for gasoline, the price paid at that time, this reduced the cost of gasoline per mile from 1.26 cents to 0.92 cent, a saving of 0.34 cent a mile. For a 50-mile day, this is a saving of 17 cents. Each Ford works 6 days a week or 312 days a year. For eleven trucks, the total days worked each year is 11 times 312 or 3432. This total days multiplied by the daily saving of 17 cents gives a total yearly saving of $583.44.

The magneto assembly consists of a small magneto, a train of gears driven from the front end of the Ford engine camshaft and a case to

(Continued on opposite page)

The installation complete



The train of gears with the front half of the case removed

What to Do with Your

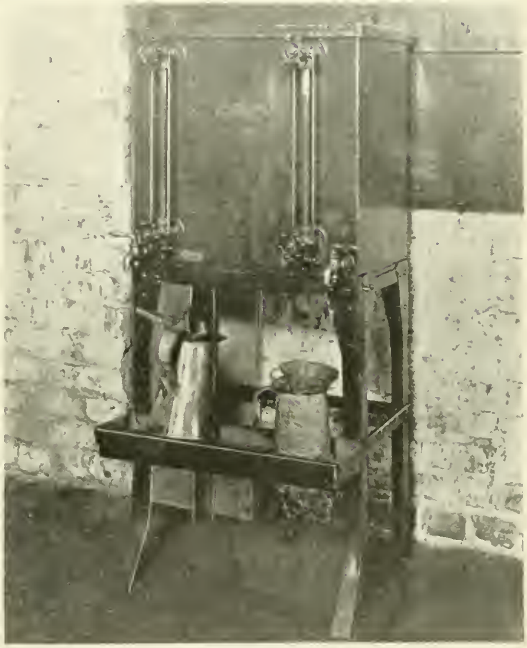
OLD CRANKCASE OIL

First Filter It and Then Use on Spring Bolts and Shackles and Driving Chains

Do not throw away the old oil which has served its purpose in lubricating the motor truck engine. It can be easily reclaimed and used to lubricate other truck parts and thereby help reduce the total cost of truck operation. Every time a motor truck is taken down or the crankcase removed, all of the oil in the crankcase sump must be drained out. If such oil appears to have lost some of the lubricating qualities required when used under extremely high temperatures, as in the engine itself, it is generally thrown away. This is a waste of money, for if the oil is filtered it can be advantageously employed to lubricate the spring and shackle bolts and driving chains.

The oil may be filtered in two different ways, either by the use of some home-made device or by a filter sold particularly for garage service. One of the latter type of equipment is manufactured by the S. F. Bowser Co., Fort Wayne, Ind. One such filter as made by the Bowser company, and used in the truck garage of the Boston Store, Chicago, is shown on this page.

George Heron, maintenance superintendent of the fifty-four gasoline trucks operated by the Boston Store, uses the filter shown to reclaim the oil taken from the engine crankcases when each engine is taken down in order for its yearly overhaul. The filter consists of a small rectangular tank provided with a series of interior strainers and set up off the floor on a small iron framework or stand. The tank itself is divided into two parts by a vertical partition extending from the front to the rear of the tank in the center. Ordinary glass gages are provided at the front of the tank for each section to indicate the amount of oil in the tank at any time. Two spigots are provided, one at the bottom of each tank section, to draw off the oil after it has been filtered. A small tray catches the drippings.



The Bowser filter as used in the truck garage of the Boston Store, Chicago, to reclaim the oil taken from the engine crankcases during repair operations

Saving Gasoline in Running Ford 1-Ton Truck

(*Continued from opposite page*)

cover the train of gears. The installation is simple and requires no removal of crank or gearcases and no complicated fitting or special machine work. Nothing vital to the engine is altered or disturbed. The complete installation can be made in a few hours and without the use of any special tools. The illustrations on page 142 show exactly how the equipment is fitted.

Each assembly costs $65 or $715 for eleven of them. They saved $583.44 during the first year, or almost as much as the total initial cost, to say nothing of the reduced cost of ignition repair on all of the Fords.

With the magneto outfit installed, the regular Ford flywheel current generator is utilized for the electric lights and horn. The spark plug wires are disconnected and wired up to the new magneto.

According to Heron, the special magneto assembly gives the increased gasoline mileage by reason of providing a hotter spark produced at the mathematically-correct moment in each cylinder. Any coil ignition such as is used on the Ford truck is slow because of the inherent current lag. It is most difficult to adjust all four coils to produce the spark in each cylinder at the proper instant in relation to the other cylinders. Master vibrators help, but do not entirely eliminate this trouble, which, however, is got rid of by the independent magneto illustrated on the opposite page.

How to Use the File

HINTS FOR THE TRUCK MECHANIC

Pointers on the Different Grades of Files, How to Select Them for the Work in Hand and How to Use Them Properly

WHEN the motor truck garage mechanic speaks of filing a piece of metal, the first thought is to procure a file. The first thought is generally the last thought, because the first file picked up is, in most cases, the one used. Very seldom does the workman examine the metal to be worked upon to determine which kind of a file would work most efficiently. To select the proper file is not a science, just good practical judgment.

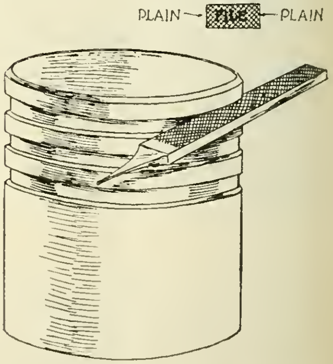
The greatest time saver in filing, particularly as applied to bench work, is in selecting the proper file for the material to be worked upon. For this reason it is very essential that the shop which desires to work on an efficient basis have an assortment of files which will take care of all work coming into the shop. While there are innumerable types, shapes and sizes of files, the hand file, flat file, square file, warding file, triangular file, round file and half-round file will constitute a good assortment of shapes. Files can be obtained which have their cutting surfaces at an angle to the file edge, single file, or those which have their cutting surfaces at angles to each other, double files. Of course, in the different shapes selected, each type should be represented in whatever grades may be necessary; that is, with reference to coarseness or fineness. For general work, a selection of five different grades, namely, coarse, bastard, second-cut, fine and dead-cut, will be found to meet the average requirements, according to *Motor Age*.

The selection of a certain kind of a file for a certain piece of work is a matter on which no certain specified rule can apply. A certain piece of work, of general nature, may be done with a coarse file by one man, and another may use a bastard file for the same purpose, and each will arrive at the same result, just as quickly and just as efficiently. However, in a general way the sort of metal to be worked upon is a key to the type or style of file to be used. For instance, a bastard file undoubtedly would be selected for cast iron, which presents a fairly smooth surface nearly free from rust. While cast iron is a softer metal than steel, it possesses a porous, glassy surface which breaks down the edges of the cutting teeth very quickly. It is advisable to use a file which has been subjected to considerable service when filing cast iron.

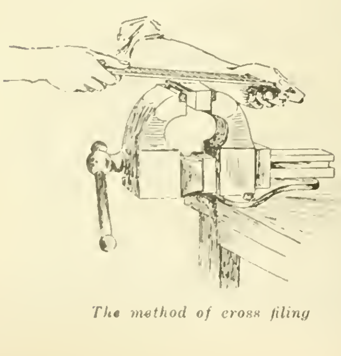
A second-cut, or fine, file may be used on all grades of steel, the second-cut for the softer grades and the fine file for the harder grades. The cutting edges being much finer and shorter on either of these two grades, they are better adapted for use on steel than the coarse or bastard file, as when sufficient pressure is exerted the cutting edges dig into the metal beyond that point where the strain is applied wholly to the edges. Files with coarse cutting edges are adaptable to work such as brass, bronze, aluminum, babbitt, and other soft metals of the same nature.

While files are used freely on metal in various locations in which the mechanic must work from different positions, the majority of the work is done in the vise, and for this reason it is very imperative that when vises are installed on benches or stands they should be of the proper height from the floor, so that the workman can do his work freely and in a comfortable position. Accuracy of filing depends, to a great extent, on just how handily a workman may be able to go about the job. The jaws of the vise should be about on a level with the workman's elbows to insure ease of manipulation.

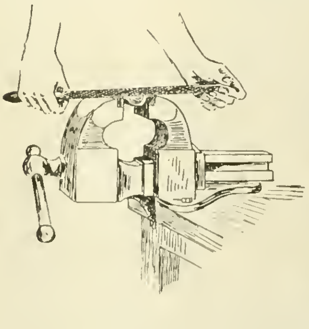
While the selection of a file handle



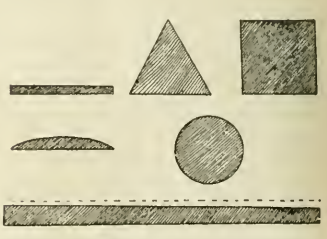
Plain-edged file with opposite cutting sides



The method of cross filing



The method of draw filing



Five file shapes above and convex surface of proper file indicated by dotted line below may be considered of little consequence, it is of great importance, especially for the workman who must use the file. It is customary, in a great many small shops, to construct a file handle from any old block of wood with the corners trimmed down, and possibly tapped. This may be all right where the file is not used more than 5 or 10 minutes at a time, but where it is used continually for hours at a time the mistake of such a handle will be admitted by the workman. Cramped and blistered hands and a sore forearm are the result of improperly shaped handles, and for this reason a handle which will perfectly fit the hand is of the utmost importance.

When a file is selected for a certain job there must be borne in mind the size and shape of the work, the quality of the metal, the amount of metal to be removed, and the quality of the finished work. The shape of the work and the quality of the metal determine the shape of the file. The amount of metal to be removed and the quality of the finished work determine the grade of cutting surfaces. If the surface is flat, the flat file, warding file or hand file may be used. The length of the surface to be filed will determine the length of the file. For very heavy work an 18-in. file would be the one used generally, while for light work an 8 or 10-in. file would be about the proper length. Sizes between these two would be used, depending on the variation between light and heavy work. For interior work, square in shape, the square file is used. For dressing down bolt threads, notching round bars, such as shafting, cutting through steel tubing, filing gear teeth, etc., the triangular file is used. Where the curvature of any piece of work greatly exceeds, in radial proportions, that of the round file, the half-round file is the proper selection. Work for which a round file may be used usually suggests itself, but any work which must present a plane surface should never be touched with a round or half-round file.

Accurate filing is the result of constant practice, and can be accomplished in no other way. Being able to execute a smooth, even stroke in parallel with the work for the full length of the stroke means accurate filing.

Butcher Uses ¾-Ton Truck for Retail Deliveries

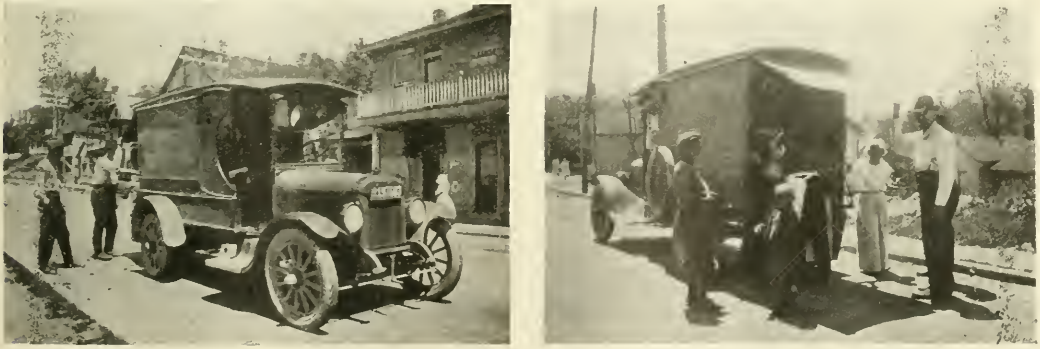
Its Speed Gets More Customers and Increases Profits

JOSEPH REITMANN, a butcher in Cincinnati who used a horse wagon for years and years to make house-to-house deliveries of fresh meat, has recently installed a ¾-ton Republic truck for the work. Asked why he made the change, he vouchsafed the information that while his horses gave satisfactory service in the old days, the motor truck has enabled him to greatly enlarge his delivery area and secure a large number of customers. The more customers he has, the more business he does, and the more money he makes.

A ¾-ton Republic was purchased because ¾ ton of meat is about the average load carried on any one route. Different routes are covered daily, and, although the stops are close once the route is reached, the greater speed of the motor truck in running from the butcher store to the first stop and back on the return trip after the last customer has been served has enabled it to cover any given route in much less time than was possible with the former horse wagon.

The truck is mounted on pneumatic tires in the front in order to enable it to make greater speed in the country territory. As shown in the illustration below, the vehicle is provided with a closed cab and built-in windshield with side curtains. The body, except for a slight increase in size, is very similar to that used on the horse wagon. It has a big scale hung in the rear at the left, with a small counter set up on the floor of the body for cutting the meat.

Rows of hooks placed on horizontal stringers on each side of the body with other hooks hung from the roof are provided to carry the various cuts of meat A roll of wrapping paper is also provided to keep dust from getting onto the meat while it is being carried from the tailboard of the truck into the customer's home.



At the left is shown a ¾-ton Republic mounted on pneumatic tires in front for greater speed. It has replaced the former horse wagon used by a Cincinnati butcher to make house-to-house deliveries. The rear end and scale are shown at the right

Saving $6,000 in Gasoline in 10 Weeks

(*Continued from page 129*)

To obtain the driver's batting average, his hits per week or game were divided by the number of times he appeared at bat, following out the same rules of regular baseball.

The tabulation on this page illustrates how a box board of one of the garages is worked up for one day or one inning. In the case of buses Nos. 326 and 356, both were operated by two different crews, and in this case both drivers received equal credit and were marked down on the tabulation as assists. Drivers making dinner reliefs did not get any credit for the performance of a bus they left.

At the end of each week there was posted on the bulletin board a typewritten form showing the batting averages of each man and a summary of the home runs—one, two and three base hits made by each driver in each garage. This enabled the men to keep in close touch with what the drivers in the other garages were doing. In addition, two special bulletin boards are made up, showing the box score by innings for each garage as shown in the accompanying illustration. These were hung at the exits so that the driver could see at a glance his position on the team.

The nine men making the most number of runs on the pennant win-

Report of the Gasoline Baseball Series Economy Contest

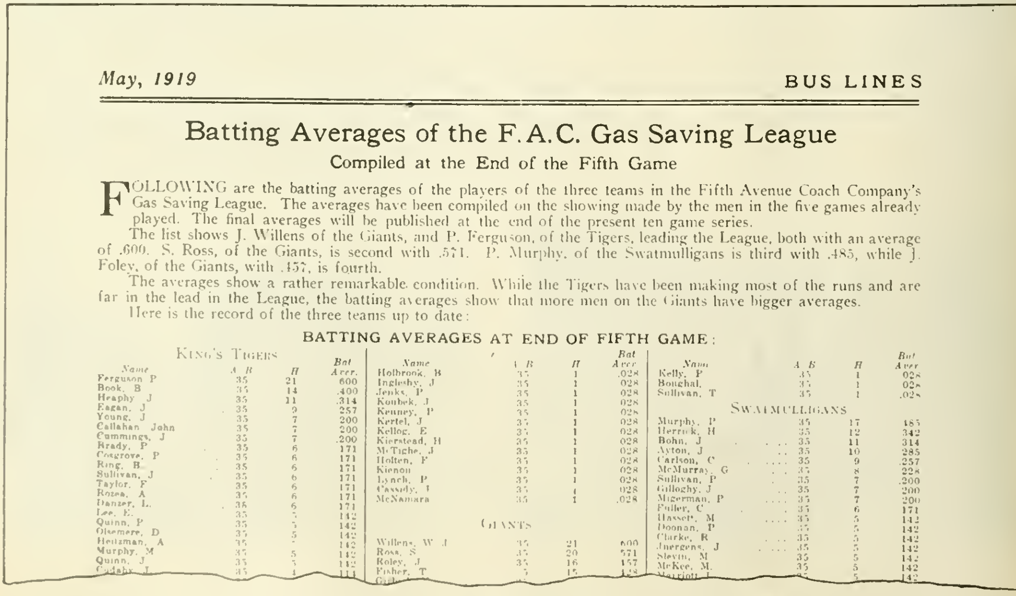
Week Ending 1919	No. 3 Garage Gasoline Cons.	No. 3 Garage M.P.G.	No. 2 and No. 4 Garage Gasoline Cons.	No. 2 and No. 4 Garage M.P.G.	No. 5 and No. 8 Garage Gasoline Cons.	No. 5 and No. 8 Garage M.P.G.
April 5	7,163	5.93	9,517½	6.07	10,007	5.85
April 12	6,766	6.56	9,837	6.22	10,093	5.93
April 19	6,647	6.66	9,822	6.40	10,584	5.73
April 26	7,302	6.22	10,183	6.36	10,925	5.64
May 3	7,247	6.22	10,062½	6.36	10,403	5.92
May 10	7,264	6.48	9,913½	6.64	10,218	6.09
May 17	6,433	6.87	8,771½	6.76	9,241	6.23
May 24	7,212	6.29	10,518	6.72	10,812	6.38
May 31	7,699	6.38	11,105½	6.56	11,802	6.25
June 7	7,356	6.51	10,726	6.67	11,365	6.33
	71,089	6.41	100,456½	6.48	105,450	6.01

Total Mileage and Total Gasoline Consumption for Three Garages

Week Ending 1919	Gasoline Consumed	M.P.G.	Mileage
April 5	26,687½	5.95	158,802
April 12	26,696	6.21	165,598
April 19	27,053	6.22	168,498
April 26	28,410	6.03	171,212
May 3	27,712½	6.16	170,569
May 10	27,395½	6.38	175,011
May 17	24,445½	6.59	161,081
May 24	28,542	6.49	185,076
May 31	30,606½	6.40	195,818
June 7	29,447	6.50	191,449
	276,995½	6.30	1,743,114

Ten Weeks' Gasoline Averages

1919	1918	During Series	Previous 10 Weeks	1917	Best Consecutive 10 Weeks
April 5	5.73	5.95	6.08	June 30	6.53
April 12	5.71	6.21	6.10	July 7	6.72
April 19	5.82	6.22	6.22	July 14	6.71
April 26	5.94	6.03	6.21	July 21	6.62
May 3	6.01	6.16	6.19	July 28	6.51
May 10	5.77	6.38	6.10	August 4	6.29
May 17	5.71	6.59	6.08	August 11	6.40
May 24	5.54	6.49	6.03	August 18	6.40
May 31	5.70	6.10	5.88	August 25	6.56
June 7	5.58	6.50	5.45	September 1	6.45
	5.75	6.30	6.03		6.53



May, 1919 **BUS LINES**

Batting Averages of the F. A. C. Gas Saving League

Compiled at the End of the Fifth Game

FOLLOWING are the batting averages of the players of the three teams in the Fifth Avenue Coach Company's Gas Saving League. The averages have been compiled on the showing made by the men in the five games already played. The final averages will be published at the end of the present ten game series.

The list shows J. Willens of the Giants, and P. Ferguson, of the Tigers, leading the League, both with an average of .600. S. Ross, of the Giants, is second with .571. P. Murphy, of the Swatmulligans is third with .485, while J. Foley, of the Giants, with .457, is fourth.

The averages show a rather remarkable condition. While the Tigers have been making most of the runs and are far in the lead in the League, the batting averages show that more men on the Giants have bigger averages.

Here is the record of the three teams up to date:

BATTING AVERAGES AT END OF FIFTH GAME:

KING'S TIGERS

Name	A B	H	Bat Aver.
Ferguson P	35	21	600
Book, B	35	14	.400
Heaphy J	35	11	.314
Eagan, J	35	9	257
Young, J	35	7	200
Callahan John	35	7	200
Cummings, J	35	7	.200
Brady, P	35	6	171
Cosgrove, P	35	6	171
Ring, B	35	6	171
Sullivan, J	35	6	171
Taylor, F	35	6	171
Rozea, A	35	6	171
Danzer, L	36	6	171
Lee, E	35	5	142
Quinn, P	35	5	142
Olsemere, D	35	5	142
Heilzman, A	35	[illegible]	142
Murphy, M	35	5	142
Quinn, J	35	5	142
Cudahy, J	35	4	111

Name	A B	H	Bat Aver
Holbrook, B	35	1	.028
Inglesby, J	35	1	028
Jenks, P	35	1	028
Koubek, J	35	1	028
Kenney, P	35	1	028
Kertel, J	35	1	028
Kellog, E	35	1	028
Kierstead, H	35	1	028
McTighe, J	35	1	028
Holten, F	35	1	028
Kienon	35	1	028
Lynch, P	35	1	028
Cassidy, J	35	1	028
McNamara	35	1	.028

GIANTS

Name	A B	H	Bat Aver
Willens, W J	35	21	600
Ross, S	35	20	571
Foley, J	35	16	457
Fisher, T	[illegible]	15	[illegible]

Name	A B	H	Bat Aver
Kelly, P	35	1	028
Boughal,	35	1	028
Sullivan, T	35	1	.028

SWATMULLIGANS

Name	A B	H	Bat Aver
Murphy, P	35	17	485
Herrick, H	35	12	342
Bohn, J	35	11	314
Ayton, J	35	10	285
Carlson, C	35	9	.257
McMurray, G	35	8	228
Sullivan, P	35	7	.200
Gilloghy, J	35	7	200
Migerman, P	35	7	200
Fuller, C	35	6	171
Hassett, M	35	5	142
Doonan, P	35	5	142
Clarke, R	35	5	142
Juergens, J	35	5	142
Slevin, M	35	5	142
McKee, M.	35	5	142

Part of a page of the Fifth Avenue Coach Co.'s house organ, showing how the drivers' interest was held by publishing the individual batting average of every contestant ning team received cash bonuses in proportion to the economy effected by obtaining high fuel averages. In order to keep the interest of the men at a high pitch, special bulletin boards were placed in each garage on which appropriate cartoons and instructions were posted daily. These cartoons were drawn by the drivers and the shopmen and illustrated humorous incidents in connection with the contest. As a result each garage was given a chance to indulge in humorous criticism of the performance of the other contesting garages.

In addition to keeping the men interested through the medium of a bulletin board, the monthly house organ, *Bus Lines*, published the details of the game and the standing of teams to date. Suitable cartoons on the front cover of each issue of *Bus Lines* followed the baseball contest from the beginning through to the end.

The economy of fuel is accomplished in different ways, some of which are up to the driver and others up to the mechanical maintenance of that company. The drivers economize by coasting where it is possible to do so without any reduction in schedule time. There are many hills on the New York streets and long grades where coasting is possible. Tests made in the early part of 1919 show a total coasting distance of 31.5 per cent of the round trip during an average traffic. Not only does the company pay particular attention to the coasting of its buses, but it has gone a step further, by instructing the drivers to coast at designated parts of their routes. More sanity in stopping buses has resulted in gasoline economy. Instead of rushing up to a street crossing controlled by a policeman and throwing on the brakes to stop in time, the driver now uses a little gray matter and coasts up to the crossing so that little braking is needed. A good deal of economy has been accomplished by the co-operation between the driver and the repair or shop department. Every driver is now more careful to see that no brakes drag, as this is a fruitful cause of gasoline waste. The spark-plug points are kept in much better condition, the compression in the four cylinders is watched more carefully, and carbureters have been much more finely adjusted, so that all operate properly on cold days.

Don't Use Waste to Wipe Engines

IN cleaning your motor truck engine, it is a wise policy not to use waste. Very often the lint of cotton waste sticks to the various engine parts and when the engine hood is put down is sucked into the carbureter. When this occurs, the flow of fuel is made irregular and sometimes stopped altogether. On many occasions the cause is not readily found and much time is wasted in blowing out the fuel line only to find the trouble in the needle valve of the carbureter.

Instead of waste, it is much better to use some clean piece of old cloth which has a soft finish and does not give off the lint that is so objectionable in the case of waste.

What holds true in the case of waste lint is also true with road dust and dirt. Under ordinary conditions the engine hood and the engine underpan serve to keep a great majority of the dust and dirt out of the air intake to the carbureter. Sometimes drivers are prone to raise their engine hoods in hot weather because of the belief that permitting a free exit of the air through the sides of the hood will prevent the engine from overheating. This practice is to be frowned upon, since it permits dirt and dust to get inside the cylinders either through the carbureter or the crankcase breather pipe. It also permits dust to get in around the valve stems and render their lubrication less efficient, and into the magneto, if one is used, or into any other of the many exposed engine accessories.

War Truck Auction on September 18

WASHINGTON, Sept. 10.—Auction sales of unserviceable army vehicles, totaling 1243, were set late to-day by the Motor Transport Corps. Those to be sold include trucks, passenger cars, ambulances, motorcycles, side cars and bicycles that "in their present condition are unserviceable for army use, but a number of them can be made perfectly usable by proper repairing."

The first sale will take place on Sept. 18, at Camp Holabird, Md., where 295 unserviceable vehicles will be auctioned. It will consist of fifty-six passenger cars, including Studebakers, Hupmobiles, Overlands, Liberties, Reos, Buicks, Grants, Paiges, Velies, Hudsons, Maxwells, Loziers, Fords, Packards and Chevrolets; five light delivery trucks, principally Fords; ninety-three two-ton trucks of various makes; ninety-nine Nash trucks; twenty-seven 3 to 5-ton trucks of various makes; eight motorcycles, and five Excelsior side cars.

Another sale will be held Sept. 19 and 20 at the Army Supply Base, Norfolk, Va., and at Camps Hill and Stewart, near Newport News, Va. The Norfolk sales will include the Reo, Kissel Kar, Studebaker, Paige and Ford passenger cars; thirty-three trucks of various sizes and types, among which will be found Pierce-Arrows, Maxwells, Studebakers, Nashes, Reos and Fords, and two motorcycles. The sales at Camps Hill and Stewart will include twenty-five passenger cars, consisting of Chalmers, Studebakers, Oldsmobiles, Maxwells, Buicks, Reos, Oaklands, Overlands and Fords; seventy-four trucks ranging from light deliveries to 5-ton types and consisting of Oldsmobiles, Nashes, Pierce-Arrows, Buicks, Republics and Fords.

One 2-ton truck will be auctioned at Camp May, N. J., on Sept. 13, and one Ford passenger car at Omaha, Neb., on Sept. 19. Many other sales have been arranged at many army camps throughout the country, the numbers of cars to be offered varying. Information concerning them may be obtained from the Motor Transport Corps at the various camps.

$10,000,000 FOR SOUTHERN ROADS

NEW ORLEANS, LA., Sept. 10—Impelled largely by the constant effort of the Motor League of Louisiana, and the appeals of thousands of automobile owners throughout the State, the State Highway Department will issue during 1919 contracts for the construction and improvement of highways totaling something more than $10,000,000. Plans have been drawn to cover Louisiana with a network of roads connecting every parish seat, and linking the State system with the highways of every State whose borders touch those of Louisiana. Many of these roads were started before the war. Completion was held up because of shortage of materials and lack of labor, but since the signing of the armistice the work has been resumed and the close of 1919 will find many broad concrete and vitrified brick highways where before wandered nearly impassable trails of dirt and mud.

Better Truck Repair and Maintenance

No. 8—Using Crane to Remove Truck Wheels

ONE of the most conventional methods to remove either front or rear motor truck wheels is by the use of a portable overhanging crane with a semi-circular-shaped base to straddle the wheel so that a direct upward pull may be exerted. A differential block and fall is hung from the boom of the crane and the wheel lifted by a chain hook inserted between two consecutive spokes. As soon as the wheel is lifted clear off the floor, blocking is placed under the rear axle to take the weight off the truck. With this done, the wheel hub cap is removed and the wheel itself taken off by moving the entire crane away from the side of the chassis frame.—C. M. GEIGER, New York City.

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks, THE COMMERCIAL VEHICLE *initiates on these two pages a new department in which better methods of maintaining trucks and the latest ideas in making quick repairs will be published.*

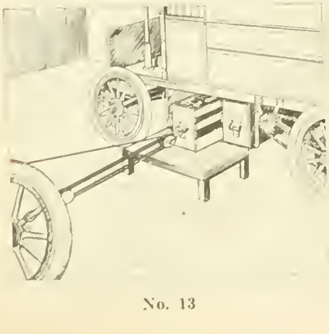
THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 9—Taking Down Electric Truck Motors

ONE simple method to take down the driving motor of an electric truck is by the use of an ordinary ladder and small wooden horse. The wooden horse is placed at the rear end of the truck body and the ladder placed on top of the horse in such a manner that the two end rungs of the ladder under the truck are directly below the motor. The mechanic presses down on the outside end of the ladder to the rear of the truck until the motor is between the two rungs on the inside end. A helper then unscrews the motor fastenings. The rungs of the ladder should be close enough together to hold the motor between them. When the motor is entirely free, the ladder is let down slowly, using the wooden horse as a fulcrum, and allowing the outside end of the ladder to be raised up from the floor. After repairs have been made, the motor may be replaced in the reverse manner.—Otto Stahl Co., New York City.

No. 10—Strengthening the Ford Engine Arms

THE arms or supports of the Ford engine are made of stampings $\frac{1}{8}$ inch in thickness and often break in the corner where the vertical and horizontal arms join. To overcome this difficulty, short pieces of $\frac{1}{2}$-inch rods are brazed into each of the grooves along both edges of the stamping. Four pieces of rods are used for each bracket. Two of these are long and the other two considerably shorter. Each of the long pieces is first laid into the bend of the support while the crankcase is on the work bench. Then, by means of an oxy-acetylene torch, the rod is heated at the bend so that it fits the groove exactly. The next step is to take the torch and a bar of brass dipped in brazing flux and fill up the open spaces around the iron, thus forming an integral unit with the steel of the support. The smaller piece of rod is brazed into place in the same manner to fill up the space between each one of the first bars and the boss of the bracket. It costs about $2.50 to strengthen the two supports on each Ford engine.—F. E. PRECOUR, New York City.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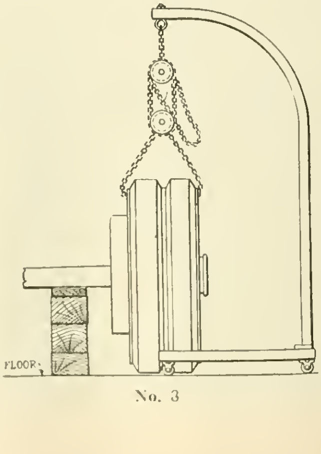

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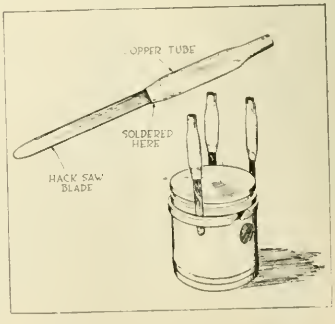

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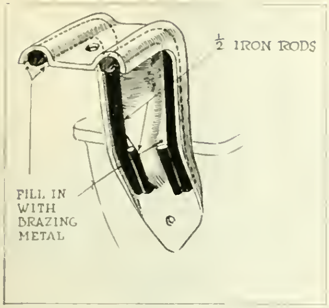

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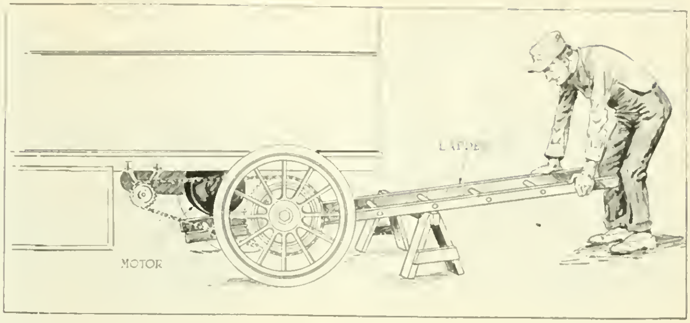


No. 9

No. 11—One Way to Remove Piston Rings Easily

THE ordinary type of piston ring may easily be removed from the piston grooves by means of three hacksaw blades inserted one at a time between the rear surface of the rings and the piston surface. In order to protect the mechanic's hands each saw blade has soldered to it a copper handle, giving the blade the appearance of an ordinary kitchen knife. The blades act as guides when inserted between the piston and the ring.—Otto Stahl Co., New York City.

No. 12—String Holds Valve Springs Compressed

MOTOR truck mechanics who have experienced difficulty in compressing the valve springs sufficiently to place the pins in the valve stems after grinding the valves can save much time and temper if, when removing the valves, the springs are also removed. Place each spring in a vise and compress it. While compressed, run a string through the spring on each side and tie them so that when you remove the spring the string will prevent the spring from expanding. When finished grinding it is a simple matter to slip the spring over the valve stem and replace the pin. When you have all the valves in place, cut the strings on the pins and they will spring into place.—F. H. Sweet, Waynesboro, Va.

No. 13—Removing Batteries Without Lifting

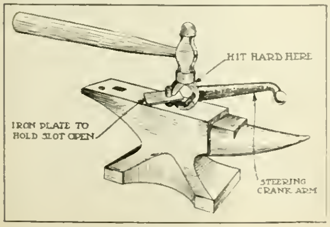
HEAVY electric storage vehicle batteries taken out of their cradles from the side may be removed easily without lifting by the use of a small block and fall and a greased wooden platform, the top of which is level with the floor of the battery cradle. One end of the block and fall may be hooked into the handle of the battery jar and the other end attached at some convenient point, perhaps the wheel of a truck garaged adjacent to the one from which the battery is being removed. The greased top of the small platform permits the battery to be pulled out readily.—Otto Stahl Co., New York City.

No. 14—Tightening a Worn Steering Crank Arm

WHEN the square hole in the end of the steering crank arm is worn so that the bolt inserted through it is loose, the connection between the two may be tightened without the use of shims by reducing the diagonal length of the hole by a hammer blow. This may be accomplished by first of all inserting a thin iron plate in the slot leading to the square hole and of then striking the metal around the hole a sharp blow with a hammer. When the blow is struck, the end of the arm with the square hole should be supported on a vise or other metal part as shown in the accompanying drawing. This method has been used successfully.—Motor World, M. Redlinger, Freeport, Ill.

No. 15—Holder for Grinding Piston Rings

WHEN grinding down piston rings on emery cloth to give the proper thickness, the mechanic is often likely to wear the skin off the ends of his fingers unless he has some sort of holder for the ring. The small circular wood holder shown in the accompanying view permits the pistons to be ground down to the proper thickness without difficulty. The holder consists of a circular disk of wood with a vertical handle at the center. The disk has two flat cross strips of wood, screwed onto the bottom in much the fashion of a cross. The two ends of each strip are rounded off to fit the inside diameter of the ring so that the ring is held in place by its own tension. The thickness of the strips should be a trifle less than that of the ring, so that when the holder is placed on a level board, covered with emery cloth, the ring and not the strips will touch the cloth.—Motor World, Charles H. Willey, Concord, N. H.



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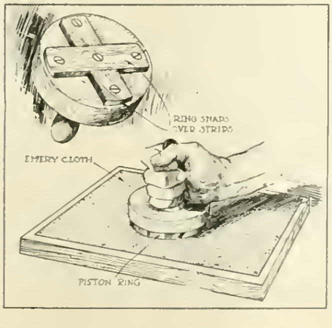

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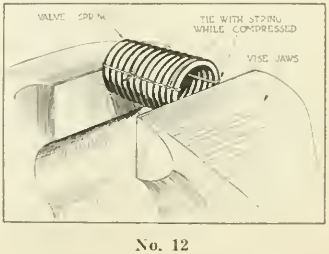
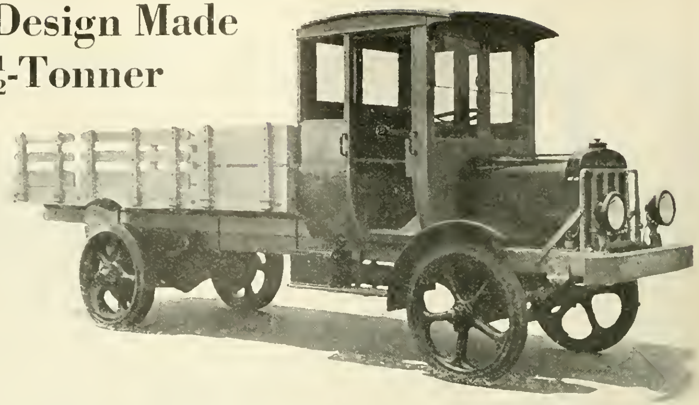


No. 12

Many Changes in Design Made in New Ace 2½-Tonner

ACE SPECIFICATIONS

Capacity, tons	2½
Price	$3,500
Wheelbase, in.	156
Tires, front	36 x 4
Tires, rear	36 x 7
Bore, in.	4½
Stroke, in.	5½
N. A. C. C. hp	32.4
Speed, r.p.m.	1,000
Speed, m.p.h.	15
Gear ratio in high gear	7¾ to 1
Final drive	Worm



The 2½-ton Ace truck, formerly known as the American, which has been completely changed in design. A new 1½-ton model has also been brought out and the 3½-ton and 5-ton trucks have been discontinued

THE American Motor Truck Co., Newark, Ohio, has completely changed the design of its 2½-ton worm-driven model. The new model is known as the Ace and not the American, as before. That company has also brought out a 1½-ton model. The 3½- and 5-ton trucks have been discontinued. The price of the 2½-ton model includes the following equipment: All-Weather cab, Westinghouse electric lights and self starter, steel bumper, odometer, mechanical horn, trailer attachment and cast steel wheels.

The new model is made up of standard parts, including a Parish & Bingham frame, Dayton cast steel wheels, Modine radiator, Buda engine, Atwater Kent ignition, Westinghouse starting and lighting, Exide battery, Zenith carbureter, Pierce governor, Brown & Lipe clutch and four-speed gearset, Timken front and rear axles, Mather springs, Ross steering gear, and Spicer universal joints.

Changes in the new model include a longer wheelbase, 156 inches as against 121 in the old model; a larger engine, 4½ by 5½ compared with 4¼ by 5¼ in the previous model; a multiple-dry-disk clutch instead of the cone type; propulsion through the springs instead of through the subframe; internal foot brakes on the rear wheels instead of the external-driveshaft type; and left steering instead of right.

The four-cylinder L-head engine has its valves cast on the right. The cylinders are cast in block. All of the working parts are enclosed. Other features of the engine include three-point suspension and rear engine supports which rest on a complete universal joint, thus protecting the engine legs against breakage. Fuel is fed to the carbureter by gravity from a 20-gallon tank mounted under the seat. The engine is lubricated by a force feed oiling system. Water is circulated by means of a centrifugal pump through a sectional radiator with a cast iron case and a heavy cast steel guard. Ignition is taken care of by the Atwater Kent system, the Exide battery and the Westinghouse generator and starting motor.

The four-speed, selective gearset is suspended at three points and mounted amidships. Drive is taken from the engine through a two-piece tubular driveshaft, provided with two universal joints in the front and two in the rear of the gearset. From the driveshaft the drive is taken through the worm-driven axle to the springs through to the wheels. Propulsion is through the springs, which are half-elliptic all around. The foot and hand brakes are of the double internal, expanding type on the rear wheel drums. The brake drums are 18 inches in diameter, the width of the brake shoes being 3½ inches. Brake and gearshift control are located in the center. The frame is of pressed steel and of flexible construction.

The cast-steel wheels are mounted with single solid tires all around. Equipment consists of two electric headlights and tail light, an All-Weather cab, jack, set of tools and tool box, oil can, Pierce governor, Veeder hub odometer, Westinghouse starter, mechanical horn, front fenders and runningboard. The springs and all other wearing parts are lubricated by oil cups. The head lights are swiveled so as to follow the cut of the wheels. The cab frame is of wood construction and steel covered inside and outside. The doors and windows are of the sliding type. A double windshield is used.

The total gear ratio in low is 31 to 1; in second, it is 20 to 1; and in third it is 11½ to 1. The total ratio in reverse is 37 to 1.

New Titan 3½-Tonner Designed for High-Speed Service

TITAN SPECIFICATIONS

Capacity, tons	3½
Price	$4,300
Wheelbase, in.	162
Tires, front	36 x 5
Tires, rear	40 x 5
Bore, in.	4½
Stroke, in.	6
N. A. C. C. hp	32.4
Speed, r.p.m.	1000
Speed, m.p.h.	16
Gear ratio in high gear	8 to 1
Final drive	Int.-Gear

THE 3½-ton, internal-gear-driven model being built by the Titan Truck Co., Milwaukee, Wis., and styled the "Hi-Way Transport," was designed for high-speed, long distance service. This model is especially adapted for inter-city express and transfer companies, fast freight contractors, movers, milk collectors, cattle-men, etc.

The Hi-Way Transport model is made up of standard parts, such as a Parish & Bingham frame, Bimel wood wheels, Buda engine, Pertex radiator, Bosch magneto and generator, Willard battery, Duplex governor, Stromberg carbureter, Borg & Beck clutch, Cotta gearset, Shuler front and Clark rear axles, Sheldon springs, Lavine steering gear, and Universal universals.

The four-cylinder engine is of the same size that is used in the 6-ton model. The cylinders are cast in block and the valves placed on the right. Water is circulated by means of a centrifugal pump through a radiator of the zig-zag tube type. The radiator is of the built-up type, with cast, finned tanks. It is supported on cushions with coil springs to absorb rebound. The total water capacity in the cooling system is 10 gallons. Lubrication is effected by a force feed system, under 40 pounds per square inch pressure. Ignition and lighting are respectively taken care of by means of a Bosch single high tension magneto with hand spark control and a Bosch generator and a Willard battery. Fuel is fed by gravity from a tank located under the seat.

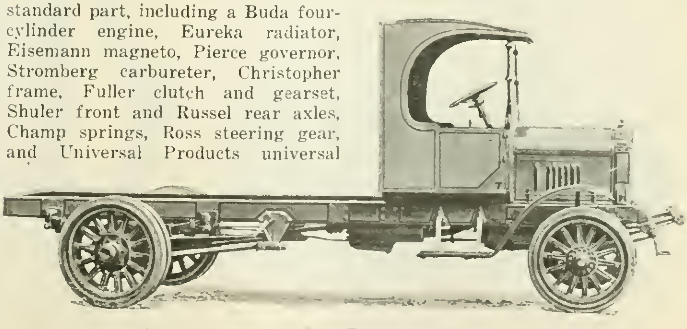
The clutch, which is of the dry-plate type with Raybestos facing material, is enclosed in a separate housing in unit with the engine. The three-speed gearset, which is of the constant-mesh, individual-clutch type, is mounted amidship on a three-point trunnion support. Drive is taken from the engine to the clutch through a short driveshaft to the gearset and from there to the rear driveshaft to the rear axle. Propulsion is taken through the radius rods and driving torque through the springs. Both the front and rear springs are half-elliptic. All of the spring leaves are made of electric silico manganese steel composition. The front springs are 3 inches wide and 48 inches long. The rear springs are 3½ inches wide and 60 inches long. The spring bolts are case-hardened and fitted with bronze bushings. The bolts are of the wick oil reservoir type, supplemented with oil cups.

The foot brake is of the internal type located on the rear wheels. The hand brake is of the external type, mounted on the driveshaft directly back of the gearset. The drums are 20 inches in diameter with 2½-inch and 3-inch widths respectively on the hand and foot brakes.

The frame material is alloy pressed steel, channel section and heat-treated. It is 8 inches high with ¼-inch stock and 3-inch flanges. A feature of this frame is that it is straight, having no offsets. It is of semi-flexible construction, being bolted rigidly in the center. All of the brackets and other fastenings are made by large S. A. E. bolts and heavy lock washers.

The wooden wheels have square spokes and are mounted with single solids on the front and dual solids on the rear. Steering is on the left and brake and gear control are in the center.

Equipment consists of a seat; cab with fore doors and windshield, fully curtained; two electric side lamps and rear lamp; Hubodometer; jack; tools; electric horn; bumper; front fenders and runningboard.



The 3½-ton Titan, styled the Hi-Way Transport, which has been designed for high-speed, long-distance service

Keldon 2-ton internal-gear-driven model, manufactured by the House Cald Tire Setter Co., St. Louis, Mo.

Keldon 2-Tonner, First Model Put On Market by St. Louis Concern

KELDON SPECIFICATIONS

Capacity, tons	2
Price	$2,685
Wheelbase, in.	144
Tires, front	36 x 4
Tires rear	36 x 7
Bore, in.	4¼
Stroke, in.	5½
N. A. C. C. hp.	29.00
Speed, r.p.m.	
Speed, m.p.h.	
Gear ratio in high gear	7.4 to 1
Final drive	Int.-Gear

THE first model of the Keldon truck, manufactured by the House Cold Tire Setter Co., St. Louis, Mo., has been placed on the market. The truck is made in 2-ton capacity and is internal-gear driven. The company plans to manufacture later models of 1- and 3-ton capacities, on the same general design as the 2-tonner. The House Cold Tire Setter Co. has been making machines for shrinking steel tire bands on wooden wheels without the use of heat, but it is stated that the company will devote its time entirely to truck production. F. W. Gordon and T. B. Kelly are the designers of the vehicle.

The Keldon truck is assembled of standard part, including a Buda four-cylinder engine, Eureka radiator, Eisemann magneto, Pierce governor, Stromberg carbureter, Christopher frame, Fuller clutch and gearset, Shuler front and Russel rear axles, Champ springs, Ross steering gear, and Universal Products universal points. Smith cast steel wheels are mounted all-around.

The cylinders are cast in block with the valves placed on the right. Water is circulated by means of a centrifugal pump through a cellular radiator with a cast iron ribbed case. The radiator is mounted on cushion springs to relieve vibration from road shocks. The engine is lubricated by means of a force feed oiling system, designed for heavy duty. The geared pump is located in the base of the oil reservoir. The oil is drawn through a fine mesh screen and discharged by steel distributing tubes to all camshaft and crankshaft bearings. Fuel is fed to the carbureter by gravity from a 20-gallon tank located in the dash.

Ignition is taken care of by a single high tension magneto with a hand spark control. The four-speed selective gearset is a unit with the engine. The clutch is of the multiple-dry-disc type with Raybestos facing. Drive is taken from the engine to the gearset through a two-piece tubular driveshaft to the rear axle.

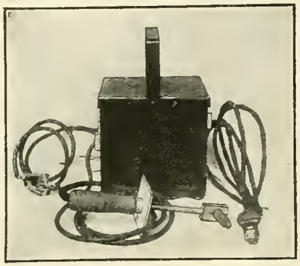
A Barrel of Oil Emptied in Three Minutes with an Optimo Bung

Spence Lead Burner—Perfect Oil Measure—Blooming Oil Cup—American Grinder—Duby Wheel Gage—Shuro Cell Tester—Agrippa Turning Tool

A TIME saving method of emptying oil from barrels and drums has been a problem to fleet owners for years. A device for this work has been put on the market by the L. A. Morgan Co., Inc., Brookline, Mass. This is the Optimo barrel discharging bung, selling at $10 complete, with 24 in. of flexible metal conveyor tubing. This device, which empties a barrel of oil in 3 minutes by air pressure, does away with all labor attached to the operation by hand, eliminates wastage of oil entirely, and makes it possible to handle this or any other fluid without slopping.

The Optimo barrel discharging bung consists of a cone-shaped metal bung turned on the outside and at the same time making an air-tight connection. This metal bung is fitted with a fluid conveyor pipe running through it. This pipe is so designed and arranged as to allow it to telescope upon it, thus giving a wide range of length which is necessary in handling barrels of different diameters. This conveyor tube extends through the metal bung and the top where it is fitted with a high pressure flexible metal pipe. The bung is made with a hex head so that it can be readily screwed into the bung hole with an ordinary wrench. The air chamber connection is a universal joint Shroeder valve, fitting any air connection.

When a barrel of oil arrives, the bung is knocked out and the sleeve of the device is extended outward and placed in the bung hole. After the sleeve is submerged to the bottom of the barrel, two slight openings are left in the bottom end of the sleeve through which the bung passes. The next step in the installation of the device is the screwing in of the bung hole. The air going in through the air chamber exerts a downward pressure on the surface of the oil, forcing it up through the sleeve through the container. The air pressure is applied at the air valve in the same manner as a tire is inflated. The result is an immediate flow of the oil. Less than 5 pounds is sufficient air pressure.



The Spence lead burner, designed to take the place of gas flame outfits

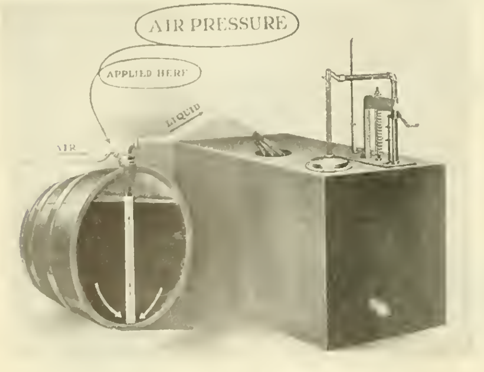
Spence Lead Burner

AN electric set, designed to take the place of the gas flame lead-burning outfits used for assembling loose plates and straps and for burning on connectors has been put on the market by the Spence Electric Co., New York City. The set sells for $40, including spare parts and glasses.

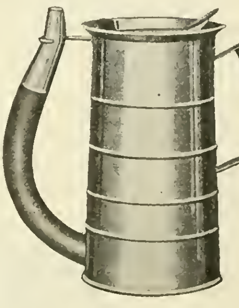
It operates similarly to an electric soldering iron, taking current from any light socket on a 110-volt alternating circuit. Any degree of heat may be obtained; and the varying of pressure at the point of contact gives positive control. Current consumption is about equal to that of a 300-watt lamp, and the outfit may be used successfully by an unskilled operator.

Perfect Oil Measure

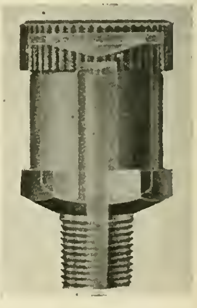
FLEET owners who are looking for an oil can that will speed up work at night when the trucks are being lubricated and that will elimi-



The Optimo barrel discharging bung, which works by air pressure



The Perfect oil measure has a flexible spout and a valve which controls the flow of the oil

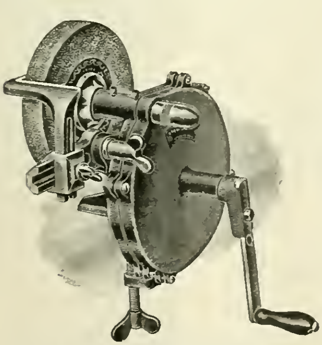


The Blooming oil cup feeds bearings when truck is in motion nate waste will be interested in a can that is being manufactured by the Bailey-Drake Co., Chicago. It is made in $\frac{1}{2}$-gallon and 1-gallon sizes, either tinned or coppered. The price is $3 and up.

This can is designed to deliver oil in any desired quantity without waste. A valve in the bottom of the measure controls the flow of oil through the nozzle. This valve is operated by a thumb lever located just above the handle and the can measures as it serves. It is intended for garage work especially, and is in effect a combination of container, strainer and flexible funnel.

Blooming Oil Cup

A NUMBER of automatic oil cups have been put on the market that feed the bearings of the truck when it is in motion. One of these is being manufactured by the Bloom Flusher Co., Tiffin, Ohio. It is intended for steering knuckles, shackles, shackle bolts, axles and other parts where the wear is greatest. Its action is dependent on four unfailing factors: Splashing due to constant vibration, the action of gravity, capillary attraction and the suction caused by the flexing action of the bearing. Excessive flow is retarded automatically through a vacuum created in the cup. These cups have $\frac{1}{8}$-inch standard pipe threads, making them interchangeable with existing oil or grease cups. They have no valves, springs, balls, wicks, plungers, vents, or moving parts of any kind, and they are designed to work equally well with any standard brand of oil.



The American grinder which is self-oiling

American Grinder

A DEVICE that is needed in fleet owners' machine shops and garages is a fast-cutting grinder. The American Grinder Mfg. Co., Milwaukee, Wis., make a self-oiling grinder that sells for $20 without attachments. A twist drill attachment costs $10, a chisel attachment is $3, and the price of a redresser is $2.

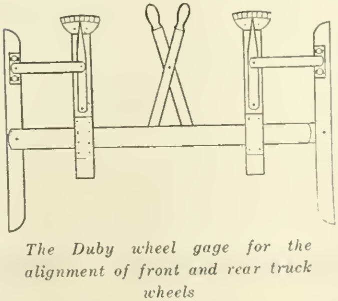
The oil-tight gear encloses the machine cut gear and pinion. Bronze bearings insure smooth, even transmission and long wear, and the mechanism operates in a continuous oil bath. The grinder comes equipped with tool rest and an 8 by $1\frac{1}{4}$-inch alundum grinding wheel.

The Shuro cell tester registers the voltage and current

Duby Wheel Gage

DURING the overhauling period, fleet owners should test the alignment of the front or rear wheels. J. F. Duby, Dorchester, Mass., has put on the market an equipment designed to positively test the alignment of either front or rear wheels. The price of this equipment is $12.

While in use the legs and castors hold the gage at the correct height and by spreading the handles the gage heads are brought in contact with the insides of the tires. The pointers register on the dials, indicating whether the wheels are out of alignment.



The Duby wheel gage for the alignment of front and rear truck wheels

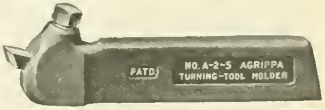
Shuro Cell Tester

A DEVICE that is designed to make tests accurately and quickly on storage batteries is being made by the H. B. Shontz Co., New York City. The price is $17. It can be held in any position while making a test, being neither positive nor negative. It is furnished with a double-reading meter and light and is operated by simply placing the prods on the posts of each cell. Exact conditions can be immediately determined by looking at the light or the meter while making a discharge test. The instrument registers both the amount of current and the cell voltage at the same time by a single indicator rotating on a double scale.

Agrippa Turning-Tool

FLEET owners maintaining repair shops must use tool holders of some description or resort to the old-fashioned and costly method of forging their cutting tools from heavy bars of solid high speed or other tool steel. J. H. Williams & Co., manufacturers of drop-forgings and drop-forged tools, with plants at Brooklyn and Buffalo, N. Y., have added a line of set screw pattern turning-tools with right and left hand offset and straight shanks to their line of Agrippa tool-holders. The prices of these turning-tools range from $1.70 for the $\frac{3}{16}$-inch cutter size to $8.50 for the $\frac{3}{4}$-inch size.

The nose of the holders, or shanks, of both cam and set screw turning-tools is beveled to permit their convenient use in close quarters. The tools are all drop-forged from carefully selected steel. The cutter-holding channel is carefully broached to accurate size in special machines and provides an absolutely rigid seat for the cutter.



Agrippa turning tool

For those who purchase cutters made of a steel rolled to the variation in size common to usual machine shop practice, the makers recommend turning-tools of the cam-fastening pattern as giving the greatest economy, strength and efficiency. Agrippa cutters, made from high speed, bar steel are cut to the diamond point form or bevel. They thus provide for the most common requirements with a minimum of grinding.

The Editor's Viewpoint

Subdividing Truck Operation

AS soon as a motor truck fleet grows to ten or more vehicles, its operation, to be economical, requires the services of more than one man. Many owners operating even larger fleets have tried this one-man supervision, but without success. If the proper supervision of a fleet of ten or more trucks —supervision which slights no phase of the work— is too much for one man, then obviously the fleet owner must find a means to subdivide the work.

Several operators of large fleets of trucks have solved this interesting and most important problem by dividing the work into three distinct heads —Transportation, Operation and Maintenance.

The Transportation Department buys the trucks, allocates them to the work to be done, keeps the cost of operation and the cost of delivery per ton, per package or per commercial ton-mile or package-mile, as the case may be. In addition, it carries on all the office supervision necessary to make the fleet an efficient, workable transportation organization. It may also cast the deciding vote in such matters as type and size of body when special bodies or demountable bodies are deemed necessary for the more economical operation of the equipment.

The duties of the Operation Department include the planning of the routes, scheduling of the loads and supervision of the drivers, helpers or others engaged in loading and unloading the vehicles.

Then there is the Maintenance Department. Too often the importance of this department is not fully realized. This is especially the case when the fleet of trucks is comparatively new. Some fleet owners seem to believe that trucks should maintain themselves. They find out, however, sometimes to their sorrow, that even new trucks need maintenance. From the moment that a railway locomotive goes into service it gets its roundhouse attention. So it should be with motor trucks.

Many fleet owners make the mistake of believing that a first-class truck transportation man is also capable of supervising the maintenance of the truck. In nine cases out of ten the efficient transportation man, one who might be put at the head of the Transportation or Operation department, is a fizzle as a superintendent of maintenance. This condition exists because the superintendent of maintenance must be a specially-trained man who understands more the mechanics of the truck and shop practice than the details of routing, dispatching and the like. Added to these qualities, the head of the maintenance department must also be an organizer and able to lay out work so that it will pass through the shop without a hitch. Such a man is difficult to obtain, yet is worth his weight in gold when it comes time to check up the cost of truck operation over a 5- or 10-year span of time.

Even with the most desirable men of proper qualifications at the head of each of these three departments, the greatest amount of work at the least truck cost cannot be obtained unless all three men work in entire co-operation. This is most important.

Better Seats Needed

THERE are many things which can be bettered in the present-day motor truck. One of these is the driver's seat. To-day the driver's seat is not comfortable enough and does not last long enough. These two deficiencies are both due to the construction of the seat and the attempt on the part of the maker to keep the final selling price as low as possible, especially when it can be done in an accessory which looks like the best but does not wear or last like the best.

The present driver's seat soon gets a depression or hole in it, with the result that the driver feels every bump the truck hits, especially when the truck is mounted on solid tires. He not only feels it, but hits the bottom. Day in and day out, this gets on his nerves and he does not give either the truck or his employer the best that is in him. A few dollars added to a better seat may mean a few hundred dollars more work during the life of the truck.

The Readers' Forum

Articles on Use of Industrial Trucks

To the Editor, COMMERCIAL VEHICLE:

We are deeply interested in transportation as applied and put into operation in modern industrial plants. Our plant is a modern steel producing plant having an annual output of approximately 180,000 tons of steel, made into steel castings, forgings, rolled steel wheels and tires. Transportation of product from one department to another is of great importance in getting out production. Have you any published articles on such transportation?—W. H. FOSTER, Mechanical Engineer, Standard Steel Works Co., Burnham, Pa.

THE COMMERCIAL VEHICLE has published several articles on the use of industrial trucks in manufacturing plants as follows:

Oct. 1, 1917, on pages 28 and 29 you will find a description of Lansing tractors and the use to which they can be put in factory work.

Nov. 1, 1917, pages 44 and 45 give a description of the use of industrial tractors on pier No. 14 of the Pennsylvania Railroad Co. on the Hudson River. There is also a sketch given with this article showing the lay-out of the pier and how the tractors are used most efficiently.

Jan. 1, 1918, pages 26 and 27 give a description of the use of industrial tractors in one of the large ammunition plants which during the war made good use of this means of decreasing the number of men doing factory work.

June 1, 1918, pages 20 to 22 give an illustrated article on the use of electric industrial trucks and tractors for handling cotton in the plant of the Savannah Warehouse & Compress Co., Savannah, Ga.

Dates of Chicago and New York Truck Shows

To the Editor, COMMERCIAL VEHICLE:

Will you tell me the dates on which the New York and Chicago motor truck shows will be held this year.—M. M., New York City.

The New York show will be held from January 3 to 10 at the Eighth Coast Artillery Armory, 193d Street and Jerome Avenue, Bronx, N. Y., and the Chicago show from January 24 to 31 in the stockyard section of that city.

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Moving Picture Bodies Are Built on Order

To the Editor, COMMERCIAL VEHICLE:

Will you please give me whatever information you have available regarding a mobile moving picture outfit as mounted on a motor truck? I intend to show pictures in towns where no theaters are located by mounting the outfit on a 1- to 1½-ton truck. What would be the price of such an outfit?—A. STUELER, New York City.

There is no special truck built for the express purpose of being used just for moving picture work. Any truck can be used in this work and the size of your moving-picture machine will govern the size of your truck. We note that you state that you wish to mount your machine on a 1- to 1½-ton truck, and we would advise that you can find a complete list of this size of truck on pages 20 and 21 of the Nov. 1, 1918, issue of THE COMMERCIAL VEHICLE. Specifications giving chassis price, wheelbase in inches, kind of tires fitted, the N. A. C. C. horsepower, electric system mounted, the type of gearset and the final drive of each truck in this size is given on these two pages. The tabulation mentioned will give you the chassis prices of all trucks offered in the 1- and 1½-ton classifications. The price of the body will vary according to its size and elaborateness.

We have published in THE COMMERCIAL VEHICLE two articles regarding the use of trucks in the motion-picture business. One appeared on page 25 of the Dec. 15, 1916, issue and described one of the trucks used by the Vitagraph company, and the other appeared on pages 22 and 23 of the Oct. 15, 1917, issue in a story entitled "Y. M. C. A. Trucks Carry Movies to Sammies."

Further information can be secured from the Chairman of Motion Pictures, 5010 Abbott Avenue, Dallas Tex., by addressing him direct.

Much Valuable Data on Truck Operation

To the Editor, COMMERCIAL VEHICLE:

In the near future we propose to start an educational tour through Northern California for the purpose of disseminating information on truck operating costs, loading methods, the use of proper sized units for certain classes of work, proper tire equipment, the use of trailers and the comparative utility of trucks and horse-drawn equipment. Very often our lecturer will speak to farmers and so we would like information on the use of trucks on the farms. Can you call our attention to any articles published in THE COMMERCIAL VEHICLE on any of these subjects?—CLIFFORD A. WILLIAMS, Western Motors Co., San Francisco, Cal.

THE COMMERCIAL VEHICLE has unquestionably published a very large quantity of general and specific information regarding the operation and maintenance of motor trucks and below we are giving you a list of some of the articles which we believe would be of interest to you.

July 15, 1919, **Trucks Have Advantages of Speed and Low Cost in Farm-to-Market Milk Haulage**, pages 24 and 25. In this article is pointed out how milk is hauled into Milwaukee from a radius of 25 miles.

July 1, 1919, **Problems Which the Fleet Owner Doing Overland Haulage Work Must Solve**, pages 5 to 7 and continued on pages 30 and 31. The Progressive Transfer Co., around which this story is written, operates out of St. Louis and points out the steps which must be taken in forming a well-organized transfer business.

July 1, 1919, **Fleet Owner Opportunities in Livestock Haulage**, page 9, is a short story telling of livestock haulage by truck.

July 1, 1919, **Detroit Public Haulage Men Increase Profits by Giving Surplus Work to Associates**, pages 12 to 14 and continued on page 25. The story of the work of the Detroit Transportation Assn. is told in this article.

June 15, 1919, **Farmers Get Benefits of Fleet-Owner Service Through Co-operative Truck Line**, pages 5 to 9. Advantages of co-operative rural motor truck express are pointed out in this article.

June 15, 1919, **Livestock Haulage to Omaha Shows How Fleets of Trucks May Be Used Economically**, pages 21 to 24. As the title suggests, this is a story on the Omaha stockyards and how the trucks are used to bring the livestock into the yards.

June 15, 1919, **Ask Your Drivers These Eight Questions**, page 25. This is a short article which points out eight questions which every motor truck driver should be able to answer.

June 15, 1919, **Federal Combination Truck Body Designed for Express and Dump Body Work**, page 31. This is a description of the Federal combination body which it is offering

June 1, 1919, **What a Truck Cost System Will and Will Not Do**, page 11. This is a short article regarding cost systems which might prove of value to you.

June 1, 1919, **Republic All-Purpose Truck Body for Farm Work**, page 23. A description of the Republic body which may be used for several purposes.

June 1, 1919, **Philadelphia Owners Find Average Operating Cost of 5-Ton Dump Truck to Be $26.09 a Day**, pages 32 and 33. This is a résumé of the answers received from the Philadelphia truckmen on what it cost to operate their trucks.

May 15, 1919, **Trucks Plus Good Roads Move Food Crops Both Quickly and Economically**, pages 5 to 9. A story on how grain was moved in the Sacramento Valley by motor trucks.

May 15, 1919, **How to Get More Solid Tire Mileage**, pages 27 and 44. Some hints of how to take care of your solid tires.

May 1, 1919, **Countrywide Investigation Shows Great Value of Motor Trucks to the American Farmer**, pages 21 to 23. In addition to a description of how trucks are being used on the farm on page 23 of this article you will find a table on the comparative cost of farm haulage by motor trucks and horse wagons.

May 1, 1919, **Motor Truck Costs May Be a Delusion if They Are Not Properly Outlined and Used**, pages 29 and 40. This article, which deals with the cost system of THE COMMERCIAL VEHICLE, was given in a talk by Joseph Husson at the Motor Truck Club of New Jersey.

April 15, 1919, pages 32 and 33, **How Fleet Owners May Keep Their Truck Costs in Simple Yet Adequate Manner.** With this article you will find cost figures indicated on our monthly cost sheets for six 3½-ton Wilson trucks operated in Detroit, Mich.

April 1, 1919, **Trucks Help 27-Year-Old Contractor to Establish a Profitable Business**, pages 5 to 9. This indicates the yearly costs of a Pierce-Arrow and Peerless 5-ton trucks.

April 1, 1919, **Actual Truck Rates on Hauls Out of New York**, page 11. With this one-page article is given a table comparing the costs of less carload freight movement and motor truck transportation for 100 pounds.

April 1, 1919, **Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections**, pages 16 to 19. This article points out the advantages of hauling livestock by truck and tells of the experiences of several overland trucking companies.

April 1, 1919, **Trucks Haul Hogs from Fort Worth Stockyards to Farm for Fattening and Resale**, pages 19 to 21. This is a story of how underweight hogs were hauled to and from the stockyards and how the food which they were fed up with was hauled from near-by camps by means of motor trucks.

March 1, 1919, **Concrete Roads with Proper Foundations Increase Motor Truck Efficiency**, pages 26 and 27. This article points out the need of permanent highways.

March 1, 1919, **Reo Company Operates an Overland Haulage Line to Get Incoming Goods from Detroit**, pages 21 to 23. This gives the daily costs of a Reo 1-ton truck.

February 15, 1919, **Field of the Motor Truck and Trailer in Cotton Haulage in the South**, pages 17 to 20. This article points out the efficient use of trucks and trailers for cotton hauling in the South.

February 1, 1919, **Trucks Save Money Hauling Hogs in St. Louis**, pages 30 and 31. The use of trucks in hauling hogs to the St. Louis stockyards is told in this article.

January 15, 1919, **Motor Trucks Enable Lighting Company to Give More Efficient Service Within a 90-Mile Radius**, pages 25 to 27. These costs cover a 9-month period for a G. M. C. 1½-ton truck.

January 15, 1919, **Department Store Truck Delivery Eliminates All Labor and Equipment Worries**, pages 5 to 8. This is an estimated monthly truck cost of a Ford truck.

November 1, 1918, **Detroit Truck Owner Finds Success by Developing Motor Line in Poorly Served Territory**, pages 47 to 49. Here is indicated an estimated daily cost of operation of a 3½-ton Acason.

October 15, 1918, **Buffalo Industrial Tractor Maker Finds Costs of Road Motor Trucks Indispensable**, pages 20 to 23. This company operates an Atterbury 2-ton truck and a Pierce-Arrow 2-ton truck, the costs for 1 month for which are shown.

October 1, 1918, **Gotham Laundry Trucks' Success Due to Reliable Service**, pages 5 to 9 Here cost figures for an Autocar 2-ton truck are given.

July 15, 1918, **Truck Operating and Maintenance Costs in New York City**, pages 20 to 22. Show figures for a Chase 3½-ton truck.

June 1, 1918, **Buffalo Finds Motor Sweepers More Efficient Than Horses**, pages 5 to 9. Cost figures for a Pierce-Arrow tractor-trailer operated by the City of Buffalo are given, also for two Elgin sweepers.

April 1, 1918, **Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton**, pages 5 to 9. Cost figures for a Republic 3½-tonner are given.

March 15, 1918, **2-Ton Lumber Truck Replaces Three Horse Wagons and Pays for Itself in 1 Year**, pages 26 and 27. Cost figures for a Republic 2-tonner are given.

Truck Life Figured in Miles, Not Years

To the Editor, COMMERCIAL VEHICLE:

Will you please give us any data which you may have on the average life in years and also in mileage of motor trucks in the class of Service, Packard, Pierce-Arrow and White.—CRAMER-KRASSELT Co., C-K Bldg., Milwaukee, Wis.

We would say that it is becoming customary to gage the life of a truck by the number of miles it will run rather than the number of years. This is due to the fact that as a general thing a truck wears out in proportion to the number of miles it is run. Some trucks which cover a small mileage yearly will undoubtedly last longer than those which cover a greater mileage so that the mileage basis gives a more scientific method of estimating truck life and truck cost.

The total mileage which any of the trucks which you mention might be expected to cover before being worn out is a very difficult question to answer because of the great variety of work in which trucks are engaged. As a general rule, however, the mileage life is assumed to be somewhere between 100,000 and 150,000 miles. The White Co. has recently advertised that it has many trucks which have run far in excess of 100,000 miles and are still giving service. The Packard Co. figures that its trucks should give at least 150,000 miles of good service if maintained with proper care and supervision.

Fit Ford with Pneumatics All Around for Speed

To the Editor, COMMERCIAL VEHICLE:

Will you please give us your advice as to what size of pneumatic tire to fit on a Ford truck chassis in order to improve the riding qualities and also get more speed with the same r.p.m. of the motor. I would think one-half way between the present truck tire and passenger car tire would be about right. My load will be about 800 or 900 pounds, exclusive of the body, which will be as light as possible and still sufficiently substantial to stand hard usage.—F. M. GRANT, P. O. Box 411, Ekalaka, Mont.

We think it would be a good plan to retain the 30 x 3½ pneumatic tires now fitted as standard equipment on the front wheels of the Ford model TT 1-ton truck. If you wish to replace the 32 x 3½ solid tires fitted on the rear wheels of the same truck as standard equipment, a 32 x 4 inch pneumatic would probably be the best size to use. A 32 x 4 inch pneumatic tire has a maximum weight carrying capacity of 500 pounds as against 410 pounds for a 3½-inch pneumatic. While you say your load will only be between 800 and 900 pounds, and while all of this is not supported on the two rear tires, we would think it best to use the 4-inch tire instead of the 3½ to allow for overloads which you will undoubtedly encounter. With a 4-inch pneumatic tire the inflation pressure for a tire of the cord construction should be about 36 pounds per square inch and about 40 pounds per square inch for an ordinary fabric tire.

Truck Use Grows with Road Improvements

11,944 Miles of Road Built and 203,556 Miles Repaired During 1918

WASHINGTON, D. C., Sept. 6—Cash expenditures on rural roads and bridges in the United States for 1918 amounted to $286,098,193, according to the Bureau of Public Roads, which adds in its report that the most striking single development of the year was the tremendous increase in motor truck traffic. Motor trucks now comprise close to 10 per cent of the grand total of motor vehicles.

During last year, 11,944 miles of roads were built, 203,556 miles of road maintained and 12,973 bridges constructed, all of this work being accomplished by the various states and with the aid of the Federal Government. There is now a total of 2,478,552 miles of rural roads in the United States, which includes 299,135 miles of surface roads. Texas, with 128,960 miles, leads in the amount of public roads, as against Kansas, which is second, with 111,052. Ohio, with 31,800, and Indiana, with 31,000 of surface roads, lead all other states.

FEDERAL AID ROAD WORK

WASHINGTON, D. C., Sept. 6—The Bureau of Public Roads approved Federal aid statements from the various states for 1426.84 miles of road in June, estimated to cost $25,611,314.99, with the Federal aid allowance of $11,725,500.61. The June statements bring the total amount of Federal aid applied for up to $54,654,984.44 to date.

Illinois sets a new record with two new projects, one for 86 miles of road to cost $2,321,650 and another for 150 miles to cost $4,463,511.60. This latter contemplates the completion of the Old National Road, extending from the Potomac River to the Mississippi River, and the Illinois improvement will extend completely across the state. The first project involves construction of the East St. Louis-Springfield highway and is an important link in the state highway system.

HARTFORD AGAINST NEW TRUCK LINE TO NEW YORK

HARTFORD, CONN., Sept. 2—Holding that present systems are adequate to all demands that may be made upon them, the transportation committee of the Hartford Chamber of Commerce has promptly disapproved of the plan suggested by the secretary of the New York Central Railroad to establish a motor truck express freight line to operate on a definite schedule between New York and Hartford. The committee cites as reasons for disapproval of the plan that Hartford already has rail and water transportation facilities, express trolleys to all intermediate points, and that the roads of the state are already overburdened with heavy motor truck travel. Among other members on the committee is the division superintendent of the New Haven road and the general manager of the trolley company. The New Haven system is interested in the trolleys and also in the boat line. The New Haven system, in other words, controls the state over the usual lines of freight transportation save by motor trucks. Disapproval of the project is not in the least surprising.

ST. LOUIS PROTECTIVE LAW

ST. LOUIS, MO., Sept. 4—Persons and firms owning vehicles used in business in St. Louis are wondering where enough painters can be found to enable them to comply with the provisions of a city ordinance, recently enacted, providing that the name and address of the owner must be painted on each vehicle after Sept. 14. Some of them insist there are not enough painters in St. Louis to do the job by then, if they all did nothing else in the meantime. The ordinance includes all vehicles used for commercial purposes, from the heaviest motor truck down to paper carriers' carts. It includes the city salesman's runabout and the ragman's wagon. The purpose of the ordinance is to identify the owner in case of accident and to aid in identifying auto thieves who use stolen vehicles. The letters must be at least 3 inches high and in a prominent place.

INTERURBAN EXPRESS EXPANDS

SIOUX CITY, IOWA, Sept. 3—The Interurban Motor Express Co. has secured a quarter block at Fifth and Iowa Streets, including a building 150 x 150, which is to be remodeled to suit its needs. The company operates on a regular schedule over a number of routes and has recently added routes to Vermilion, S. D., one to Rubie, Iowa, and one to Brunsville, Iowa.

TEXAS WILL GET ROADS!

AUSTIN, TEX., Sept. 4—Texas is undertaking a road-building program unprecedented in magnitude by any such improvement ever undertaken in the state. Since the beginning of the year county and district bond issues have been voted amounting to more than $70,000,000, and it is probable that before the end of the year this amount will be increased to near the $100,000,000 mark.

In addition, the people will vote on a road amendment Nov. 4. This amendment proposes the raising of the 15-cent limit for taxing for road and bridge purposes to 30 cents on the $100 valuation. In addition it proposes that people of any district by a majority vote may levy a special road maintenance tax of as much as 60 cents on the $100 upon themselves.

NEW MICHIGAN TRUCK LINE

MENOMINEE, MICH., Sept. 4—The Upper Peninsula Motor Transit Co. will begin operations between Escanaba and Menominee soon. The organization of the company has been perfected and the necessary trucks purchased. Two trucks will operate each way daily.

$400,000,000 More for Good Roads

Bill In Congress Aims to Carry Out Federal Road Aid Act of 1917

WASHINGTON, D. C., Sept. 8—A bill has been introduced in Congress by Senator Sheppard appropriating $400,000,000 at the rate of $100,000,000 per year for the next 4 years, as additional appropriations for the purpose of carrying out the Federal Road Aid Act of 1917.

The bill also provides that where sparsely settled states find it difficult to meet the Federal aid funds with an equal amount, the Secretary of Agriculture shall have the power to pay more than 50 per cent of the cost of the projects.

OFFICERS ELECTED BY DETROIT ASSOCIATION

DETROIT, Sept. 9—At the annual meeting of the Detroit Transportation Association, held Friday, Sept. 5, the following officers were elected: President, E. Foster Moreton; vice-president, James Cahill; treasurer, Joseph Turner; managing secretary, F. L. Henk. The new board of directors will consist of Joseph Maniero, A. F. Newman, Charles Nielson, Frank Holiday, Thomas O'Brien and Fred Baier. The membership now consists of more than 100 companies, operating over 600 trucks of all sizes.

NORTHWEST SHIPS BY TRUCK

CHICAGO, ILL., Sept. 3—Although little has been published concerning the ship-by-truck activity in the Northwest, a list of the lines operating in Minnesota, Wisconsin, the Dakotas and Montana shows forty lines operating regular routes in and out of Minneapolis and St. Paul and seventy-two lines in Minnesota alone. New lines are being established every month.

NEW SHIPPING RATE RULED

CHICAGO, ILL., Sept. 6—The Chicago Eastern District Freight Traffic Committee has ruled in favor of a change in freight rates on vehicles of all kinds, carload, also vehicle bodies and cutter bodies, carload, in the white unfinished, between points in central territory and Chicago, Peoria and Mississippi Valley Crossings on shipments destined to points west thereof governed by the Illinois and Western classifications.

The official classification basis replaced a fourth class basis, by ruling of the committee. Action in the case was initiated by the Central Territory Freight Traffic Committee, which argued that the rates on these commodities between points in the central territory were on the official classification basis, and that no necessity existed for continuing a lower basis of traffic destined to points in the Western territory.

Research Laboratory for Oil Industry

$1,000,000 Will Be Spent On Project—Joint Meeting Held in Colorado

NEW YORK CITY, Sept. 4—Further co-operation with the automotive industry in attempts to solve fuel problems were outlined here to-day by officials of the American Petroleum Institute, whose plans include the establishment of a large research laboratory for the study of all matters concerning the oil trade. Action to this effect was taken by the directors of the institute at a meeting just held at Colorado Springs, Col.

The plans follow closely upon the joint meeting here of committees representing the institute and the automotive industry, as comprised by the Society of Automotive Engineers, the National Automobile Chamber of Commerce and the Motor and Accessory Mfg. Assn. Additional efforts at co-operation between the two industries will result from the plan for establishing the proposed laboratory.

The oil directors approved the expenditure of $1,000,000 for the project. The necessary financing was left to a committee consisting of Henry L. Doherty, of New York; Walter C. Teagle, president of the Standard Oil Co., of New Jersey; Dr. Van H. Manning, director of the Federal Bureau of Mines, and R. L. Welch, general secretary of the institute. As much of the work of the laboratory will be directed to engine problems, the committee plans to work in conjunction with automotive leaders.

TRUCK CO-OPERATION

ST. LOUIS, MO., Sept. 8—Commission merchants of Montgomery City, Mo., have made arrangements to have their goods hauled in trucks from St. Louis if strikes interfere with express and freight traffic. The plan is to have trucks from St. Louis filled with express goods meet trucks from Montgomery City halfway, so that each trip can be made in 10 hours, even with heavy loads. The trucks will supply the towns between St. Louis and Montgomery City with emergency goods.

TRUCKS USED DURING CAR STRIKE

LOS ANGELES, Cal., Sept. 2—Never has there been seen in this part of the United States, and perhaps in the entire country, such a practical demonstration of the utility of the motor truck as that which now prevails. Los Angeles for a week has been entirely apart from other sections of the country through the combined strikes of its street railway, electric intercurban and steam railroad systems. For days not a wheel has been turned on a railroad track for the transportation of either mail, passengers or freight.

Into this breach has stepped the motor truck. Without the truck there would be absolutely no transportation except such as could be rendered by horse, boat and airplane. But with the trucks the city's business is moving along almost in a normal way. Trucks and passenger cars are now being used for practically every purpose. Old trucks that had been in the discard for need of repairs have been reconditioned rapidly and are now rendering valuable aid to an otherwise stricken community.

THEATER MAKE-UP HAULED BY TRUCK

BLOOMINGTON, ILL., Sept. 10—J. W. Percy, manager of a traveling theatrical company, known as Percy's Comedians, playing in repertoire and making 1-week stands, has found it economical to use a 2-ton truck with a trailer to handle the baggage and scenery from city to city, instead of depending upon local transfer companies. Prices charged for handling baggage and scenery in most of the cities of the Middle West have increased enormously and have become a burden to the troupes playing the smaller cities. Percy finds that he is saving money in owning his own truck and is also assured of more reliable service. As the jumps average but 25 miles, the truck can take care of the transfer work without difficulty and the innovation, so far, has been found a complete success.

TRUCK MOVES HOUSE

ST. LOUIS, MO., Sept. 5—The Brashear Truck Service Co., of this city, has just completed the hauling of a complete household from Belleville, Ill., to Springfield, Mo. The Commercial Club of Springfield assisted in obtaining a return load. In spite of the fact that motor truckage is becoming popular in Missouri for hauling household goods, because of the saving in crating effected, it has been found that bad roads are a serious hindrance. J. R. Brashear, president of the Service Company, reported that he had experienced very bad roads on his latest venture, that the truck went through one bridge and that the crew had to repair roads before they could get over them.

NEW YORK-BOSTON TRUCK LINE

BOSTON, MASS., Sept. 5.—F. L. Z. Caracristi, who was formerly identified with the Ford Motor Co., has formed the New York & New England Freight & Storage Co. He plans to do long distance hauling between the two cities and has opened temporary quarters until a new building is finished in the fall.

MISSISSIPPI GOOD ROADS WORK

JACKSON, MISS., Sept. 5.—The campaign for good roads in Mississippi is pressing steadily forward. This month the voters of Warren County will pass on a bond issue of $500,000 to be used in the construction of new highways, and Hinds County is issuing bonds for $125,000, in addition to about half a million already issued for the same purpose.

Truck Tour Reaches State of Iowa

Farmers Shown Efficiency of Trucks In Hauling of Grain and Corn

CHICAGO, Sept. 10.—The Motor Truck Development Tour, which left Chicago on Aug. 4, has now reached the State of Iowa, and in spite of the bad roads in that state, the motor trucks, all on pneumatic tires, went through mud to the axles but came through without much trouble. In a speech made by Governor Harding of Iowa he said that the prosperity of the State of Iowa depended on its good roads and that they should be built to carry the traffic that it must carry and that the roads ought and would be built heavy and strong enough to carry the heaviest loaded motor truck, even if the state had to spend $30,000 a mile for it.

In Iowa Falls, Ia., a farmer was doing some threshing, with about 10 double horse teams, from a patch 1½ miles away. The farmer was induced to haul off the horses and with four motor trucks a 35-acre patch of wheat and oats was cleared in 3 hours, hauling the grain to the barn in a large truck with a special farm body. Five trucks released ten horse drawn teams and about 10 to 15 men's loading time.

At Ames, Ia., one of the trucks, a 2-tonner, left at 7.43 a. m. for a farm 4 miles out and arrived at 7.58—15 minutes running time—for a load of shelled corn. He received his load by 8.55 and was back in Ames again by 9.08—13 minutes—with a 98-bushel load of corn.

NEW TRAYLOR TRUCK

ALLENTOWN, PA., Sept. 5.—Plans have been made by which the Traylor Engineering Co. of this city will commence the manufacture of motor trucks, in addition to speeding up and expanding tractor production. Output on a large scale is expected soon, as the company has facilities both here and at Cornwallis, Pa.

Both trucks and tractors will be of new designs, the latter being a high-speed light model improvement of the Sample tractor that the company has been making.

GARFORD PRODUCES NEW MODEL

LIMA, OHIO, Sept. 8—A new model, known as 25, of 1¼ ton capacity, has been added to the truck line of the Garford Motor Truck Co. Announcements of its specifications were made here to-day.

The new truck sells at $1890 and is built with frame and axles of a strength of a heavier capacity than its designation. The engine is 22 hp., four cylinders of the dimensions of 3¾ x 5⅛ in. The tires are solids, the fronts being 36 x 3½ and the rear 36 x 4. Electric lighting and starting equipment is $125 extra.

Pa. to Enforce New Laws Sept. 15

State Will Send Out a Squad of Inspectors to Guard Against Infractions

PHILADELPHIA, PA., Sept. 3—Rigid enforcement of the new motor vehicle regulation act will start throughout Pennsylvania on Sept. 15. State highway authorities are preparing to ask state and local police to co-operate in the movement. This act, which provided a code for licensing and regulation of motor vehicles of every description in Pennsylvania, was approved in July.

The state will send out a squad of inspectors on motor vehicles to see that the law is kept on all state highways. It is announced that these men will be equipped and fully empowered to act and will have with them devices for checking and testing excessive weights, glaring headlights and other infractions.

Inspectors also will be detailed on that date to check up second-hand car dealers and public garages in regard to the records and reports required under the newly approved laws. The department also has announced that tests of headlights have been prepared and that users of lights which are against the law will be prosecuted.

GETTING READY FOR THE SHOWS

NEW YORK CITY, Sept. 6—Truck makers, as well as accessory manufacturers, were receiving this week the invitation blanks for application for space at the 1920 National truck shows to be held here and at Chicago in January.

FRANCE WILL BUY A. E. F. TRUCKS

PARIS, Aug. 30—France has agreed to purchase the whole of the left-over supplies of the American Expeditionary Forces, including about 45,000 trucks.

Negotiations have been in hand for a considerable time. The American government offered the whole of its material to the French and refused to consider treating for only parts of this material. It was desired by the French to purchase only such material as was specially required in France, railroad rolling stock, food supplies, tractors, buildings, etc. The cars owned by the A. E. F. were not desired. It was made clear, however, the American government would not consent to separate the material. It was owing to this that a settlement has not been possible earlier.

NO ARMY TRUCKS ON MARKET YET

WASHINGTON, D. C., Sept. 5—More than 18,000 trucks and cars out of the army surplus of 38,000 existing when the armistice was signed have been transferred by the War Department to other government bureaus, according to testimony by Brig. Gen. C. B. Drake, Chief of the Motor Transport Corps, before the House investigating committee. Thirteen thousand of these vehicles have been turned over to the Department of Agriculture for road construction, 780 to the Public Health Service, Treasury Department, and 4886 to the Post Office Department.

Public selling of surplus vehicles can not be made, it was said, until the requirements of other government bureaus have been determined, but the disposal of all unserviceable vehicles is now being directed.

JUMBO TRUCKS REDESIGNED

SAGINAW, MICH., Sept. 6—The Nelson Motor Truck Co. will make changes of construction along slightly heavier lines in its trucks, making possible an increase in the rating of Jumbo Model D from 4000 to 5000 lb. Several equipment improvements are also to be made, including installation of a new lubricating system. The chassis price has been increased from $2500 to $2700. The new Jumbo models will be announced soon of 1½ and 3½-ton sizes, each to be supplied in three wheelbase lengths.

PARMALEE TO USE MOTORS

CHICAGO, Sept. 3—Motor buses and trucks will supplant the hundreds of horse-drawn vehicles of the Frank Parmalee Transfer Co. of this city, with the reorganization of the company. Over 100 motor buses are to take the place of the 125 horse-drawn vehicles for the transfer of passengers from hotels and railroad stations, and the baggage will be handled by about fifty 3-ton motor trucks.

The modernization of the company's equipment is the first and most important change which accompanies its reorganization. The capital has been increased from $500,000 to $1,000,000 and the organization will now be co-operative, with all the superintendents and heads of departments in the employ of the company being given the chance to buy stock on favorable terms.

Changes in the personnel include the transfer of the presidency to Charles A. McCulloch from John C. Shaffer. Among those interested in the reorganized company are J. Ogden Armour and John R. Thompson.

IOWA SHIP-BY-TRUCK PARADE

DES MOINES, IA., Sept. 4—Twenty thousand Iowans saw an unusual demonstration of motor transportation on the last day of the recent Iowa State Fair, when a ship-by-truck parade was staged at the fair grounds. More than 300 trucks were in line, extending four times around the ½-mile track at the fair grounds. The parade was headed by six fire trucks from the Des Moines fire department, and the vehicles shown ranged from ½-ton trucks to large street flushers and oil tanks. Both users and dealers participated. Each dealer was allowed to enter but one truck.

Many of the trucks came from points as far away as 50 miles from Des Moines.

Service Association Formed in N. Y.

First Meeting Held to Discuss Ways of Getting More Efficient Service

NEW YORK CITY, Sept. 8.—After 2 months of preparation the Automotive Service Managers Assn. of N. Y. held its first formal meeting on Wednesday evening, September 3, 1919, at the National Automobile Chamber of Commerce, in New York City. The organization meeting was well attended by a representative body of manufacturers and dealers, service managers and superintendents of motor truck repair stations of the Metropolitan district, several coming from as far as Newark, and the very evident manifestation of interest augurs well for the success of the enterprise.

The association was organized with the avowed purpose to improve and facilitate co-operation between the automotive industry and owners of its products through efficient service by promoting: 1—meetings for discussion of problems and solutions, 2—education and welfare of automotive mechanics, 3—interchange of ideas, and 4—establishment of kindred organizations.

ARMY TRUCKS RETAINED

NEW YORK CITY, Sept. 4—Brigadier-General Drake, Motor Transport Corps, states that the following types of trucks and trailers will be retained by the army for its use:

Type 2, Light Delivery Truck.—½-Ton light delivery, Dodge; ¾-ton, White; ¾-ton G. M. C.; 1-ton, White.

Type 3, 1½ and 2-ton Trucks.—White, Garford, Packard.

Type 4, 3 and 4-ton Trucks—Standardized "B"; Riker; Mack, **3½-ton trucks**; F. W. D.

Type 5, 5-ton Trucks, or Over.—Mack, 5½-ton; Mack, Special Engineer.

Type 7, Ambulances.—G. M. C.

Type 8, Trailers, Cargo.—Trailers, ¾-ton, Tank, Water, 180 gallons; Ration and Spare Parts; 1½-ton, two-wheeled, Light Aviation; four-wheeled cargo; Trailers, 1½-ton four-wheeled Special Bodies, Trailers, 3-ton Gun and Caisson; 4-ton, four-wheeled Cargo; four-wheeled Special Bodies; 5-ton Tire Press; 10-ton Portable Crane; Tank Corps with Ramp.

Type 9, Trailers, Kitchen.—Trailers, 1½-ton, two-wheeled, Kitchen, A and B Type.

Type 10, Trailers, Machine Shop Trailers.—4-ton, four-wheeled, Machine shop—Spare Parts.

MIRRORS REQUIRED ON VEHICLES

BOSTON, MASS., Sept. 6—The new law requiring all motor trucks and taxicabs to be equipped with mirrors went into effect this week in Massachusetts. It does not apply to passenger cars. In another year mirrors will be required on all vehicles.

M. T. C. Establishes Training School

Three Other Similar Schools To Be Started In a Short Time

BALTIMORE, MD., Sept. 5.—The first of four large vocational training schools to be established by the Motor Transport Corps was opened here to-day at Camp Holabird. The school will employ civilian instructors and all students enlisted will devote their time exclusively to school instruction. The teachers include Professor Dean A. Fales, formerly in charge of the Gas Engine Department of the Massachusetts Institute of Technology, and Major A. A. Case, formerly Professor of Applied Science at Ohio State University.

The organization and direction of the Motor Transport Corps school system are under Col. J. J. Fulmer. Four hundred men will compose the entering class and will be given a preliminary course of 4 weeks, including the psychological and trade tests, and the fundamentals of military life. At the completion of this course, each man will be classified, and the classification will decide his future activities in the school.

Following the preliminary course are four courses covering all branches of automotive work, including:

School of chauffeurs.
School of auto-mechanics.
School of inspectors and foremen.
School of automotive engineers.

The courses are being designed to produce motor truck drivers and mechanics with sound fundamental training. Men of good general education will be granted an opportunity of taking the automotive engineering course which will last 1 year and will be given at one of several schools of technology and will qualify the students as Motor Transport Corps officers or superintendents of shops in the automotive industry.

The school instruction will alternate with periods of production work in the shops, service park units operation and with operating units in the field. Instruction will be given by lectures and demonstrations in the buildings which are equipped especially for the school work and set apart from the shops. It is expected 1500 students will pass through these schools yearly.

The inauguration of the school was attended by Secretary of War Baker, Senator J. L. France, Senator Hoke Smith, Senator C. S. Thomas, who spoke, General March, Chief of Staff, Brigadier General C. B. Drake, Chief of the Motor Transport Corps, and others.

In addition to the Holabird school it is planned shortly to open three other similar schools at Camp Jesup, Atlanta, Ga., Camp Normoyle, San Antonio, Tex., and Camp Boyd, El Paso, Tex.

Each of these camps has the complete standard M. T. C. shop equipment, including huge cement, steel and glass structures covering 5 acres, with excellent machinery and tool supplies. The army hopes to make these institutions the most capable automotive schools of instruction.

ARMLEDER GIVES UP WAGONS FOR TRUCKS

CINCINNATI, OHIO, Sept. 10—The O. Armleder Co., which has been building delivery wagons for the last 38 years and trucks for the past 10, has discontinued the horse-drawn vehicle business. It is remodeling its plant to devote it exclusively to motor truck manufacture, with facilities for 20 trucks per day.

TRUCKS REQUIRE BETTER FERRIES

PHILADELPHIA, PA., Sept. 6.—Asserting that only certain ferryboats can carry heavily laden motor trucks and that much delay is occasioned thereby, numerous complaints are being made about the ferry service to Camden by transportation companies and individual truck owners. The Chamber of Commerce of Philadelphia, through its bureau of transportation, is working with the ferry companies to find a means of preventing such blockades. Investigations show that the heaviest load, truck and contents combined, which any of the ferryboats can safely carry, is 21,280 pounds. Attention of the ferry companies has been called to the provisions of the recently passed Dithrich bill, which places the maximum weight of combined truck and load at 26,000 pounds.

An effort is being made to induce the ferry companies to make provision for the heavier loads when repairing the older boats, ferry slips or approaches, as well as when constructing new boats. The present delays are greatly hampering motor truck delivery of merchandise to Camden and vicinity.

Coming Events

1919

Aug. 23 to Oct. 6.....Toronto, Can., Shows of Cars, Trucks, Tractors, Airplanes and Motor Boats, in conjunction with Canadian National Exhibition.
Sept. 12-20..Peoria, Ill., State Fair.
Sept. 13-20..Hutchinson, Kan., State Fair.
Sept. 14-20..Sioux City, Ia., State Fair.
Sept. 15-20..Yakima, Wash., State Fair.
Sept. 15-20..Springfield, Mass., State Fair.
Sept. 16-19..Billings, Mont., State Fair.
Sept. 20-27..Memphis, Tenn., State Fair.
Sept. 20-27..Oklahoma City, Okla., State Fair.
Sept. 22-24..Philadelphia, Pa., Annual Convention of National Assn. of Purchasing Agents, Bellevue-Stratford Hotel.
Sept. 22-27..Pueblo, Colo., State Fair.
Sept. 22-27..Salem, Ore., State Fair.
Sept. 24 to Oct. 3.....New York City, N. Y., Electrical Exposition, Grand Central Palace.
Oct. 6-12....Chicago Dairy Show.
Sept. 24 to Oct. 4.....Kansas City, Kan., State Fair.
Sept. 29 to Oct. 4.....Muskogee, Okla., State Fair.
Oct. 6-19....Dallas, Tex., State Fair.
Oct. 20-25....Raleigh, N. C., State Fair.
Oct. 22-27....Shreveport, La., State Fair.

1920

Jan. 3-10....New York City, Motor Truck Show, 8th Coast Artillery Regiment Armory, 193rd St. and Jerome Avenue.
Jan. 24-31...Chicago, Ill., Motor Truck Show, Drexel Pavilion.
Feb. 9-14....Louisville, Ky., American Good Roads Congress.

Dispose of War Trucks in New Way

New Bill Necessary to Sanction Transfer of Army Trucks for Road Work

WASHINGTON, D. C., Sept. 2.—A bill has been introduced in Congress to authorize the transfer of motor trucks to the Department of Agriculture by the War Department. The bill was made necessary by a recent decision by the Judge Advocate of the Army, who found the Post Office Act of February, 1919, void. This decision held up the transfer of the 23,000 trucks asked by the Department of Agriculture from the War Department.

NEW REPUBLIC SERVICE STATION

PHILADELPHIA, PA., Sept. 6—The Swain-Hickman Co. is inaugurating a new service bureau in Harrisburg, Pa., for Republic trucks. George C. Eppelman, retail sales manager in Harrisburg, says that $60,000 worth of parts are being carried. Delivery counsel and haulage experts are now at the service of customers, no matter what type of equipment is used.

TRUCKS AT DAIRY SHOW

CHICAGO, ILL., Sept. 6—Big displays of motor trucks will feature the National Dairy Show, which is to be held this year in Chicago from Oct. 6 to 12, inclusive. About 10,000 sq. ft. of space will be given over to the motor truck section of the show and there is a representative list of the largest and most widely known, both of the light and heavy variety, trucks.

The motor truck manufacturers are giving far more attention to this year's dairy exhibit than they have given to those of any previous year, as they are gradually awakening to the problems of the dairy business, which are based on the need of speedy transportation.

29 TRUCKS AT CANADIAN SHOW

TORONTO, CAN., Sept. 2—Canada's only national motor show was opened here in conjunction with the Canadian National Exhibition this week by the Prince of Wales.

Twenty-nine truck manufacturers are represented. Many of the exhibitors are wrathy over the fact that at most they can show but three or four models, and it is freely predicted that the Automotive Industries of Canada—the N. A. C. C. of the Dominion—will withdraw not only their designation, "Only Canadian National Motor Show," but also their sanction and support from the event unless the much-heralded Automotive Palace, with quadruple or quintuple the accommodation afforded by the Transportation Building, is constructed before another year rolls by.

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Read by Fleet Owners

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Worcester, Mass. Cleveland, Ohio

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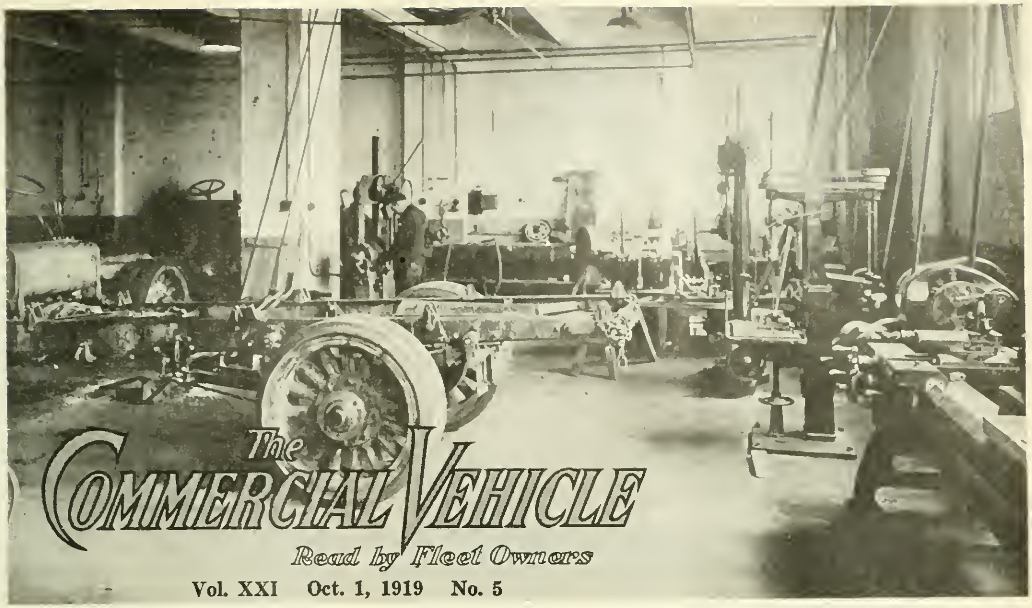


The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Oct. 1, 1919 No. 5

MAINTENANCE CHARTS
Insure Proper Truck Inspection

THE CHARTS ARE PRINTED IN FULL—READ THEM

Centralized Repairs Give Quality Work at Low Cost

Solution of Wholesale Grocery Truck Problems May Be Applied by Other Fleet Owners

SUCCESSFUL truck maintenance and operation from the viewpoint of a large fleet owner are achieved only after they have been split up under the supervision of two men. The big thing is that with a large fleet there should be a separate man for maintenance and another man for the operation and traffic supervision. When a fleet gets to a size where it numbers twenty or more trucks, the loading, routing, storage and maintenance of these vehicles become too much for one man to handle efficiently. This has been the experience of the Atlantic & Pacific Tea Co., a national distributor of groceries and bread to a chain of over 3900 retail stores located in eight large cities and in the territory surrounding these cities.

That company operates 108 Pierce-Arrow trucks from eight warehouses, located in Jersey City, N. J.; Brooklyn, N. Y.; Bronx Borough, New York City; Boston, Providence, R. I.; Philadelphia, Pittsburgh, Detroit and Chicago. The main headquarters are located at the Jersey City warehouse where fifty trucks are operated. The rest of the fleet is divided into ten for Brooklyn, one for the Bronx Borough of New York City, ten for Boston, two for Providence, four for Philadelphia, twelve for Pittsburgh, four for Detroit and fifteen for Chicago.

Bought Trucks 8 Years Ago

Eight years ago the Atlantic & Pacific Tea Co. bought a Saurer truck and a year later purchased several more. As the territory was enlarged each year, the fleet was correspondingly increased. Being new, the trucks stood up under the hard usage given them. As a result, little provision was made for the proper maintenance of the vehicles. The repairs were sufficiently small enough to be taken care of by neighboring garages or service stations.

However, as the fleet grew larger and the first trucks bought became useless as the result of improper maintenance, the officials of that company started to investigate conditions. It was found that none of the trucks had received an overhauling in 4 years and that the whole fleet would soon become useless if immediate measures were

Lubricating Chart For Pierce-Arrow Trucks

Odometer Reading

DAILY

Three turns to grease cups on steering pivot pins

Except on water pump, all other grease cups one turn

Oil clutch leather with Neatsfoot Oil

Oil governor (3 oil cups)

Oil magneto and carbureter control rods

Oil moving parts of foot brake and all brake rod joints

Oil all other parts not cared for by grease cup lubrication

EVERY 150 MILES

Grease cups on water pump one turn. (Use heavy grease)

Refill motor with 6 pts. cylinder oil. (Drain old oil first.) (See Note 1)

EVERY 300 MILES

Charge universal joints with grease. (See Note 2)

Fill steering gear case with grease

Oil clutch lever shaft bearings

EVERY 600 MILES

Charge steering rod joints with grease

Charge front wheel hub caps with grease

Oil fan

Oil magneto. (Two drops of light oil in provided places.)

Charge front universal (joint back of clutch). (See Note 2)

EVERY 1200 MILES

Charge outer bearings of rear axle with grease

Oil between spring leaves by jacking truck up

Wash motor with kerosene inside and out. (See Note 3)

Clean wire gauze screens in oil leads

Clean wire gauze screens in carbureter hot air pipe

Drain radiator, flush thoroughly and refill

EVERY 5000 MILES

Charge rear axle with 9 qt. Worm Gear Oil. (See Note 4)

Charge transmission gear case with 7 qt. Worm Gear Oil. (See Note 5)

WEEKLY

Wash Truck

Note 1—Before every second draining of oil from motor inject a little kerosene through reed valves of carbureter while motor is running. Stop motor, drain oil thoroughly and replace with new.

Note 2—Charge front universal joint with oil and grease (Joint on front end of short shaft).

Note 3—Wash motor on the outside with kerosene. About every 1200 miles, or monthly, motor should be washed out with kerosene. Drain oil from crank case, close cock and pour one quart of kerosene into the oil tank and after opening the pet cocks on the cylinders turn motor over by hand at least a dozen times, but under no considerations run the motor under its own power. Drain kerosene thoroughly and clean oil pump and oil lead strainers. Refill motor with 6 pints of fresh oil. Add more when needed.

Note 4—Clean off top on axle before removing. After draining oil through bottom plug, clean case thoroughly by washing with kerosene, drain off and refill axle with 9 quarts worm gear oil. Test oil level frequently by removing try plug.

Note 5—Clean off top cover on gear case before removing. After draining oil through bottom plug clean case thoroughly by wasing with kerosene, drain off and refill case with 7 quarts worm gear oil. Smallest gear should dip in oil to a depth of at least one-half inch. Observe oil level frequently.

Lubrication chart as used in the proper maintenance of the A. & P. fleet. Read the five notes at the bottom. They are most important

not taken to straighten out the maintenance methods.

Need for Maintenance Man

This investigation was started about three years ago. At that time it was found that the fleet needed supervision from two angles, operation and maintenance, and not from the operation angle only. With a fleet of this size, lack of co-operation and standardized repair methods rendered it impossible to keep accurate tabs on the condition of the trucks.

Realizing this fact, the officials of the company in 1917 scouted the truck service field for a man competent enough to take over the complete rehabilitation of the trucks. The man selected for this work was James L. Black, the superintendent of motor equipment for C. Feigenspan, Inc., one of the large brewing companies in Newark, N. J.

Maintenance Plan Built Up

Though Black joined the Atlantic & Pacific Tea Co. two years ago, nearly one year was spent in laying plans and looking for a suitable place for a service station. The maintenance station and repairshop is in a building entirely separate from the garage in which the trucks are kept overnight. This is because one of the loading platforms is in the garage so that the latter is really integral with the warehouse. The garage thus serves a dual purpose, and there was not sufficient room to take on a third class of work in the truck maintenance.

The service station was located in a former horse stable near the Jersey City warehouse. The machine shop was placed on the second floor of the building, the first floor being used only for light repairs, such as taking off the bodies and washing the chassis before being sent to the machine shop.

In order to take care of the demand for a speedy reconstruction of the trucks, fifteen competent mechanics were engaged and a complete machine shop equipment was installed. Though the number of mechanics seems somewhat large, the nature of the work was sufficient to warrant their employment. Overhauling now takes from 5 to 8 days instead of from 2 to 3 weeks, as is usual in most garages with smaller working forces. In addition to the trucks there are also fifty Fords used by the salesmen to be taken care of. As a result, the fifteen mechanics are kept busy all of the time. However, the working force will gradually be lowered as the completion of the reconstruction period draws nearer. The trucks will then be put under a systematic inspection so as to prevent any serious wear and tear.

The Shop Equipment

The machine shop equipment consists of an arbor press, two drill presses, a lathe, a hack saw, two emery wheels, an oxy-acetylene outfit, a forge and several engine stands. This equipment is large enough to take care of all repairs.

It has been so arranged that unit repairs will be concentrated at the Jersey City service station. These units are daily being sent to this shop where they are being overhauled. However, in order to save time several extra engines are kept on hand to replace the ones to be overhauled. An instance of the successful working out of this plan is illustrated in the recent experience of the Brooklyn warehouse. The crankshaft of one of the engines in the trucks working from that branch broke and a call was made on the service station in Jersey City for its emergency car. Instead of attempting to repair the engine at once, a spare one was taken over to Brooklyn and installed. The truck was on the road the next day instead of having to wait several days or a week for the repair to be made.

It is the claim of that company that better results can be had in centering all unit repairs in one place, regardless of the distance of that place from the others. In this particular case the fleets in the cities other than Jersey City are not large enough to warrant the installation of very expensive equipment, such as is needed for thorough overhauling work. It has proved cheaper also to do that work in the company's own service plant rather than in outside service stations or garages. However, as the fleet enlarges in these cities to about the size of the Jersey City fleet, it is planned to provide these fleets with equipment sufficient to take care of their own maintenance.

Much Trouble Eliminated

At present, much of the trouble that was encountered several years ago has been eliminated. The men then in charge of most of the warehouse fleets were not experts in truck maintenance methods, and, as a result, the trucks were in poor condition. Little attention was paid to the lubrication or oiling of the trucks, and the bushings were completely worn out. The new men that have taken their places have been employed by Black, who has seen to it that they have followed out his plans for inspecting and taking care of the light repairs of the trucks. It has been figured out that, in order to get a competent repair shop personnel, the foreman in charge must himself be competent. It then follows that he will employ men who come up to his standards. This is especially so at the Jersey City service station. Black, who has had much experience with mechanics, has certain ideas as to the requirements of a good mechanic. He will not take a man who has not served his apprenticeship in a machine shop. He states that a man who has worked in a passenger car garage, in most cases, is not thoroughly schooled in machine shop work. He has not had the proper guidance. As a result, when he comes to a large machine shop, it usually means that the foreman in charge must take him in hand so as to coach him in proper machine shop practice. This all means a waste of time.

Work Laid Out for Men

As a result of the type of men employed in the machine shop, it has been deemed wise to lay out the work so that each mechanic will not be forced to stay on one class of work for any length of time. For instance, should a man be picked out to specialize on clutches, his work will be up to

(*Continued on page* 181)

Inspection Chart For Pierce-Arrow Trucks

TRUCK No. DATE

Mark X where attention or replacement of parts is required.
Give additional details of required work on inspection report card.

A.—FRONT AXLE (Jack truck up)
1 Pivot axles
2 Wheel bearings—right
—left
3 Coupling rod
4 Steering rod
5 Steering lever
6 Steering wheel
7 Steering column
8 Ball pin joints
9 Dust covers
10 Grease cups
11 License bracket

B.—FRONT SPRINGS—Right
—Left
1 Position
2 Spring leaves
3 Spring clips
4 Spring shackles
5 Spring bolts
6 Grease cups

C.—BUMPER
1 Motor hood and side panels
2 Mud guards—right
—left
3 Drip pan
4 Running board and brackets
5 Battery box and brackets
6 Tool box and brackets
7 Tool box equipment
8 Radiator
9 Radiator support blocks

D.—STARTING CRANK BEARING
1 Grease cup
2 Compression in motor

E.—MOTOR
1 Motor support brackets
2 Inlet manifold
3 Exhaust manifold
4 Water outlet manifold
5 Cylinder block nuts
6 Valve clearance
7 Valve lifters
8 Valve guides
9 Spark plugs
10 Spark plug wires and terminal caps
11 Fan
12 Fan belt
13 Magneto alignment
14 Magneto breaker points
15 Magneto collector ring brush
16 Magneto distributor
17 Magneto distributor block and contact points
18 Coil
19 Wires
20 Carburetor
21 Float level
22 Strainer
23 Carburetor
24 Gasoline connections
25 Spark and throttle control rods
26 Primer
27 Primer pipes and joints
28 Governor
29 Water pipe alignment
30 Hose connections
31 Packing nuts
32 Grease cups
33 Oil pump
34 Oil tank
35 Oil pipe connections
36 Oil leaks
37 Oil gauge glass

F.—DASH
1 Side lights
2 Switch

G.—CAB
1 Cushions
2 Curtains
3 Horn

H.—CLUTCH
1 Clutch operation
2 Clutch bearings
3 Clutch blocks and cover
4 Clutch brakes
5 Clutch throwout shaft and bushings
6 Grease cups

I.—TRANSMISSION
1 Oil level in gear set
2 Main and countershaft bearings
3 Gears
4 Gear shift lever
5 Grease cups
6 Universal joints
7 Universal joint boots
8 Shafts—Intermediate shaft bearing grease cups
Propeller
9 Torque rod and radius rods
—right
—left
10 Joints, pins and bushings
11 Support brackets
12 Grease cups

J.—BRAKES
1 Foot brake adjustment
2 Brake shoe linings
3 Foot brake camshaft
4 Brake rods and joints
5 Grease cups
6 Hand brake adjustment
7 Brake shoe linings—right wheel
—left wheel
8 Brake rod joints and pins
9 Equalizer
10 Grease cups

K.—REAR AXLE (Jack truck up)
1 Wheel bearings—right
—left
2 Thrust bearing cover and nuts
3 Driving caps and nuts
—right wheel
—left wheel
4 Oil level in axle

L.—REAR SPRINGS
1 Spring leaves
2 Spring clips
3 Spring shackles
4 Spring bolts
5 Spring seats
6 Grease cups

M.—Tail light and license bracket
N.—Body
O.—General appearance of truck
P.—Total mileage

INSPECTOR

This method of inspection should be followed by an inspector until he is familiar with the work.

SYSTEM *for Allocating Truck Loads*

Envelopes Used to Give Drivers Their Instructions—Loads Made Up Night Before to Save Early Morning Delays

This Story Is for Truck Traffic Managers

TRAFFIC and route managers who are having trouble instructing their drivers during the morning loading rush may solve this problem by getting a list of the day's shipments the night before, thereby enabling them to make up and place the loads before the next morning. The efficiency of such a system is apparent, especially when it is considered that by its use the driver knows exactly where his particular load is located the minute he arrives at the garage in the morning. This relieves the traffic and route managers of considerable work in the morning, as the locating of loads, etc., was done the night before.

Men in charge of the loading and routing of large fleets of trucks are ever on the alert for schemes that will enable them to perfect a system that is fool-proof, so far as the allocation of loads is concerned. They have spent many anxious moments in the morning rush, trying to locate loads for the drivers. In the case of a large fleet it is necessary that some system be installed that will save loading time during the morning.

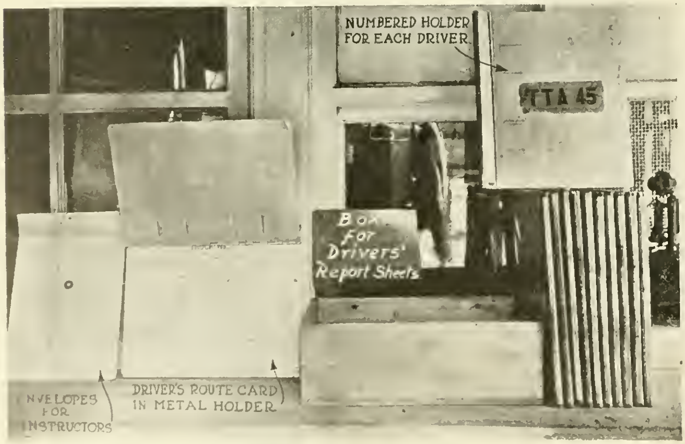
How the System Works

William H. Costigan, superintendent of transportation for the Robert Gair Co., a large Brooklyn paper products manufacturer, has arranged so that a list of the next day's shipments will be sent to him the night before. With these in hand, he is able to segregate the shipments according to the routes on which they are to be taken and to assign the loads to the drivers, who will cover the various routes. All of the receipts for each route are then placed in a separate large manilla envelope, each bearing a driver's number.

Costigan next ascertains where each load will be located on the loading platform. Instructions are then written on a sheet of paper telling each of the drivers where to go for his load, as well as any other special information in regard to deliveries, etc., that may come up. The envelopes are then taken over to the garage, where they are placed in special metal holders, also numbered to designate the different drivers.

A special stand has been placed near the exit of the garage on which to keep these holders. They are arranged numerically, so that the drivers will lose no time locating them in the morning. All that the driver has to do each morning is to take out the envelope placed in his holder, read his instructions and then follow them. No questions are asked, no time is lost in searching for the load, and, best of all, the men in charge are relieved of the necessity for actually being present at the loading platform. This saving enables them to perform other duties.

The metal holder, in which the envelope is placed, is also used by the driver to hold his route sheet as shown in the accompanying illustration. In this way the report, when handed in at night, is flat and clean and not mussed up with grease, dirt or dust. When the driver returns at night he deposits the route sheet in a special box placed on the stand, so that he wastes no time and so that all of the sheets may be collected at one time by one of Mr. Costigan's assistants.


NUMBERED HOLDER FOR EACH DRIVER
TTA 45
Box For Drivers' Report Sheets
NVELOPES FOR INSTRUCTORS
DRIVER'S ROUTE CARD IN METAL HOLDER

The Material of the System

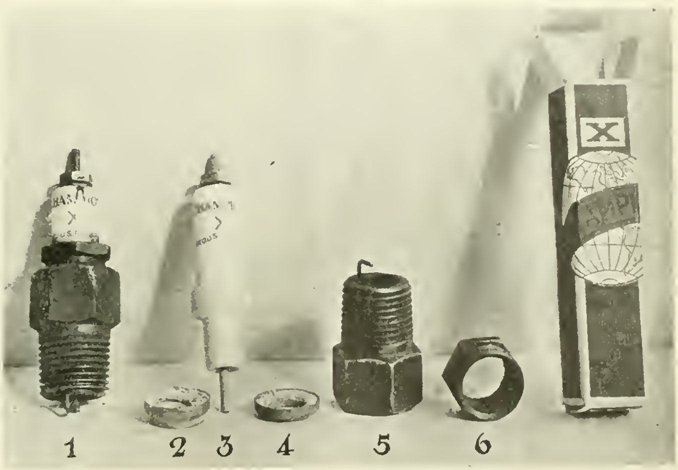
Each night any special instructions for the drivers are written on sheets of paper and these inserted in separate manila envelopes as shown at the extreme left. Each envelope is then placed inside of the driver's route card holder and these are put on the bench in the garage as shown at the extreme right. Each night the driver puts his filled out route card in the special box shown

This Article Tells How to Cut Your Spark Plug Bill in Half

HOW ONE FLEET OWNER

Saves $700 a Year in Spark Plugs

New Porcelains Bought Instead of Throwing Away Entire Plugs



New Porcelains Are Bought

Both the old and the new parts are shown above. No. 1 is the spark plug with the broken porcelain as it is taken from the engine. No. 3 is the new porcelain which comes complete with the two gasket washers, Nos. 2 and 4, only the broken porcelain with its center electrode is thrown away. The base, No. 5, and the cup, No. 6, of the plug are kept for the insertion of the new porcelain. At the right is shown the box in which the new porcelain is bought. This method of inserting new porcelain saves from 50 to 60 per cent of your spark plug bill

FLEET owners can save from 50 to 60 per cent on the cost of replacing damaged spark plugs every year if they replace broken porcelains by new ones, instead of throwing the entire plug away when the porcelain is broken. A good example of how this has been accomplished is shown in the experience of the Atlantic & Pacific Tea Co., Jersey City, N. J. That company operates 108 Pierce-Arrow trucks and tractors. Instead of scrapping its damaged spark plugs, it sends them back to the factory where they were made, or to the local agency to be renewed. The cost of this renewal includes only the price of a new porcelain and not the whole plug. As a result of this repair policy, the Atlantic & Pacific Tea Co. saves over $700 yearly on the replacement of spark plugs with broken porcelains.

The part of the ignition system that is apt to give the most trouble, and for the most part through no fault of its own, is the spark plug. As a result, fleet owners find that this small accessory figures in no small way in the maintenance costs every year. It will, therefore, be of interest to them to know that by co-operating with the spark plug manufacturers they can eliminate entirely the need of throwing away defective plugs.

Though spark plug prices range from 75 cents to $1.25 apiece, the frequent replacement of new ones every year, especially in the case of a large fleet owner, such as the Atlantic & Pacific Tea Co., adds considerably to the maintenance costs.

A majority of the spark plug makers, in order to help eliminate the needless waste of scrapping the entire plug, are now selling the porcelains separately. This is so in the case where the plugs are designed to enable replacement of the porcelains by the owner himself.

On the other hand where it is impossible for the owner to insert a new porcelain, a number of the spark plug manufacturers will make the porcelain installation themselves at the expense of the porcelain only. This cost usually amounts to about 40 or 50 per cent of the total cost of a plug.

The Atlantic & Pacific Tea Co. changes about twelve spark plugs a year per truck, or 1,296 plugs for the 108 trucks. Figuring on the basis of $1 per plug, the total cost would be $1,296 a year, were these plugs bought new at the list price. By buying the porcelains only, it saves $778, as the porcelains cost on an average of about 40 per cent less than the total, or $518.

When it is figured that a complete overhauling of a truck, that is, making a brand new vehicle of it, costs anywhere from $800 to $1,800, a saving of $778 will go a long way towards cutting down repair costs.

Fleet owners, whose trucks are working day and night, as a number of the Atlantic & Pacific trucks are, will find that their spark plugs will become fouled or otherwise damaged from the continuous running and will require inspection and renewal more often than under ordinary conditions.

Saving Time and Expense

in Keeping a Record of Parts Carried

In a Truck Garage Stockroom

Numbering Bins Is Not Enough—Carry Through Must Be Provided in Marking Catalogs with Corresponding Numbers

IT is of no avail to number the stockroom bins in which motor truck parts are kept unless the names of those parts as printed in the catalogs from which they must be ordered are correspondingly numbered. This has been the experience of George Heron, Maintenance Superintendent of the Boston Store, a large department store in Chicago. He has charge of fifty-four gasoline trucks of from ¾- to 2-tons in capacity and carries in stock a total value of from $8,000 to $10,000 worth of parts for their use.

Keeping a record of truck parts carried in stock for a fleet of this size was at first quite a problem, until Mr. Heron decided upon the method of numbering the items in the parts list catalogs to correspond with the numbers on the stockroom bins, as shown on this page.

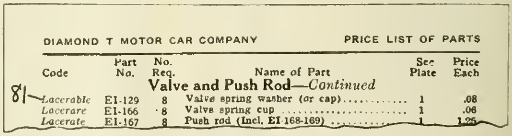
The numbering of the bins was done on a regular system. First of all, the various small parts were grouped according to the truck unit of which they form a part. For example, engine parts were given consecutive numbers and similarly gearset parts, clutch parts and rear axle parts. Of course, every truck part listed in the parts list catalog for that make of vehicle is not given a bin in the Boston Store garage stockroom, but only those parts which wear out most often and are purchased outside. When once this list of parts was determined the bins were numbered consecutively in horizontal lines. After the bin numbering had been completed it was a simple matter to transfer these numbers in ink to the corresponding items as published in the different parts catalogs.

As told previously in the August 15, 1919, issue of THE COMMERCIAL VEHICLE, the Boston Store uses eleven Fords, twenty Diamond-Ts, ten Republics and eight Macks, and intends to standardize on Diamond-T trucks for certain classes of its work. The Republic and Diamond-T trucks may be considered as assembled rather than manufactured vehicles. This class of truck was purchased particularly because of the ease in obtaining spare parts from more than one source and of getting these parts at a much lower cost than would be the case if similar parts had to be ordered for a so-called manufactured truck direct from the maker of that truck at his home plant.

This plan of using assembled rather than manufactured trucks has a direct bearing on the method of keeping the various parts in the stockroom, since the same make and size of engine is used in the Republic truck as in the Diamond-T. A stock of small engine parts can therefore be made to serve for both makes of trucks and the bin number given to the part as written down in the Republic parts list may also be repeated in the Diamond-T catalog.

The procedure in ordering a repair part which is not in stock or of replenishing the supply of the part given a bin number is to first of all look at the parts list of catalog of the maker on whose truck the part is used and note the bin number given to it. It is then a simple matter to discover just where that part is kept in the stockroom by means of the system shown.

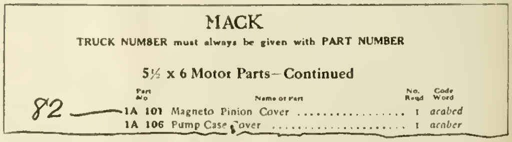
One corner of the stockroom, showing the numbered bins on the sides and in the center row



DIAMOND T MOTOR CAR COMPANY — PRICE LIST OF PARTS

	Code	Part No.	No. Req.	Name of Part	See Plate	Price Each
				Valve and Push Rod—*Continued*		
81	*Lacerable*	EI-129	8	Valve spring washer (or cap)............	1	.08
	Lacerare	EI-166	8	Valve spring cup	1	.06
	Lacerate	EI-167	8	Push rod (Incl. EI-168-169)	1	1.25

Reproduction of a portion of the Diamond-T catalog, showing the part numbered 81 as indicated in the view of the stockroom shown opposite



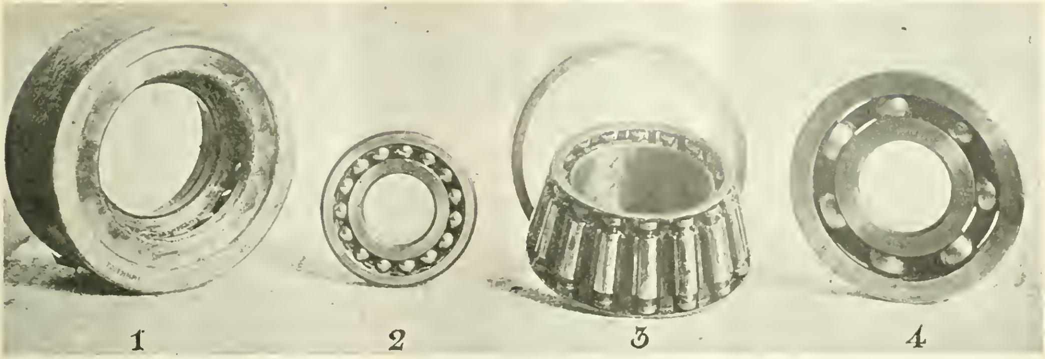
MACK

TRUCK NUMBER must always be given with PART NUMBER

5½ x 6 Motor Parts—Continued

	Part No	Name of Part	No. Reqd	Code Word
82	1A 101	Magneto Pinion Cover	1	*acabed*
	1A 106	Pump Case Cover	1	*acaber*

Reproduction of the Mack parts catalog, showing how the bin No. 82 is written in ink opposite the name of the part



Types of Truck Bearings Which Can Be Repaired When Worn

These are the types of truck bearings which the A. & P. company has repaired when worn, instead of buying new bearings. This plan gives a saving of $4,500 a year in the maintenance of a fleet of 108 trucks. No. 1 is an S K F thrust bearing used in the worm axle. No 2 is an annular ball bearing. No. 3 is a Timken taper bearing used in the wheel hub and No. 4, a Hess-Bright annular ball bearing

CUTTING MAINTENANCE COSTS

By Repairing Worn Bearings

One Fleet Owner Operating 108 Trucks Saves $4500 Yearly by Having Worn Bearings Put Into Shape by Outside Company Specializing in That Work

THIS story concerns a fleet owner who saves $4,500 a year on the replacement of worn truck bearings. Many fleet owners do not realize that they can save about 50 per cent of the cost of new bearings by having the worn or damaged bearings renewed by outside companies specializing in that work. Each year during the overhauling period, many fleet owners scrap bearings that could be easily renewed at a very low price.

When it is figured, for instance, that thrust bearings average in price about $50 apiece, the saving by having these renewed at from $20 to $25 is manifest. Though annular bearings cost less than the thrust type, the saving in having them renewed is considerable, especially when it is figured in the maintenance of a large fleet. Take for instance the Atlantic & Pacific Tea Co., Jersey City, N. J., which operates 108 Pierce-Arrow trucks and tractors. That company would be forced to pay nearly $8,000 a year for new bearings, were it not possible for it to take advantage of this renewal work.

At least one thrust bearing is replaced a year on each of its 108 trucks. This thrust bearing, which is used on the rear axle worm, costs $73.40. Were this bought at the list price, the Atlantic & Pacific Tea Co. would be forced to pay $7,963.60 a year. By sending these worn bearings to an outside company to be repaired, the cost has been reduced about 50 per cent, or $3,963.60.

Replacement of annular bearings a year averages about two per truck. These bearings are used in the gearset and rear axle. Figuring on the basis of $5 apiece and a saving of 50 per cent, the saving would be $540 for the 108 trucks a year. Adding this to the $3,963 60 saving on the thrust bearing installations, the total is $4,503.60.

There are a number of companies that make a specialty of rebuilding worn bearings, one of these being the Ahlberg Bearing Co., which has service stations in all of the principal cities. All of the worn bearings of the A. & P. company are sent to the New York City plant of the Ahlberg company. When a bearing is brought to any of its service stations, it is first inspected by an expert, to judge the condition of the rings. That company does not accept bearings with broken or burnt rings or excessive pits. If the rings on first examination seem satisfactory, the customer is given a reground bearing in exchange for his old one, a small charge being made for the regrinding of the raceways and the material furnished. The old bearing is then reground. It is delivered to the factory, where it is again inspected for flaws, and the inner and outer rings are measured, tested and gaged for width, size of diameter and unusual wear.

As a result of this bearing service the A. & P. company also saves much time during the overhauling period. Instead of having to wait for its bearings to be repaired, all it has to do is to turn in its old and worn ones for rebuilt bearings of the same makes, as each Ahlberg service station carries a complete stock of all makes, sizes and types of standard bearings.

Window Glass Manufacturer Buys Trucks to ELIMINATE RAILWAY DELAYS

Company Shipped Through Nearby Centers with Better Rail Service and Now Hauls Other People's Goods on Return Trips to Cut Operating Costs

THE three Stewart trucks owned and operated by the Licking Window Glass Co., Utica, Ohio, have been good money makers, according to the officials of the company. While the trucks were first put into service to haul window glass to nearby cities and towns during the period of car shortage during the war, the company managers readily found good use for them in other lines and embraced the opportunity. They are using them in the operation of freight lines from several cities and towns in central Ohio. Considerable hauling for farmers both to and from the market points is also done.

In answer to a question of how and why the Licking company purchased trucks after using horse wagons for many years for all of their delivery work, W. H. McCann, president of the company, stated:

H. W. McCann, general manager of the Licking Window Glass Co., Utica, Ohio

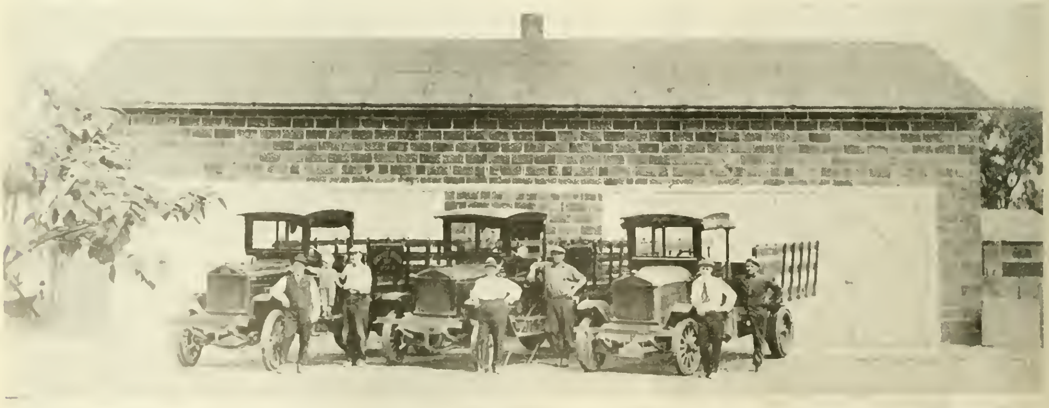
"We got started in the truck business during the war when it was sometimes impossible for us to ship less than carload orders from the railroad depot in Utica because freight cars were not available. We found that we could get these shipments through if we hauled them to the larger railroad junction points of Newark and Columbus, Ohio. Of course, it was impossible to haul such distances with horse wagons, and we simply had to have trucks. There was no other way out.

"Only one truck was bought at the beginning, but after hauling our glass to Newark and Columbus for two or three months, we got so many requests to haul back to Utica such goods as groceries, furniture, etc., that one truck could not begin to take care of it. Accordingly, a second and third truck were added in the short time of six months.

"We now haul goods that we never thought of hauling when we began. We move wheat, corn and livestock direct from the farms to the shipping points or to market, and sometimes to agricultural fairs. We have also moved a considerable number of oil well rigs direct from the towns to the oil fields or from one oil field to another."

The three trucks are of 3-ton capacity, as is shown in the accompanying illustration. They are garaged in a building located on the grounds of the company, the garage being shown in the background of the picture on this page. The company keeps its own

(*Continued on page* 173)

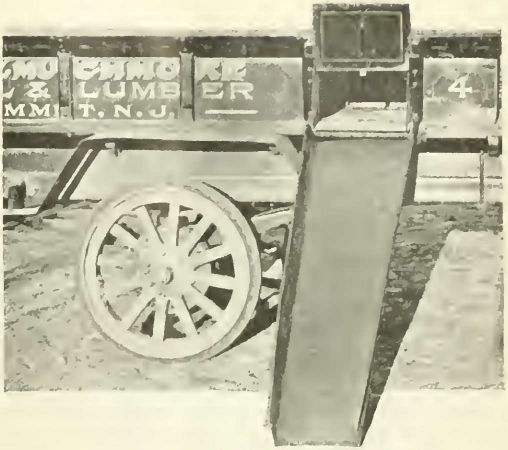


The three 3-ton Stewarts operated by the Licking company and the garage built for their use. The first of the trucks was bought to handle the company's shipments of glass to nearby rail centers where better service could be had than in Utica, Ohio, where the plant of the company is located. Later it had so many requests to bring back other people's goods that it added two more trucks

DUAL PURPOSE BODIES

Solve Idle Truck Problems of the Small Town Operator

* * *



One of the two side chutes fitted on each 1-ton Maxwell truck body to permit coal to be carried in the winter and lumber in the summer. The body cost $300 complete

THE fleet owner with a limited number of trucks used to deliver more than one class of goods, such as lumber and coal, can profitably employ a combination body to keep his trucks busy the year round. For instance, a truck with a body which can be used to carry lumber on one trip and coal on the next can be utilized to carry either class of material according to the volume of business done in each class of goods in the different seasons of the year. Without such body, the fleet owner will have to change bodies according to the season of the year, keep the truck idle during part of the year, or operate it at a disadvantage; all of this reduces the ability of the truck and costs money, both of which are saved when a combination type is used. A good example of how such a small fleet owner solved this body problem is the experience of George V. Muchmore, who delivers coal, lumber and building materials in the territory surrounding Summit, N. J.

Conditions Studied First

A study of Mr. Muchmore's local conditions showed first that the small capacity vehicles were the most economical to run in the country districts. Orders for coal for the major part were for 1 and 2 tons. Lumber and building material orders showed no necessity for the use of large capacity trucks. In addition to these facts, the speed of the smaller trucks was such as to enable quicker deliveries as well as to overcome the steep grades encountered. Though all of these facts were deciding factors in the selection of the size truck needed, they were not sufficient for a decision on the type of body most suited for the work.

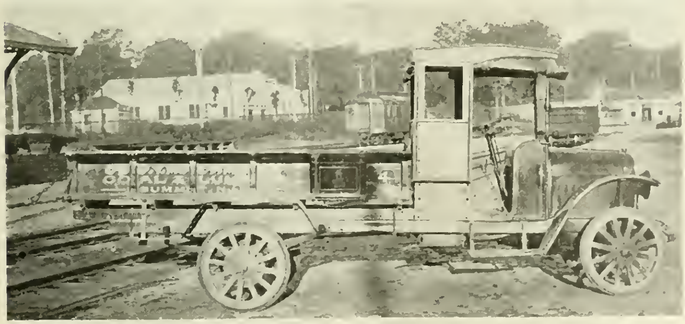
The body had to be designed so as to take care of the small coal orders, as well as the lumber and building material. It had to serve a dual purpose. During the months of July and August, when the slack period for coal orders sets in, the body must be used for hauling brick, sand, etc. In November and December, when the slack period for lumber and building materials begins, and the demand for coal has been resumed, the body must be designed so as to help in expediting coal deliveries.

As a result of these conditions, Muchmore selected an ordinary flareboard express body, fitted with two metal side chutes for the discharge of coal and sand. The chutes are placed at both sides of the body near the front end so as to enable the segregation of coal or sand orders. When two orders are carried in the truck, one order is placed in the forward part of the truck and is divided from the other order in the back end of the body by a board placed across the middle. The load in the back end of the truck is discharged from the rear, the body being equipped with a hinged tailgate. The hinged tailgate is also used as a floor extension when lumber is carried. It may be set at any angle desired by an adjustable chain.

Body Cost $300

Though this body cost Muchmore $300, the price paid for having it built according to his own design has more than paid for itself since it has been put in use. It was built by Joseph Koch, a body builder in Summit, to withstand the wear and tear of brick and coal, as well as the heavy lumber. The best of oak, selected from the Muchmore stock, was used. Though the flooring is 2 inches thick and the side boards 1 inch thick, these

(Continued on page 173)



The 1-ton Maxwell truck with the combination body which can be used to handle lumber and building supplies in the summer and coal in the winter so that the truck can be kept busy the year round

Maintenance Methods for Contractor's Trucks

Severe Service and Necessity for Speed in Contract Paving Work Set Up Special Problems, the Solutions of Which Are Told in Detail in This Article

THE problems of maintaining trucks owned by contractors in road building and street paving work are more difficult of solution than those in average delivery or haulage work over city streets because of the hard usage which the trucks receive and the seasonableness of the work, which requires a 100 per cent performance under rush or peak-load work for nine months out of the year.

The bodies of contractors' trucks need more careful overhaul than perhaps those on trucks in any other industry because of the heavy loads sometimes dropped into them from a height of several feet as from a hopper or from a derrick skip or bucket. Then again, in contracting work, there is that ever-present rush and need for speed which generally precludes giving the minute daily attention which the truck and body should receive.

How these problems of body maintenance and truck upkeep have been solved by one contractor, the Union Paving Co., Philadelphia, is told in this article. The Union company maintains a fleet of twelve trucks of 5- to 5½-ton capacity with one 2-tonner employed for handling contracting tools. As told in the Sept. 15, 1919, issue of THE COMMERCIAL VEHICLE, 90 per cent of the company's work is hauling asphalt for Philadelphia streets.

As road work forms the bulk of the Union Paving Co.'s business, and as work on the roads is impossible in winter, the months of that season are the logical ones for overhauling the motor trucks. As steady road-making and mending, such as fixing State highways, begins in the latter part of April or the first part of May, the vehicles have a long season and must be very thoroughly gone over at the general repair time in winter, generally from December to March. At such times, the trucks, as fast as they can be spared, are completely disassembled and cleaned, each portion of mechanism receiving careful examination by expert mechanics of the force acting as inspectors, suggestions being made by the superintendent of trucks and the foreman of the repair shop as to parts replacements and repair.

The Plan of Overhaul

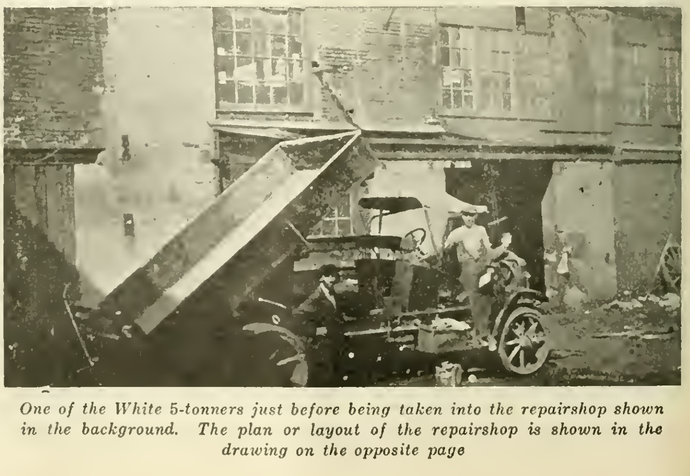
Each truck body, chassis and parts are examined carefully in every detail at such times, and all adjustments and mechanics are thoroughly tested by the ablest mechanics under the supervision of the superintendent of trucks, Thomas J. Bowes. With the fleet of the present size—eleven units—not counting the service car and passenger cars of the office force—the period of overhauling each truck is 15 days. New trucks, or those purchased within the season ,are overhauled when winter arrives, on general principles, the same as older vehicles.

As the trucks average 10,000 miles a year on heavy work, though over rather smooth roadways for the most part, the necessity for close examination when such an opportunity presents itself is apparent.

The work of overhauling the trucks begins with the motor, which is thoroughly inspected on Bowes' home-made and original motor stand, by means of which quick action may be taken on any part and the motor swung over, or upturned, with a minimum of effort. This stand will be more fully described and illustrated in a separate article to appear in a subsequent issue of THE COMMERCIAL VEHICLE. Steering gear, transmission, and entire rear are next overhauled in that order.

The chassis next undergoes a rigid inspection as a whole, the tires are looked after, and it is noted whether wearing down of the tires or wrenching of the rear has thrown the chassis ever so little out of true. If that is the case the chassis is straightened immediately.

After the overhauling of the chassis no especial order of parts of a truck is observed in the inspection and adjustment. The lubrication is thoroughly gone over, and after each overhauling a road test is made, of very brief duration, to learn if all assemblies are correct and that each truck runs as well as possible for a dump truck. Springs, thus far, have given



One of the White 5-tonners just before being taken into the repairshop shown in the background. The plan or layout of the repairshop is shown in the drawing on the opposite page comparatively little trouble. Since inventing and putting on the original tailgate latch to prevent leakage of asphalt, sand, and other material, as described in the last issue of THE COMMERCIAL VEHICLE, the superintendent of trucks sees that the gates and their mechanism are subjects of unusually close inspection.

As regards a thorough overhaul, the Union Paving Co., because of the vehicles' almost constant use, except in the spring, when units of the fleet are painted one after another, has no other stated season for examination in painstaking detail. However, the trucks are given a general cursory inspection as often as possible, which is every 3 or 4 days, and oftener, if any particular vehicle shows symptoms of needing attention. In fact, it is almost impossible to enter the repairshop of the company at any time of the day without finding work in progress, either for immediate use or service use for the future.

Two Day Mechanics

It has been mentioned that the trucks average 10,000 miles a year, but the overhaul is not done with any relation to mileage alone, having a seasonal significance alone. Like a good many other concerns whose maintenance methods are still in a state of development, the Union company has never computed an average cost of overhaul.

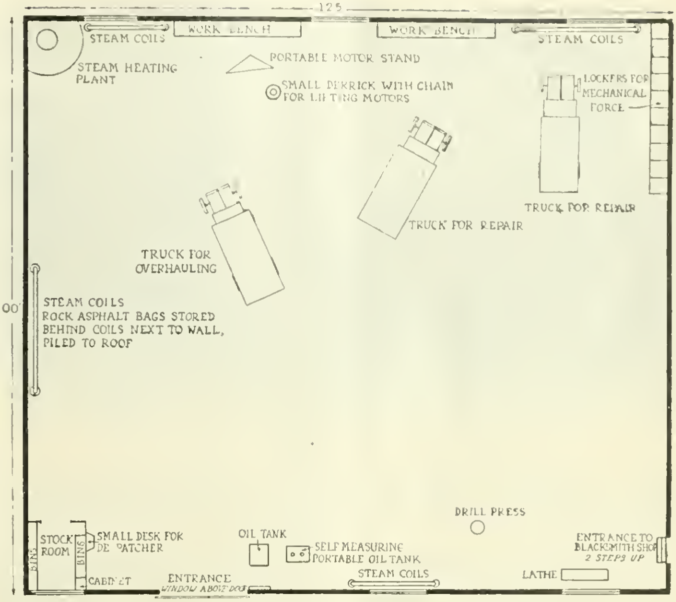
A comparatively small force of mechanics is able to care for the fleet maintenance. Only two and a helper are used in day work, and two on the night jobs. In emergencies, of course, it is possible to put on several more mechanics. The service truck and the fleet of twelve passenger cars for the executives and office men are repaired and overhauled when they need it.

The company's problems, thus far, have been more of operation than of maintenance—witness the care exercised to keep down leakage of material and the one-season overhaul.

Don't Save on Paint

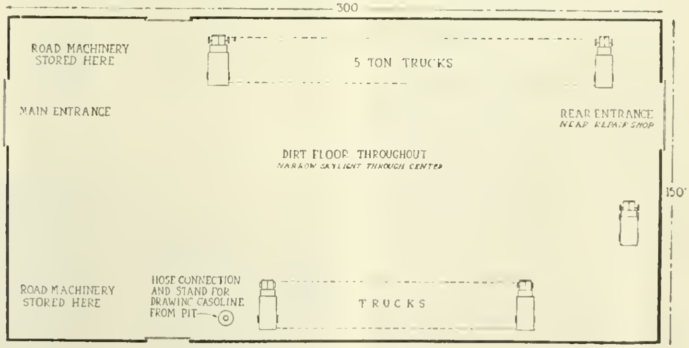
Painting usually is done in the early spring, just before the trucks go out on their heavy campaign of road work. The painting is largely done by the repair shop force, although it may be done by outside men. While the trucks have their regular season for thorough overhauling, they are gone over daily by the inspectors so as to discover small repairs before they can become big ones.

The company has developed the protective idea with regard to paint even more than the decorative idea, but there usually is a happy combination of the two.


125
100'
STEAM COILS
WORK BENCH
WORK BENCH
STEAM COILS
STEAM HEATING PLANT
PORTABLE MOTOR STAND
SMALL DERRICK WITH CHAIN FOR LIFTING MOTORS
LOCKERS FOR MECHANICAL FORCE
TRUCK FOR REPAIR
TRUCK FOR REPAIR
TRUCK FOR OVERHAULING
STEAM COILS ROCK ASPHALT BAGS STORED BEHIND COILS NEXT TO WALL, PILED TO ROOF
DRILL PRESS
STOCK ROOM
BINS
BINS
SMALL DESK FOR DESPATCHER
CABINET
OIL TANK
SELF MEASURING PORTABLE OIL TANK
ENTRANCE
WINDOW ABOVE DOOR
STEAM COILS
ENTRANCE TO BLACKSMITH SHOP 2 STEPS UP
LATHE

Layout of Contractor's Truck Shop

A typical contractor's truck repair shop located in the plant with other of the contracting machinery. It is used solely for truck repair work, however. The layout of the different tools and the position of the trucks undergoing repairs are shown, together with the location of stockroom and lockers


300
150'
ROAD MACHINERY STORED HERE
5 TON TRUCKS
MAIN ENTRANCE
REAR ENTRANCE NEAR REPAIR SHOP
DIRT FLOOR THROUGHOUT
NARROW SKYLIGHT THROUGH CENTER
ROAD MACHINERY STORED HERE
HOSE CONNECTION AND STAND FOR DRAWING GASOLINE FROM PIT
TRUCKS

Typical Contractor's Garage

This garage, with dirt floor, is also used to store other forms of contractor's machinery, such as concrete mixers and the like. It is not steam heated, so that precautions must be taken against radiator freezing when trucks are stored during the winter

While there is not much preference shown in the manufactured brand of paint used, usually Tuscan red or carmine is employed for the bodies as being more durable in color and sticking better, as well as showing less the effects of wear and tear.

Each truck is given three coats. It pays to do this work in a lavish manner, as it is understood paint prevents rust and disintegration therefrom and because, as the trucks are painted but once a year, it would be poor economy to be stingy with the brush and pigment. After the three coats are dry, comes a top coat of finishing varnish.

Truck Garage with Dirt Floor

This truck garage, a large building, 300 by 150 feet, has a dirt floor and is also used to store other forms of contracting machinery, such as road scrapers, concrete mixers, etc. The building is not heated

Any good varnish as impervious to moisture as can be obtained at the time is used.

It ordinarily takes 10 days to paint and varnish a truck body—at least that much time is allotted to the work on each. The service truck usually is painted at the same time, making a fleet of a dozen vehicles to be coated. It is not possible, of course, always to make the 120 days consecutive, but they are painted one after another at greater or less intervals.

Grouping time and labor, the approximate cost for thus painting and varnishing a truck is $40. The paint for each is estimated at about $11.

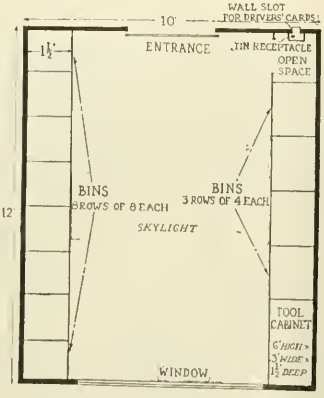
One plan being put into effect in the case of bodies cracking through heat from asphalt is their repair by means of a tightly fitting U-shaped metal sheath, or jacket, half-girdling the body from beneath, riveted on and increasing the strength of the body like a brace, while preventing further cracking or leakage.

Garage a Huge Shed

The garage at the Union plant differs materially from the usual housing place for a fleet of trucks, in that it is a huge shed, 150 by 300 feet, with dirt floor and containing not only the trucks, but many types of road machinery used in the business. While the big shed keeps off the rain and snow, it is not as damp-proof as the usual garage with concrete floor and tight walls of masonry. This probably adds to the care in keeping the trucks in good condition. The cars are parked along the walls, back of the road machines.

The repair shop, a short distance in the rear and to the left of the garage-shed, is a roomy brick structure, occupying a site 100 by 125 ft. In this building is concentrated what is especially needed for repairs. The present equipment consists mainly of an 18-in. drill press valued at $300 and made by the Champion Blower Forge Co., Lancaster, Pa.; a 14-in. Monarch lathe outfit, valued at $1,200, reseating valve tools, wheel-pullers, and the usual repair shop array of such tools as wrenches, drills and reamers. A stock of parts worth about $500 is kept constantly on hand. The stockroom, though small, is complete and compact as to bin arrangement in the allotted space, 10 by 12 ft.

The stockroom is situated just at the left of the entrance to the repair shop. At the right is a small blackboard, once used for such dispatching as there was from this building, but now used only for recording "reminders" for parts and other supplies. In the stockroom, which is lighted by a window at the farther end and a skylight, are eight rows of bins 1½ ft. deep and about 1 ft. wide, placed on the right-hand side; on the left are three rows of similar bins, with a tool cabinet 6 ft. high, 3 ft. wide and 1½ ft. deep for reserve apparatus. On the front wall, at the left-hand side of the entrance, is a tin box fastened with a leather strap and placed under a slot, into which the drivers deposit their Motor Truck Daily Time Cards. In the bins such parts as bolts, nuts, spark plugs and other small bits of mechanism are kept. Extra tires and chains, as well as fenders, are stored on the floor against the walls, out of the way of the bins.



The Stockroom Layout

The truck parts stockroom of the Union Paving Co. is 10 by 12 feet and is located in the repairshop, as shown in the plan view given on the preceding page

Outside, in the repair shop proper, which is steam heated, large coils being placed on the walls between the expansive windows, are two work benches fully equipped with the usual implements, the lathe and drill press mentioned, a row of lockers at the lower end of the space for the mechanics' clothing, a self-measuring Bowser portable filling tank containing 50 gal. of lubricating oil, an ordinary tank containing 60 gal.—no less than 100 gal. of oil always is on hand—and there is a small derrick with chain hoist near the work bench opposite the main entrance, for moving motors and other heavy articles.

Build Up Gearsets

There are four 5-ton jacks and a 1-ton jack. At the upper end of the repair shop, back of the stockroom and heating plant, against the wall, are reserve bags of rock asphalt piled nearly to the roof.

As regards repair parts kept on hand to the amount of $500, as already stated, no attempt is made to establish a ratio between the cost of those parts and the initial cost of the trucks, cost of repair parts thus far always having been charged against the item of "Truck Expense" in mass, or group.

It is a principle in the Union shop to build up gearsets and motors, after having them disassembled as rapidly as possible, so there will be no delays on this score at the last moment. Such built-up transmissions, motors and parts of rears of trucks, as well as jackshafts and crankshafts, are always kept in reserve, so they may be rushed out to a job in the service truck in case of emergency.

A blacksmith shop adjoins the repairshop, reached by two steps up, through a narrow doorway. There heavy iron truck parts which may have become bent are heated and straightened with the ordinary blacksmithing equipment.

Rag Picker Uses Light Truck

"A-N-Y r-a-g-s, rags, any rags?" is a familiar cry to the housewife in almost any city in the country. It usually means that there is coming through the alley the "rag man," who drives a rawboned, spavined horse hitched to a delapidated wagon with rickety wheels.

But the call of the rag man has lost its romantic significance in many parts of Los Angeles. The ramshackle outfit has given way to a neatly painted motor truck. There still is heard the same, "A-n-y r-a-g-s," but it is somewhat muffled by the exhaust of the truck's engine. Sam Goldstein is the pioneer motorized rag man in the western city. His neat outfit is responsible for a marked increase in trade, he admits, and furthermore he has extended his day's radius of backdoor visits through the use of the truck to five times what it formerly was when he drove a horse on his rounds.

The Workbench in the Shop

This view shows a portion of the work bench with some of the tool equipment. Note also the steam heating coils in back of the bench close to the wall. The location of the bench in the shop is shown in the sketch at the top of page 171

Combination Truck Body

(*Continued from page* 169)

have been reinforced by strips of iron laid lengthwise on the floor and upright on the side boards every 4 inches.

Not only do these iron strips reinforce the flooring but they protect it when coal is being shoveled out of the truck. They prevent the shovels from damaging the wood when being scraped along the floor, and also prevent the driver from slipping on that wet floor, which occasionally happens with the all-metal type of coal bodies. The side boards are protected from the wear and tear common in brick carrying over rough roads.

In order to get a better chuting angle for the coal and sand, the body has been mounted on four cross sills, 6 inches high. The length of the body back of the driver's seat is 9½ feet; the width is 4 feet, and the height of the side boards is 1½ feet. The side chutes are 14 inches square. The tailgate is 2½ feet high.

Rag Picker Uses Ford to Increase Business

Even the rag picker has found that horses are too slow. Sam Goldstein of Los Angeles has increased his business by the use of a converted chain-driven Ford

Eliminating Railway Delays

(*Continued from page* 168)

mechanic for all service work. This has been found to be the best plan, as it is cheaper and the work can be done in less time. There are no delays such as occur when a truck has to wait its turn in the small town public garage.

The charges for service vary according to the distance and commodity to be hauled. When a truck is rented out by the day, the charge is $25. On long hauls a charge of $1 per mile is made and that has been found to be profitable. In hauling wheat a charge of 7 cents per bushel is made for less than 5 miles and a charge of 10 cents per bushel for distances up to 10 miles. The truck hauls 100 bushels of wheat at a load. This makes a full 3-ton load and no trouble on hills or mud roads is encountered with that load. On occasion overloads are caused, but these help to keep the threshing machines busy and the number of trips is not many. For hogs and cattle the company charges by the trip at the rate of $1 per mile.

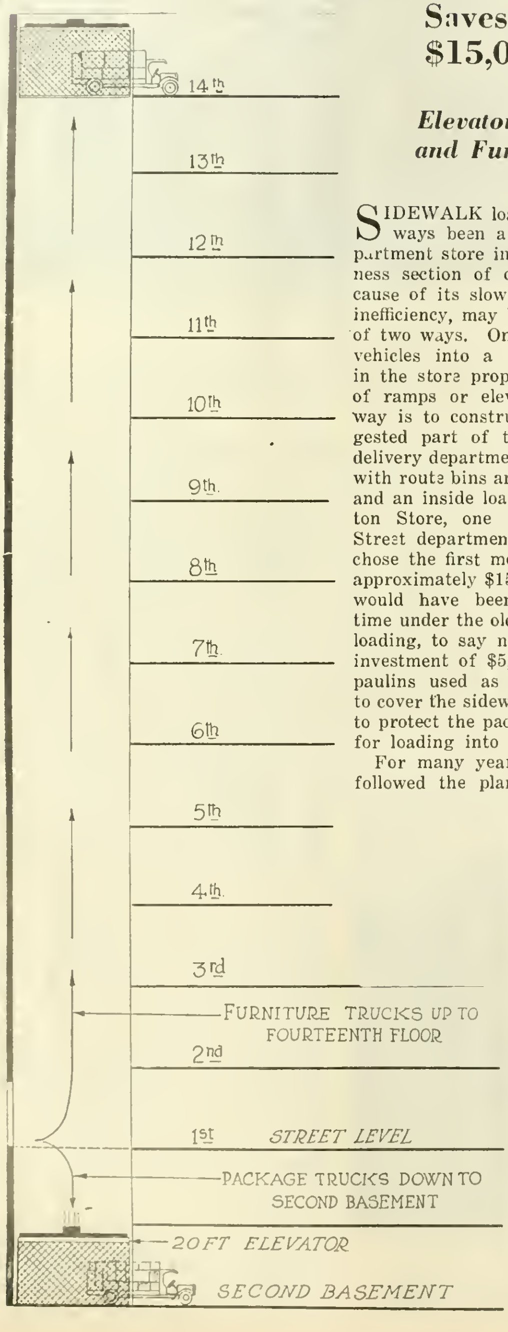
The cost of operation for gasoline, oil and tires is about $10 for 100 miles. This does not include the wages of the driver or wear and tear on the truck. On the average the company gets about 10 miles on a gallon of gasoline. Of course the mileage depends a great deal on the load and other road conditions.

In the accompanying picture the mechanic is at the extreme right and H. W. McCann, secretary and general manager of the company, is at the extreme left.

Eliminating Sidewalk Loading

Saves One Department Store Over $15,000 Yearly in Idle Truck Time

Elevators Take Package Trucks to Sub-Basement and Furniture Trucks Up to Fourteenth Floor

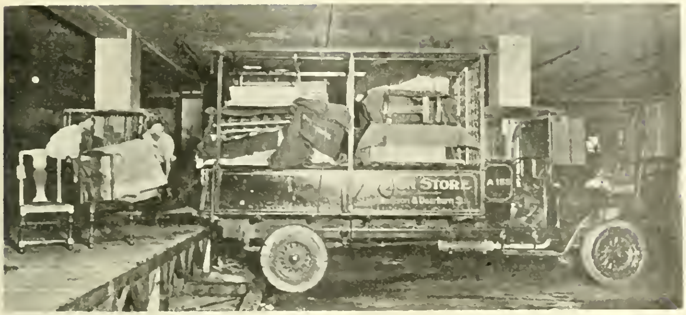


SIDEWALK loading, which has always been a problem of the department store in the congested business section of our large cities, because of its slowness and consequent inefficiency, may be eliminated in one of two ways. One way is to run the vehicles into a special loading bay in the store proper, either by means of ramps or elevators. The second way is to construct, in the less congested part of the city, a separate delivery department building complete with route bins and similar equipment and an inside loading bay. The Boston Store, one of the large State Street department stores in Chicago, chose the first method and has saved approximately $15,000 a year in what would have been idle motor truck time under the old system of sidewalk loading, to say nothing of saving an investment of $5,000 for canvas tarpaulins used as hamper covers and to cover the sidewalk in rainy weather to protect the packages when laid out for loading into the truck body.

For many years the Boston Store followed the plan of loading all of its vehicles across the sidewalk. The package goods were brought from the delivery department in the sub-basement to the street level by means of two large elevators and a third smaller sidewalk elevator, and then carried across the sidewalk to the tailgates of the waiting vehicles in small wheeled hampers. As the business of the company increased and the crowds of pedestrians on State Street and the two cross streets bounding the store became bigger and bigger, this method became more and more costly. Under these sidewalk loading conditions it took over an hour to load each of the trucks.

To overcome this costly method of loading, the Boston Store decided to use the two large elevators for transferring the package delivery trucks from the street into the sub-basement and for carrying the furniture trucks to the fourteenth floor of the building on which furniture shown on the floors below is carried in stock. No new investment was required for these elevators, for they were already installed and used to distribute the

One of the trucks coming off the elevator into the sub-basement



One of the furniture trucks being loaded at the platform on the fourteenth floor

goods sold from one floor to another, and to bring in new stock and take out material to be loaded into the trucks. Both elevators are reached from the narrow alley which is so common between the main streets in Chicago.

Loading Time Reduced

By this method all except a small number of the very largest trucks used for package delivery work are now loaded entirely within the building. The package trucks are run off the elevator onto the sub-basement floor where they are loaded from the route bins by the same type of hamper which was formerly employed to transfer the goods to the sidewalk. The distance which the hampers must be moved has been greatly reduced, so that the trucks can be loaded in a small fraction of the time required when sidewalk loading was employed.

By using both elevators at the same time to lift the trucks up out of the sub-basement to the street level, thirty trucks, when once loaded, can be got out of the building in eight minutes. George J. Peters, delivery superintendent of the Boston Store, estimates that this method of interior loading has saved $14,560 in what would otherwise have been idle truck time under the sidewalk method of loading. He calculates that each of his package delivery trucks costs on an average of $1.60 an hour. As thirty-five of these trucks are loaded daily, this small saving of 1 hour per truck is equivalent to $560 a day or to $14,560 for an operating year of 260 days.

But this is not the only saving which the elimination of sidewalk loading has effected. In addition, it has saved almost an hour on the part of every driver and his helper because the vehicles can be loaded much quicker when entirely under cover than is the case in stormy weather when backed up to the curb. This is a most important consideration, especially because it provides better working conditions for the men, and better working conditions mean more and better work.

George J Peters, delivery superintendent of the Boston Store

Greater Saving Possible

The present method of loading the Boston Store's package trucks in the sub-basement is not all that can be desired, since all of the packages must be moved in hampers from the route bins to a point near the elevator entrances before the packages can be loaded into the vehicles. This method results in confusion and congestion by reason of the drivers moving back and forth over the same route with either empty or loaded hampers. Still more of the drivers' and helpers' time might be saved if the route bins were laid out in such a manner that the trucks might back up to them and have their loads put on directly across a narrow platform between the route bins and the ends of the truck tailgates. This very plan is being considered by the Boston Store, and the new suggested layout of the route bins and sorting tables will be treated in a subsequent issue of THE COMMERCIAL VEHICLE.

Notwithstanding this further saving in time which may be effected by a better layout of the package handling equipment, the present method as compared with sidewalk loading has saved an investment of approximately $5,000 for hamper tarpaulins and canvas covers to be laid down on the sidewalk under the packages, while they are being sorted preparatory to being loaded into the truck bodies in the reverse order to that in which they will be delivered. Each of the hamper covers to protect the

(*Continued on page* 183)

A package truck entering one of the two elevators leading to the inside loading bay in the sub-basement

COLD-WEATHER HINTS *In Truck Operation*

Methods That Will Save the Fleet Owner Much Worry, Time and Money

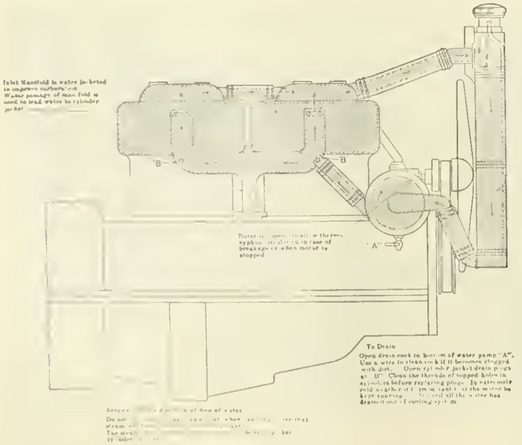
No. 1—COLD-WEATHER CARE OF MACK TRUCKS

THIS is the first of a series of articles pointing out some of the best methods which fleet owners have followed in the maintenance and operation of their trucks in freezing weather. Some of the methods apply particularly to the Mack AB and AC models, while others apply equally well to all makes of trucks. The second article, in the next issue, will give cold-weather hints for Packard trucks.

WITH the coming of winter and freezing weather there are certain precautions which the fleet owner should take to prevent costly delays. These delays may be due to the freezing of the engine cooling water, to the congealing of lubricating oil in the various truck parts or improper operation under conditions of lessened traction caused by snow or ice on the highways.

Most fleet owners, while they realize that they will have to face such conditions, generally do not make provision or organize their forces to overcome them until it is too late. For this reason the first of this series of articles on the best methods of truck operation in freezing weather is published well in advance of cold weather in most parts of the United States, so that truck superintendents may pass along the information to the men under their supervision and equip their trucks with such material as is necessary to overcome such difficulties.

Much of this information applies to all makes and sizes of trucks, although some of the data are applicable particularly to the AC and AB models of Mack trucks. The general data were so well expressed in the booklet entitled "Fighting Snow," published by the Fifth Avenue Coach Co., New York City, that the cold-weather hints followed by that company are published in full on the opposite page. The hints as outlined by the Fifth Avenue Coach Co. may be divided into three general heads, the first on radiator protection, the second on securing proper traction and the third on details of operation. The data on radiators and traction are self-explanatory, while that on operation are more detailed and not so generally known.


Inlet Manifold is water jacketed to improve carburetion
Water passage of manifold is used to lead water to cylinder jacket
"B"
"B"
"A"
To Drain
Open drain cock in bottom of water pump "A". Use a wire to clean cock if it becomes clogged with dirt. Open cylinder jacket drain plugs at "B". Clean the threads of tapped holes in cylinders before replacing plugs.

Cooling diagram of the Mack AB model engine, showing the arrangement of the radiator, water jacket and pump and the direction of water flow

For instance, when coming to a standstill it is best to release the truck brakes just before coming to a full stop, so that the truck will roll the last few inches. This will avoid the formation of ice under the wheels which causes them to spin when starting.

The slogan "Do not drive down hill any faster than you can *drive* up" expresses a very important fundamental in the operation of trucks either in summer or winter weather and is one with which drivers should be made familiar.

It does no good if the men in charge of truck fleets know these principles of cold-weather operation if they do not transmit their knowledge to the drivers. Similarly, it is of no value to tell drivers how to overcome difficulties due to the lessened traction on icy streets if their trucks are not equipped with apparatus such as a shovel, sand or skid chains. Now is the time to gather such material together and place it on each truck so that when the need for its use arises, the material will be immediately available.

It should be borne in mind that it is better business to take hours getting everything ready to start the truck in the morning and thereby keep the truck intact and not in need of repairs than to spend only a few minutes trying to get it started quickly and paying the repair bill afterward. The International Motor Co., New York City, has realized the benefits of such procedure to the owners of fleets of Mack trucks and has published two booklets, one on the care of AB model Macks in freezing weather and another on the care of AC Macks. Both of these booklets apply particularly to trucks which are stored in cold garages or left in the open in freezing weather. While much of the information contained in the Mack booklets applies

COLD-WEATHER HINTS

Adapted from "FIGHTING SNOW" by Fifth Avenue Coach Company

RADIATORS

Protect cooling water against freezing.

- (a) Add alcohol or some Anti-Freezing solution to cooling water: or
- (b) Heat Garage: or
- (c) Draw off water every time truck is left standing with stalled engine for over ½ hour outdoors.

TRACTION

When snow falls, or roads are icy, equip truck with

1 shovel, 1 small pick, 1 box of sand, 12 skid chains for rear wheels.

It is possible to operate motor trucks successfully on snow and icy streets provided drivers use extreme care and follow these instructions.

STOPPING

When coming to a standstill, release brakes just before coming to a full stop, so that truck will roll the last few inches.

This will avoid formation of ice under the wheels which causes them to spin when starting.

IMPORTANT

Start slowly. Do not attempt to force truck ahead faster than wheels will take hold. Spinning wheels, with or without chains, will not send truck ahead unless there is traction. If traction is lacking get out with shovel and sand and make it.

Do not, under any circumstances, grind skid chains between rubber tires and a hard road surface. Chains are intended for use in soft mud or snow. When the wheels cut through to hard road surface remove chains at once.

Feed small amount of gas, let clutch in slowly, and you will find that wheels do not spin. Accelerate gradually. A slippery road surface does not offer the resistance of a dry road, and therefore the same rate of acceleration is not necessary or possible, as the excess acceleration produces spinning wheels.

GENERAL

Remember that the amount of power required to start or to stop a truck depends on the resistance or traction between the road and the driving wheels.

If road surface is slippery and driving wheels spin and skid, driving and braking effort will decrease accordingly—therefore

"Do not drive down hill any faster than you can drive up."

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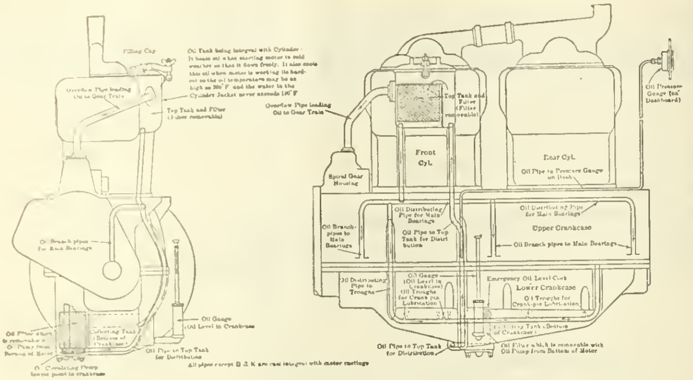
particularly to Mack trucks, other portions can be used to good advantage by all fleet owners and is given herewith for that reason.

For instance, if the truck has been left standing in snow and ice and the wheels have frozen to the ground, the wheels should be loosened with a crowbar or jack and the truck pushed by hand or towed a few feet to another spot before starting. Under no circumstances should the power of the engine be used to start the truck until the ice joint at the wheels has been broken. Furthermore, all movable connections, such as universal joints, brakes, brake connections and cams, clutch connections, brake shafts, clevises, etc., which may be frozen fast, should be broken loose with kerosene or light oil. The power of the engine should not be applied for this work, as serious clutch or bearing trouble or breakage may result.

A frozen engine should first be freed until it can be turned over easily by hand. The cylinder cocks should be opened and the engine primed with gasoline to remove the moisture and free the pistons. After the engine has been turned over by hand to clean out the gasoline, a light lubricating oil should be squirted into the cylinders by means of an oil gun to replace the oil cut by the gasoline and to prevent scoring the cylinders. Sometimes it is a good plan to remove the handhold cover plates from the crankcase and squirt light lubricating oil into the main bearings, connecting rod bearings, wrist pin bearing and camshaft bearings, as these parts will get little lubrication until the congealed oil in the crankcase is warmed. This procedure will pre-


Filling Cap
Oil Tank being integral with Cylinder - It heats oil when starting motor in cold weather so that it flows freely. It also cools this oil when motor is working its hardest as the oil temperature may be as high as 300° F and the water in the Cylinder Jacket never exceeds 180° F
Overflow Pipe leading Oil to Gear Train
Top Tank and Filter
Overflow Pipe leading Oil to Gear Train
Oil Branch pipes for Rod Bearings
Oil Gauge Oil Level in Crankcase
Oil Pipe to Top Tank for Distribution
O. Circulating Pump
All pipes except B & K are cast integral with motor castings
Top Tank and Filter (Filter removable)
Oil Pressure Gauge (on Dashboard)
Spiral Gear Housing
Front Cyl.
Rear Cyl.
Oil Pipe to Pressure Gauge on Dash
Oil Distributing Pipe for Main Bearings
Oil Distributing Pipe for Main Bearings
Upper Crankcase
Oil Branch pipes to Main Bearings
Oil Pipe to Top Tank for Distribution
Oil Branch pipes to Main Bearings
Oil Distributing Pipe to Troughs
Oil Gauge (Oil Level in Crankcase)
Oil Troughs for Crank pin Lubrication
Emergency Oil Level Cock
Lower Crankcase
Oil Troughs for Crank-pin Lubrication
of Crankcase
Oil Pipe to Top Tank for Distribution
Oil Filter which is removable with Oil Pump from Bottom of Motor

The Mack AC engine oiling diagram, showing the layout of the various pipe lines and the direction of oil flow to the various bearings The engine oil tank and the flow from it through the timing gears before entering the crankcase are clearly shown

vent possible burned out bearings.

In finally starting the engine after the above steps have been taken, it is very important not to race the engine, especially during the first two minutes. Instead, the spark should be retarded slightly and the engine speed worked up gradually for about ten minutes.

In Mack trucks the cover of the cylinder oil tank, which is shown in the lubricating chart of the AC model trucks, reproduced on this page, should be removed to see that the lubricating oil is flowing freely. If it is not, the engine should be immediately stopped to prevent the bearings being destroyed or the cylinders scored. If the oil is not flowing, light lubricating oil should be inserted into the engine through the cylinder oil tank. It is also a good plan to make sure that the oil pump is working, if necessary removing it for inspection.

Hot Water Helps

When the engine is hard to start, warm water may be poured over the manifold to aid in the evaporization of the gasoline. When this is done, special precaution should be taken to prevent any of the water entering the auxiliary air valve. If water has frozen in the gasoline tank, gasoline pipe or carbureter, it may be melted by applying warm water and then draining off the water and removing and cleaning the strainers in the gasoline tank and carbureter. Special precaution should be taken against cracking the glass float chamber of the carbureter by pouring boiling water over it or flooding the carbureter with water. In cases where the truck is to be allowed to remain in the open for any great length of time, all the gasoline should be drained from the fuel system to prevent the freezing of any water that may be contained in the fuel.

Preventing Cracked Cylinders

If the cooling system of the engine has been frozen, hot water should not be placed in the radiator as the sudden change of temperature is likely to crack the cylinder jackets or cause leaks at other points of the system. It is better to use warm water until the temperature of the cylinders has risen to an appreciable extent.

Poor ignition is another cause for difficulty in starting trucks in cold weather. To overcome this trouble, the spark plugs should be removed to see that each sparks properly. Sometimes moisture may have frozen on the points and caused a short circuit. Magneto terminals, breaker box and distributer should also be inspected for frozen moisture as this also causes short circuits. All wires should be inspected to see that they are not short circuited by freezing.

Battery Needs Inspection

When a battery is included in the equipment, it should be inspected to see that it is not short circuited by ice formed across the terminals. If the engine starts with great difficulty with the fuel system apparently functioning properly, it may be due to the lowered efficiency of a cold battery. If this proves to be the case, the battery should be removed and placed in a warm location and then put back.

When the gearset lubricant has become frozen, it may be softened by pouring warm water over the gearset case. If this does not soften the oil, kerosene may be poured into the case, but when this is done, great care should be taken to drain out all of the lubricant and refill the case with proper grease before the truck is put into service. Another plan to follow is to then put the gears successively in all speeds, jack up the rear wheels and turn the engine over by hand a few times before starting.

To free the rear wheels when frozen, each wheel may be jacked up one at a time, the gears put in neutral and the wheels turned by hand a few times to free the bearings, the driveshaft or chains and the differential.

Operating Hints

To free the clutch, the clutch pedal should be moved forward a few times to loosen up the bearings and other moving parts. The clutch pedal may be thrown out and wedged fast, after which the motor may be turned over by hand, leaving the gears in speed to free the clutch lining from the flywheel disks.

In the way of hints to the driver in his operation of trucks in cold weather, those followed by the Fifth Avenue Coach Co., as given on page 177, will prove of great value. In addition, the driver should not run his truck close up behind another vehicle when operating over bad roads.

This action is particularly important in order to avoid collisions when operating truck trains or when driving trucks in heavy traffic or storms or over snow or ice-covered roads. A great deal of operating difficulty in cold weather with the streets covered with snow or ice is in starting. To overcome such trouble, the driver should always bear in mind that traction is necessary. If it is lacking, he should get out with shovel and sand and make it. With this done, it is most important to start slowly and not attempt to force the truck ahead faster than the wheels will take hold. This may be done by feeding a small amount of gasoline and letting the clutch in slowly. Acceleration must be gradual. A slippery road surface does not offer the resistance of dry roads, and it is therefore not possible to secure the same rate of acceleration.

Eliminating Skids

Skidding, particularly on hills, may be avoided by driving down the hill at the same speed at which the truck can be driven up. When a truck does go into a skid, the best plan is to turn the front wheels in the direction of the skid as this will tend to straighten the truck out on its course. A slow application of the brakes and a reduced speed on days when the streets are ice covered also help to reduce skidding.

BODIES *for* Oil in Large and Small Quantities

One Truck Has Removable 200-Gallon Tank And Another, a Tank Holding 2350 Gallons

The 200-gallon tank in this ¾-ton Nash is removable so that upon occasion it may be removed to permit the truck to carry other goods

WHAT are perhaps the smallest and the largest mobile gasoline tanks in the United States are shown in the two illustrations on this page. Of course, the motor truck furnishes the mobility for each tank. The smallest tank, which is of 200-gallon capacity, is a removable affair set up in the flareboard express body of a ¾-ton Nash truck. The largest tank has a capacity of 2350 gal., and is mounted on a 5½-ton Mack. The Mack truck with the tank also hauls a second tank on a trailer. The latter tank has a capacity of 1900 gallons, so that the total capacity of the truck and trailer is 4250 gallons.

These two examples of tank bodies express the two extremes in the distribution of gasoline by means of motor trucks. The 600- to 800-gal. tank trucks most usually employed by the large producers fill in the gap between.

The small tank is used for rush deliveries of gasoline in much the same fashion as the light ¾-tonner is employed by department stores for rush deliveries. By making the tank removable, however, the truck owner can take it out of the flareboard express body and employ his truck to haul other goods when the work demands.

The giant tank mounted on the Mack is used to transport casinghead gasoline, a commodity so pregnant with danger on account of its great inflammability that the railroads refuse to ship it between the plant where it is secured and Los Angeles, a distance of 75 miles, where it is consumed. Casinghead gasoline weighs only 6 lb. to the gallon, as compared with ordinary gasoline, which weighs 8 lb.

Removable Tank for Special Deliveries

ONE of the latest methods of utilizing a truck for carrying oils and gasoline is that employed by C. H. Dickson, representative of the Gate City Oil Co., Kansas City, Mo., and owned by the Cosden Oil Co., Tulsa, Okla. Mr. Dickson recently purchased a ¾-ton Jeffery truck and a 200-gal. steel tank from the Columbia Steel Tank Co., Kansas City. A framework was made for the tank which would fit into the truck body and the tank was bolted to it. With the assistance of a small derrick, which he keeps in the garage, Mr. Dickson can put the tank in the truck and haul gasoline to his customers, or he can remove the tank and haul cans of oil with very little trouble, so that the truck serves a double purpose. Large 600- and 800-gal. tank trucks are used for carrying gasoline and oil from the warehouse, but often when a customer only wants fifty or 100 gallons of gasoline, the light 200-gal. truck handles the delivery more easily and cheaply.

2350-Gallon Tank on Mack

IN order to overcome transportation difficulties, the Wilshire Oil Co., Los Angeles, Cal., has put in service what is said to be the largest mobile gasoline tank in the United States. This tank, mounted on a 5½-ton Mack chassis, is used to transport casinghead gasoline, a commodity which the railroads refuse to ship, between the company's plant near Ventura, Cal., and Los Angeles, a distance of 75 miles, because of the attend-

This Mack 5½-tonner is fitted with a four-part tank holding 2350 gallons of casinghead gasoline, a commodity so explosive in nature that the railroads will not handle it on account of the excessive risk involved

Here are two I. H. C. trucks employed in the production end of the oil industry. By the use of small two-wheeled pole trailers, they are seen hauling long lengths of pipes in the Kansas oil fields

ant danger. The tank on the chassis has a capacity of 2350 gallons and in conjunction with this equipment another tank, mounted on a trailer, is drawn. This tank's capacity is 1900 gallons, making a total of 4250 gallons hauled each trip.

Casinghead gasoline is very explosive and is of exceptionally high test. In fact, it is not marketed at all, being diluted first. It weighs but 6 pounds to the gallon while ordinary gasoline weighs 8 pounds. Extreme care has to be taken on the road and particularly in descending grades as a gas vapor surrounds the tank constantly and a spark from a brake shoe would ignite this instantly.

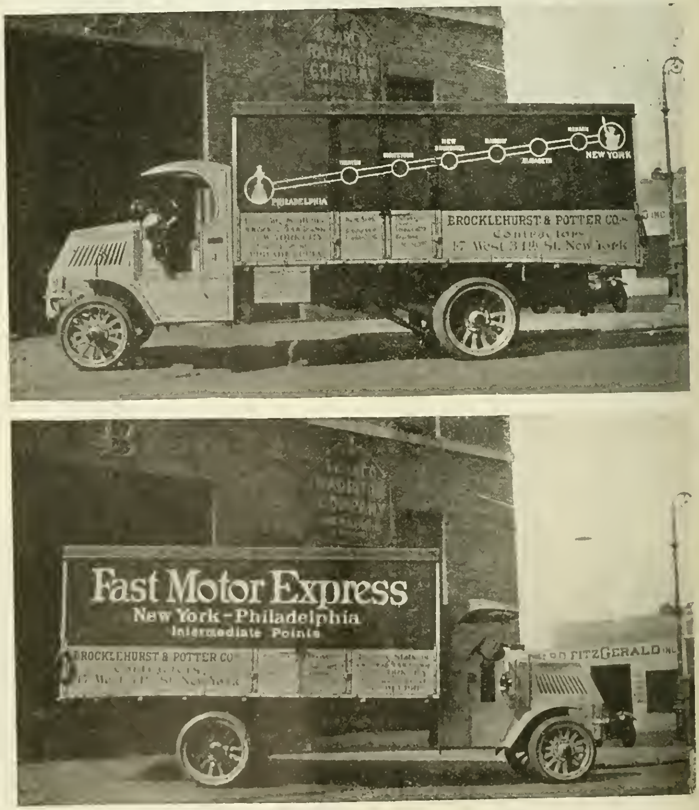
Advertising Value of Truck Bodies

THE advertising value of a motor truck body is of great importance to the fleet owner provided he takes full advantage of it. One example of an admirable manner in which the greatest use has been made of the sides of the motor truck body for advertising purposes is shown in the two illustrations of the same truck shown directly opposite. The upper view shows the left side of the body and the lower view the right side. The latter illustration with the words, "Fast Motor Express" in very large type with the words "New York-Philadelphia—Intermediate Points," expresses at once the work which the truck does. Painted in white upon a black background, the words, "Fast Motor Truck Express," cannot fail to catch the eye of the passerby.

To get a picture of these points, all the pedestrian has to do is to look at the other side of the truck, for there he will find in one corner a large circle out of which rises the figure of William Penn, as mounted on the dome of Philadelphia's City Hall. At the other end of the body in the upper corner is a second large circle labeled New York, from which rises the flaming torch of the Statue of Liberty as erected on Bedloe's Island, New York Harbor. Between the two circles there is a two track line punctured at several places along the way by smaller circles representing Trenton, Wrightstown, New Brunswick, Rahway, Elizabeth and Newark, beginning from the Philadelphia end.

These two sides of the same body, as shown in the accompanying illustrations, present one of the best worked out examples of the utilization of a truck body for advertising purposes, for they leave no doubt in the mind of the observer as to the work which the truck does, the route over which it runs and the intermediate towns which it serves.

The truck is a 7½-ton Mack owned by Brocklehurst & Potter, New York, and as the designs indicate, runs regularly over the 104-mile route between New York and Philadelphia. To provide for rapid loading from the sides as well as from the end, a large side door extending the full height of the truck from the floor to the roof is fitted on each side.

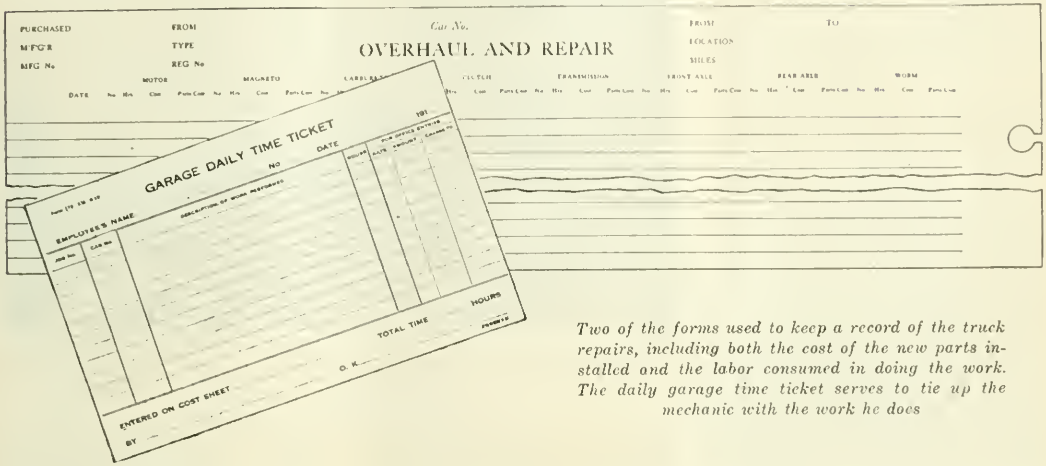


Excellent Example of Truck Body Advertising

These two views show both sides of the same truck. They show what excellent advantage may really be taken of the advertising possibilities of a truck body when the truck owner desires

Maintenance Charts Insure Proper Truck Inspection

(*Continued from page* 163)



PURCHASED FROM

M'FG'R TYPE

MFG No REG No

Car No.

OVERHAUL AND REPAIR

FROM TO

LOCATION

MILES

MOTOR MAGNETO CARBURETER CLUTCH TRANSMISSION FRONT AXLE REAR AXLE WORM

DATE No Hrs Cost Parts Cost

GARAGE DAILY TIME TICKET

NO DATE 191

EMPLOYEE'S NAME

JOB No. CAR No. DESCRIPTION OF WORK PERFORMED HOURS

FOR OFFICE ENTRIES RATE AMOUNT CHARGE TO

TOTAL TIME HOURS

O. K.

ENTERED ON COST SHEET

BY

Two of the forms used to keep a record of the truck repairs, including both the cost of the new parts installed and the labor consumed in doing the work. The daily garage time ticket serves to tie up the mechanic with the work he does

standard for a certain time, and he will then become lax. The reason for this is that he soon loses interest on account of the monotony of doing one particular piece of work every day. This has been the experience of Black. He has also figured out that in order to thoroughly familiarize the mechanics with every detail of the truck, they must be allowed to vary their work.

The whole overhauling or reconstruction work of the Atlantic & Pacific Tea Co.'s fleet is based on a cycle of operations. As each truck comes in for an overhauling, an overhaul and repair sheet is filled out, showing the truck's number, its make and the warehouse to which it belongs. Before it reaches the machine shop, the body is taken off on the floor below the machine shop, and the chassis is thoroughly cleaned. It is then taken upstairs to the machine shop. Each mechanic is then given a certain unit of the truck to overhaul and repair. He stays on that job until it is finished.

Recording the Repairs

On the overhaul and repair sheet is listed in order the engine, magneto, carbureter, clutch, transmission, front axle, rear axle, steering column, radiator, brakes, chassis, universal joints, body, paint, miscellaneous and remarks. Under each of the unit names space is set aside for the date, number of hours, cost and the cost of the parts. In this way that company is able to keep tabs on the cost and the time required for each specific piece of work. At the same time, the names of the men doing the work are kept on separate records. These records are styled Garage Daily Time Tickets. The employee's name is listed together with the date, the truck number, a description of the work performed, the number of hours, his pay rate, and the total time in hours. This card is placed in a space set aside for each particular mechanic. As each piece of work is finished, the foreman sees to it that the mechanic is assigned to another job by writing out on the card under the Description of Work Performed column just what he is supposed to do. In that way the assignment of work is simplified and a good record of the mechanic's time is kept.

James L. Black, who is in charge of the centralized repair work of the A. & P. fleet of 108 *trucks and tractors*

Special Man for Greasing

The lubrication and greasing of the trucks is taken care of by a man specially assigned to that work. His work is also based on a cycle of operations. It has been figured out that he can grease and oil eight trucks a day. The foreman keeps a record of this work and assigns to the greaser each day certain trucks to work on. As each truck is numbered, it is a simple matter for him to keep track of the vehicles.

It is the plan of the A. & P. Company to install some standard method of inspection in all of the warehouse garages. At present this work is not systematized. In order to have each foreman thoroughly familiar with the right method of inspecting his trucks, an inspection chart has been printed to take care of the repair of every part of the truck. If followed out correctly, the inspector will start from the front axle and work back through the grease cups, front springs, bumper, starting crank, engine, dash, cab, clutch, transmission, brakes, rear axle and rear springs.

While inspecting the two axles, he will have them jacked up so as to ascertain the condition of the wheel bearings, driving caps, etc. Attention is also to be paid to the taillight, license bracket, body, and the general appearance of the truck. In order that he may not skip any of the parts directly related to the foregoing units, provision has been made for listing of these parts.

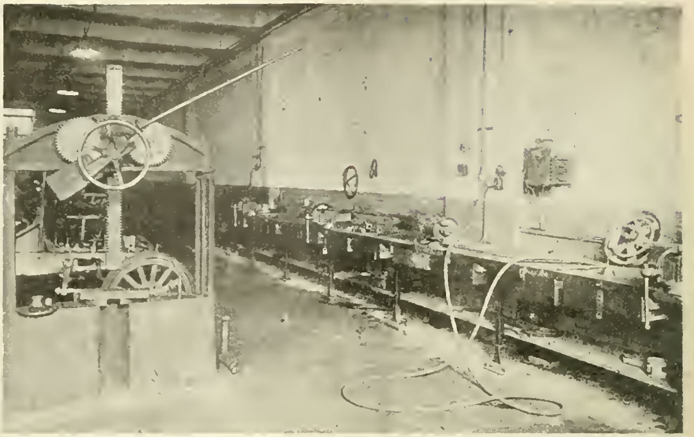
It has been figured out that, following out this system of inspection every month, a mechanic will become so familiar with this work that it will become a habit with him later on, so that he will not have to follow the chart. He will then be given a less intricate list of units to inspect and check up on, as shown on page 183. On both provision has been made for listing truck number and inspection date.

Special Lubrication Chart

In order to systematize the lubrication of its trucks, the A. & P. Company has prepared a chart especially adaptable to the Pierce-Arrow trucks. This chart will be sent to each of the warehouse garages, where the man in charge will follow out and check up on the instructions given on the chart. These instructions take in the daily and weekly lubrication needs of a truck, as well as the parts to be lubricated on the mileage basis, which allows for attention to certain units at mileages ranging from 150 to 5,000.

Each instruction for oiling is accompanied with advice on the best way of doing the work. In all, the system is complete enough to eliminate any serious breakdowns from careless or haphazard attention to the lubrication and greasing. There is no excuse for burned out bearings, etc., for each instruction must be checked up on the chart.

Saving Money on Small Parts

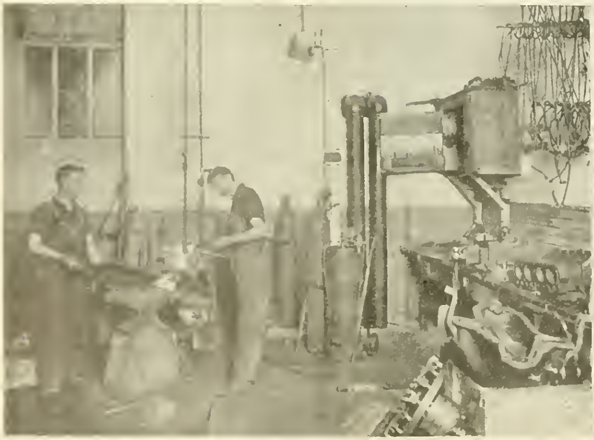


One corner of the A. & P. repairshop, showing the work bench along one wall with drawers for the individual mechanic, and in the foreground a press used for removing bushings and parts

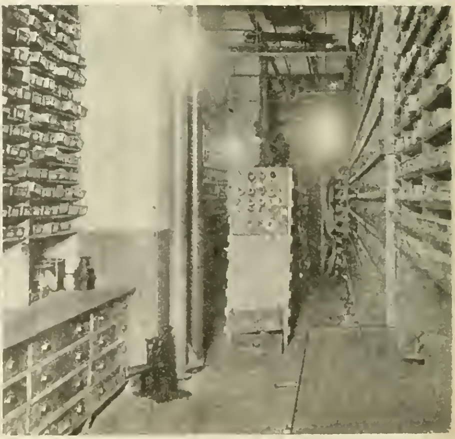
Cutting down the purchases of small parts and accessories goes a long way in lowering maintenance costs. Much can be saved by the reclaiming of all parts and taking advantage of the offers made by certain companies for saving money on worn-out or damaged units and accessories. This has been the experience of the Atlantic & Pacific Tea Co. Instead of scrapping its worn bearings, they are sent to the various bearing service stations to be reclaimed. It is estimated that practically $8 a bearing is saved by this method. In the same manner the spark plugs are reclaimed. Instead of throwing the spark plugs away when the porcelains are cracked, they are renewed by the replacement of new porcelains, the charge for such parts being 25 cents. This means a saving of 22 cents when the plugs are bought in large quantities. Now that the A. & P. fleet is in process of reconstruction, there is a large call for new plugs. On the average 100 a month are used, and with the present method of reclaiming the plugs there is a considerable saving.

Road Repairs Greatly Reduced

Following along the line of standardization in the employment of machinists is that of keeping to one make of truck and working away from mixed fleets. The A. & P. fleet is made up entirely of 5-ton Pierce-Arrow trucks. As a result, the mechanics have been drilled entirely on the



One end of the shop, showing the forge, anvil and acetylene welding outfit which is moved about readily by mounting the oxygen and acetylene tanks on a small wheeled hand truck



A good example of a well-kept stockroom. Metal containers instead of built-in pigeonholes are employed

TRUCK NO.

DATE

MOTOR
Cylinders
Crankcase
Suspension
Bearings
Valves
Compression
Push Rods
Manifolds
Oil Tank
Oil Pump and Pipes

GOVERNOR

RADIATOR
Connections
Water Pump
Fan

CARBURETER
Float—Needle Valve
Reed Valve
Gas Tank
Feed Pipe
Primer

CLUTCH
Clutch Brakes

IGNITION
Magneto
Breaker Points
Coil-Switch
Battery
Plugs—Wiring

TRANSMISSION
Case—Supports
Bearings
Gear Shift

STEERING ARR.
Pivot Axles
Levers
Rods—Cross—Side
Column Lever

REAR AXLE
Worm Thrust
Drive Plates
Shafts

CHASSIS
Guards—Bumper
Universals
Shaft—Flexible
Shaft—Intermediate
Rod—Torque
Rods—Radius
Foot Brakes
Hand Brakes
Springs
Spring Supports
Wheels—Bearings
Frame

BODY
Cab

METER
GREASE CUPS

Remarks:

Signed by

The simplified inspection chart used by the truck mechanics after they have become more intimately associated with every phase of the work by several months' or a year's experience

mechanism of one vehicle, thus becoming quickly conversant with the methods of repairs and consequently expediting overhauling. The supplies in the stockroom are made up entirely of the parts needed for only one make of truck, thus enabling a better system for checking up on units needed in the maintenance of the trucks. As a result of this standardization and the ability to keep a better watch on the running condition of the trucks, calls for help from trucks stalled on the road have become almost negligible and hardly average more than one or two a month. What this means is realized when last year road repairs averaged from eight to ten a day.

In order to eliminate any breakdowns through poor lubrication of the springs and other parts of the trucks, Black has decided to equip all of the trucks with oil cups and to take off the grease cups. By doing this, Black figures that he has eliminated the troublesome part of lubrication by grease cups, that being the time and trouble to turn up the cups and to fill them. By using the oil cups, the mechanic is less likely to skip over this important work, as he would probably do were he to encounter any trouble in turning the grease cups. There is less chance of clogging, etc., with oil fluid, that is so common with the use of grease. In addition to this feature, oil will reach all bearing surfaces that grease is likely not to reach when it becomes hard or clogged.

The oiling of the trucks is also based on a cycle of operation, as in the case of the repair work. A man has been employed whose duty is to take care of the entire lubrication of the 108 trucks. He goes over each truck once every eight days and records the number of each vehicle he works on. His average for a day is about ten trucks.

The Atlantic & Pacific Tea Co. has installed a cleaning system that is a big time saver, both during the maintenance work and the operation of the trucks. By using air pressure in combination with the washing fluid, that company has eliminated the use of pails as well as the need of crawling under the trucks.

A 120-pound air pressure forced into the tank holding the fluid sets up a spray that is strong enough to work loose any mud or other accumulations that have collected on the wheels or under the trucks. By using a solution of 10 pounds of lye and 25 pounds of soda in 50 gallons of water, all grease and oil accumulations are easily washed off the trucks

The device consists of a portable 50-gallon airtight tank, a 10-foot flexible hose for the fluid and an air hose leading from the main line to the tank. Both pieces of hose are connected to the tank at the top. The piece of hose used for the fluid is equipped with a 6-foot piece of piping. This is of smaller diameter than the hose so as to give added pressure to the washing fluid and to set up a stronger spray. The force of the spray is controlled by means of a faucet.

The tank is equipped with two handles, which are placed on its sides, as well as a socket, placed on the side of the tank so as to hold the spraying nozzle when it is not in use. It takes about 20 minutes with this washing machine to clean a truck.

Eliminating Sidewalk Loading

(*Continued from page* 175)

goods from rain and snow costs from $5 to $6, and some of the sidewalk canvases, which are 12 feet long, cost as much as $15. This saving is also exclusive of that charged against damaged goods by getting wet through rain or snow. Packages of expensive material, such as silks and the like, can readily be damaged if allowed to stand out in the open when it is raining or snowing or if dropped into a puddle of water on the sidewalk. By loading all of the goods into the trucks when under cover, all such damage has been eliminated.

Sidewalk Loading Going

Sidewalk loading for department stores is bound to disappear because it is slow and expensive. It has not been eliminated entirely up to this time because of physical conditions at some of the stores that would not permit of the construction of a loading bay below the street level, where it would not seriously interfere with the valuable first floor sales space. However, wherever possible, the saving which has been made by the Boston Store is indicative of the greater truck efficiency which can be secured by other concerns which eliminate sidewalk loading either by the method shown or by the construction of a separate building in another part of the city where rents are lower.

Better Truck Repair and Maintenance

No. 16—Spark Tester For Ford Trucks

OPERATORS of Ford trucks may test the intensity of the ignition sparks by means of a small apparatus hung over the longitudinal radiator tie-rod or engine hood support. The apparatus consists of a square piece of wood board about ½ inch thick and about 2 inches long to a side. A long nail, bent over to form a hook at the top, is driven into the center of the board to permit the board to be hung from the radiator tie rod as shown. Four nails, one at each corner of the board, are driven to it from the bottom and bent over in right angle turns so that the pointed ends of the nails are in close proximity to the center nail on which the board is hung. Then, by inserting the ends of the ignition cables over the corner nails and turning the engine over by hand, the sparks will be clearly seen at the center nail. The end of each corner nail should be about ⅛ inch away from the center nail.—Motor World, C. E. PACKER, Chicago.

No. 17—Bracket To Hang Toolbox On Truck Frame

WHEN working on a truck chassis which does not have a running-board or one from which the running-board has been removed, the mechanic can save much time by hanging his wooden toolbox on the chassis frame by means of a simple bracket. Such a bracket, as shown in the illustration on this page, may be bolted to either the side or end of the box. The bracket is made of sheet metal and is U-shaped, one side of the U being attached to the box and the other side forming a rectangular-shaped hook which may be slipped over the top of the chassis channel or I-beam. The use of such a bracket saves considerable of the mechanic's time. If the box is placed on the floor, he must bend over to pick up each tool as used. If the box is placed on the frame, it usually tips over. By hanging it on the chassis frame, it is always within easy reach of the mechanic's hand and may be moved along the frame as the mechanic passes from one truck part to another. While in most cases the bracket is attached to the side of the box, it may also be attached to the end, so that the box may be suspended from the front axle when the mechanic is working underneath the chassis.—Motor World, MAXWELL MOTOR CO., Detroit.

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks. THE COMMERCIAL VEHICLE *prints on these two pages better methods of maintaining trucks and the latest ideas in making quick repairs.*

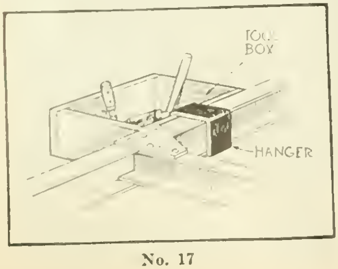
THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 18—Taking a Dent Out of a Tank

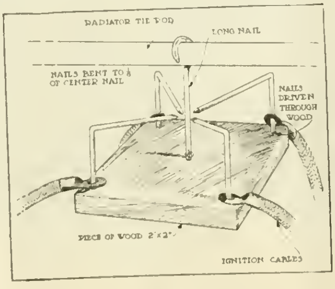
COMPRESSED air, furnished either by an ordinary hand pump or by a mechanically operated garage pump, may be employed to good advantage in taking the dents out of gasoline or oil tanks, no matter of what shape. The procedure is to solder a tire valve to the filler cap and pump air through the valve into the tank until the latter is under from 50 to 75 pounds' pressure per square inch, according to the thickness of the tank material. Then, by tapping lightly with a hammer around the edges of the dent, the pressure of the air inside the dent will push it out level with the surrounding metal.—Motor World, PHILIP BAKER, Blairsville, Pa.

No. 19—Easy Way To Make Drop Light Holder

A ROUND or cylindrical piece of wood of slightly greater diameter than the socket of an electric bulb



No. 17



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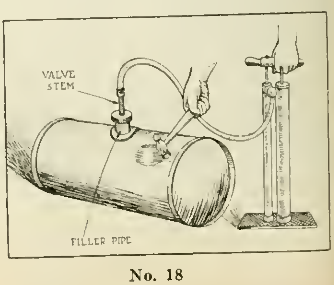
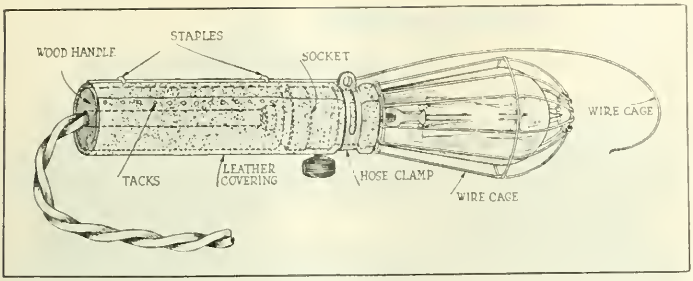
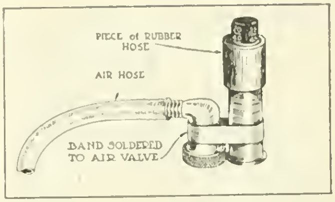


No. 18



No. 19



No. 22

serves to make a good holder or handle for a drop light, such as is used in motor truck garages. A hole of the same diameter as the socket is drilled into one end of the piece of wood and a smaller hole drilled clear through the center to the other end, to provide for the lamp cord. The whole piece of wood is enclosed in a piece of leather, which also encircles the socket. The leather is fastened to the wood piece by two rows of tacks and to the socket by means of an ordinary hose clamp. A hole must be cut in the leather to allow for the switch key to turn the light on or off. An ordinary wire-cage lamp protector and a hook attached to the wood handle by means of staples complete the outfit.—Motor World, OTIS GIBBENS, Roodhouse, Ill.

No. 20—Replacing Pistons Easily By a Sleeve Jig

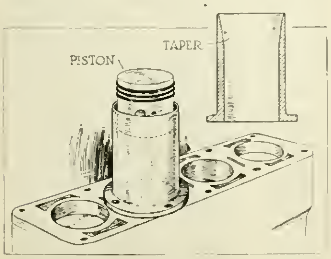
A SIMPLE jig for easily replacing the pistons in a detachable head engine may be made of a sleeve with a flaring upper end, as shown in the accompanying sketch. The diameter of the straight-sided portion of the sleeve must be made the same as that of the piston bore. A flange may be attached to the bottom so that the sleeve can be held in its proper place, directly over the cylinder bore, by means of stud bolts dropped through one or two holes in the flange and into the bolt holes by which the detachable head is held in place. The flaring top of the sleeve enables the piston and its rings to be inserted easily and then pushed through into the cylinder without the use of a screwdriver to mar the rings. It also permits the workman to get the pistons into the cylinders without skinning his fingers and in much less time than by the ordinary method.—F. E. SPOONER, East Orange, N. J.

No. 21—Lathe Chuck for Centering Engine Pistons

PISTON-PIN holes may be quickly bored, ground or reamed in a lathe by the use of a special chuck made up to form an integral part of the regular face plate. The chuck, as shown in one of the accompanying sketches, consists of a V-shaped block of either cast iron or steel and planed exactly parallel with the back, which is placed directly against the lathe face plate. A strap, made up as shown in the sketch and provided with a large hole at its midpoint, is employed to hold the piston against the sides of the V-block by means of bolts through the ends of the plate and the slots in the chuck face plate. This strap merely serves to keep the piston in place. The hole in the strap permits the reamer or other tool to pass through to the piston pin hole.—Motor World, K. A. WOODRUFF, Lamesh & Woodruff, Omaha, Neb.

No. 22—Tire Gage and Air Hose Combined

AFTER the driver of a motor truck mounted on pneumatic tires has inflated the tires, he should determine the air pressure in order to be certain that it is not too high or yet too low. This can only be done by using a tire gage. Sometimes, however, the tire gage is mislaid or left in the pocket of the driver's other suit, so that just when he wants the gage, he does not have it with him. Troubles of this nature can be overcome by fastening the tire gage to the end of the hose line. Then it is always handy when wanted. The connection between the tire gage and the end of the air hose may be made by soldering a band around the two. To prevent the gage from being damaged when the end of the hose is accidentally dropped on the floor, a piece of rubber hose may be slipped over the barrel of the gage to take all the hard knocks and keep the gage in working order. —Motor World, CHAS. ANGELL, Alden, Mich.



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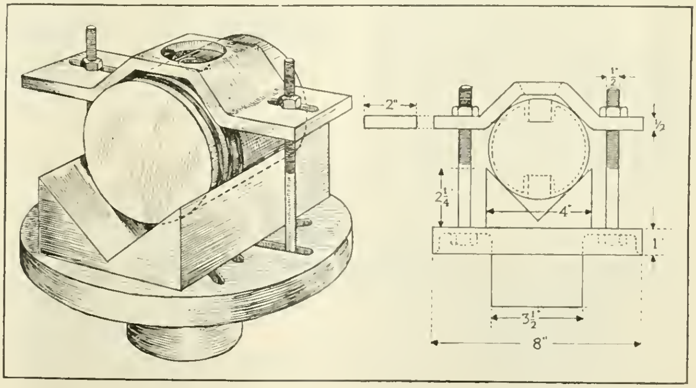
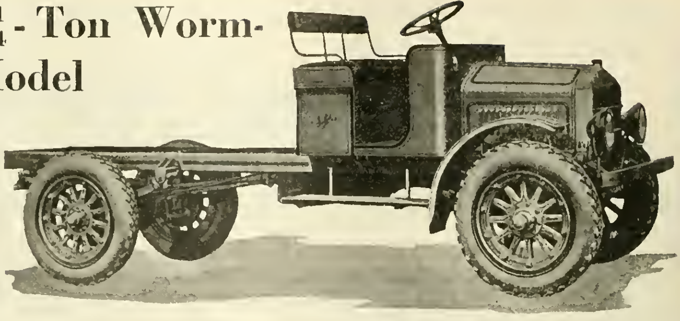


No. 21

Garford Adds a 1¼-Ton Worm-Driven Model



The new 1¼-ton worm-driven Garford truck

GARFORD SPECIFICATIONS

Capacity, tons	1¼
Price	$1,890
Wheelbase, in.	135
Tires, front	36 by 3½
Tires, rear	36 by 4
Bore, in.	3¾
Stroke, in.	5⅛
N. A. C. C. hp.	22.5
Speed, r.p.m.	1300
Speed, m.p.h.	18
Gear ratio in high gear	—
Final drive	Worm

THE Garford Motor Truck Co., Lima, Ohio, has added a 1¼-ton worm-driven model to its line of trucks. The capacities of its trucks are 1, 1¼, 1½, 2, 3½, 5 and 6. It also makes 4½, 7 and 10-ton tractors. Like its predecessors, it is made up of standard parts, including a Buda engine, Splitdorf magneto, Stromberg carbureter, Brown & Lipe clutch, Timken rear axle, Standard Parts springs, Ross steering gear, Fedders radiator core, and Spicer universal joints. The frame, radiator tank, gearset and front axle are made at the Garford plant.

The four-cylinder engine is of sturdy design, employing a heavy crankshaft of the three-bearing type and cast iron upper and lower crankcases. The flywheel is enclosed in a housing integral with the crankcase. The cylinders are cast in block, with the heads and valve chambers integral. With the valve location on the right side and the carbureter on the left, the fuel passes through a water-jacketed section of the cylinder. The pistons of gray iron are provided with three concentric, tested compression rings. The timing train is limited to three gears. The magneto driveshaft is extended forward of the gear panel in order to drive the centrifugal water pump. When electrical equipment is required the magneto is driven in tandem with the generator, thereby eliminating the necessity of chains for this unit. The timing gears, which operate in oil, are helical in form and of very broad face. The oiling is of the constant level splash system. A gear pump driven by the camshaft circulates the oil through a steel tube system to the main crankshaft bearings, the overflow oiling the piston and cylinder. The lower piston rod bearings are oiled by splashers dipping into troughs filled by a feed from the gear pump.

Water is circulated by means of a centrifugal pump through a vertical finned tube radiator with a cast iron case. The radiator tanks are bolted to the copper core, the radiator being mounted on a cushion suspension.

Ignition is taken care of by a single high tension magneto with hand spark control. Fuel is fed by gravity from a 20-gallon tank located under the seat. A combined strainer and shut-off, attached directly to the tank, is employed in feeding the fuel.

The clutch is of the multiple-dry-disc, ball-bearing type, enclosed in a housing attached to the flywheel base. The selected three-speed gearset is mounted amidships. All of the gears and shafts are constructed of 3½ per cent nickel steel, double heat-treated. The shafts are mounted on roller bearings throughout. The gear and shaft rods are on top of the gearset case. As in all of the other Garford models, the gearset is supported at three points.

Drive is taken from the engine through the clutch to the gearset and to the rear axle through a two-piece tubular driveshaft and thence to the springs and wheels. Driving torque and propulsion are both taken through the half-elliptic springs. The front driveshaft employs a pair of composition discs. The rear drive is made of steel and is grease tight and dust proof.

The front axle, of Garford design, is manufactured in its entirety in the Garford plant. It embodies a single piece drop-forging for the load carrying member and nickel steel knuckles. Oversize knuckle pins and a spherical seated ball-thrust are other features of this axle.

The housing of the rear axle is of one piece. The axle shafts are 2⅝ inches in diameter at the bearing and have a splined fit in the differential. Timken bearings are used both at the wheels and differential.

The differential is of the bevel type. Combined with the worm-carrier it may be removed from the axle as a unit. The worm is of hardened steel, the mating gear of bronze.

There are two independent sets of brakes operating on the rear wheels. Both braking systems have equalizers. The hand and foot brakes are of the internal-expanding type. Steering is on the left and brake and gearshift control in the center.

The front and rear springs, which are of semi-elliptic pattern, have leaves of chrome vanadium steel. The spring shackles are of drop-forged, heat-treated steel. Lubrication of the shackle pins is by oil feed. The frame of 7/32-inch stock has a depth of 5 inches and a width of 2½ inches. It is of pressed steel material and semi-flexible construction. There are six pressed-steel, channel-section cross members. All connections as well as brackets are hot riveted. The front and rear wooden wheels are of square spoke construction.

The standard tire equipment is of the solid pressed on type. Pneumatic tires come as extra equipment. The curved steel dash and seat are included as standard equipment. The lamp equipment include two side oil lamps mounted flush on the dash and one rear oil lamp. A full set of tools is included in the price of the chassis. Pneumatic tires, a power tire pump and extra rim are furnished at $285 extra. Electric lighting and starting may be had for $125 extra.

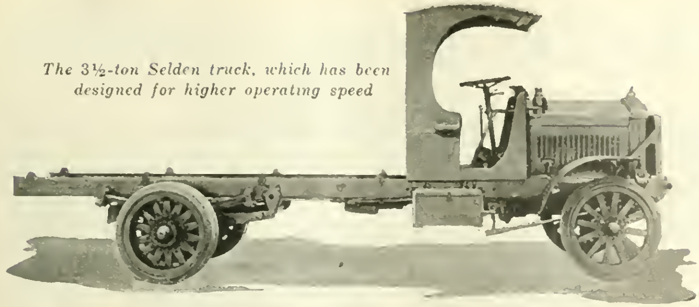
Selden 3½-Tonner a Development of War-Time Demand

SELDEN SPECIFICATIONS

Capacity, tons	3½
Price	$3 850
Wheelbase, in.	162
Tires, front	36 by 5
Tires, rear	36 by 10
Bore, in.	4½
Stroke in.	5½
N. A. C. C. hp.	32.4
Speed, r.p.m.	1125
Speed, m.p.h.	14
Gear ratio in high gear	8¾ to 1
Final drive	Worm

AS a result of its experience in building trucks for the United States Government and other countries during the four years of war, the Selden Motor Truck Co., Rochester, N. Y., has found it possible to make some improvements in its product. These improvements are shown for the first time in the new 3½-ton model, styled the 3½-A. This model has been on the road over a year and is designed for higher operating speed. The former 3½-ton model NL has been discontinued.

This new model, as in the case of the previous ones, is made up of standard parts, including a Paris & Bingham frame, Archibald wooden wheels, Continental engine, Long radiator, Eisemann magneto, North East generator and Willard battery, Stromberg



The 3½-ton Selden truck, which has been designed for higher operating speed

carbureter, Brown & Lipe clutch and gearset, Timken front and rear axles, Perfection springs, Gemmer steering gear, and Spicer universal joints.

Changes in the new model include the use of a flexible frame instead of a semi-flexible type; the absence of all rivets, and gearset mounting amidships instead of in a unit with the engine. The chassis is made in three lengths and three wheelbases as follows: Model 3½-A-7, 7 feet behind the driver's seat, is known as Selden 3½-A tractor and has a wheelbase of 120 inches; Model 3½-A-12½, 12½ feet behind the driver's seat, has a wheelbase of 162 inches, and 3½-A-16, 16 feet behind the driver's seat, has a wheelbase of 190 inches.

The four-cylinder engine is mounted at the front around the starting crank housing and at the rear on a heavy pressed-steel member bolted to a flange on the crankcase. This member is attached to the frame universally to eliminate undue strains due to the weaving of the frame. The cylinders are cast in pairs and the valves are placed at the left. Water is circulated by a centrifugal pump through a vertical finned tube radiator with a cast-iron case.

Ignition is taken care of by a single high tension magneto, with a hand spark control. Electric starting and lighting may be added as special equipment. Fuel is fed by gravity to the carbureter from a 30-gallon tank located under the seat. The carbureter adjustment is controlled from the dash. The engine speed is controlled by a Pierce centrifugal governor, driven from the engine. Lubrication of the engine is taken care of by a splash-pressure system.

The multiple-dry-disc type of clutch is fully inclosed and mounted on the engine. The clutch is connected to the amidship-mounted gearset by a propeller shaft equipped with Spicer universal. The selective four-speed gearset is equipped with special gear ratios in order to give maximum pulling power at low speeds and to counteract the higher gear ratio in the rear axle. The gearset is of the selective type. Both driving torque and propulsion are taken through the half-elliptic springs.

Both the hand and foot brakes are of the internal type mounted on the rear wheel drums. The drum diameter is 21 inches and the width 3¾ inches. Steering is on the right and brake and gearshift control on the right and center respectively.

The wooden wheels are of square-spoke construction and are mounted with solids all around. The rear wheels are mounted optionally with 36 by 10-inch Giant tires, or with 36 by 5-inch duals. Steel wheels are furnished at additional cost.

Equipment includes two locomotive type dash and one tail light, license plate brackets, mechanical horn, jack, Motometer, Hub-Odometer, complete set of tools, radiator guard, cab and front fenders.

Acason 1½-Ton Model Now in Production

ACASON SPECIFICATIONS

Capacity, tons	1½
Wheelbase, in	142
Tires, front	36 by 3½
Tires, rear	36 by 6
Bore, in	3¾
Stroke, in	5¼
N. A. C. C. hp	22.5
Speed, r.p.m	1200
Speed, m.p.h	18
Gear ratio in high gear	9¼ to 1
Final drive	Worm

PRODUCTION of the new 1½-ton worm-driven Acason truck is now in full force. With the addition of this model, the range of trucks built by the Acason Motor Truck Co., Detroit, now includes capacities of 1, 1½, 2, 3½ and 5 tons in addition to light and heavy commercial tractors.

The Waukesha four-cylinder engine, which forms, with the clutch and gearset, a unit power plant, is carried on three-point suspension. The cylinders are block cast, the cylinder head is detachable and the crankshaft is mounted on three bearings. The valves are placed at the right. Engine lubrication is the non-circulating splash system, the oil being pumped from the reservoir to the troughs by a geared pump.

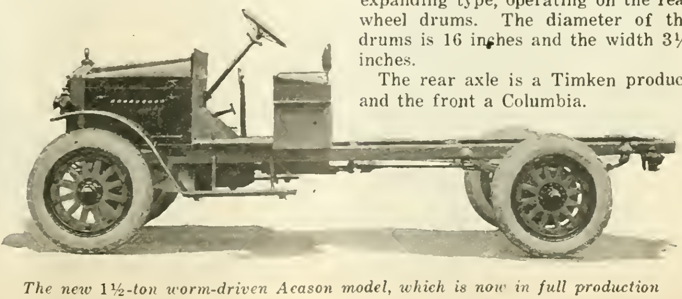
Cooling water is circulated by a centrifugal pump and the National zig-zag tube radiator is equipped with a detachable cast-iron case and guard. Fuel is fed to the Schebler carbureter by gravity from a tank located under the seat. The centrifugal Waukesha governor is driven from the engine.

Ignition is by an Eisemann single high-tension magneto with hand-operated spark control. No announcement has been made in regard to the optional fitting of starting and lighting systems.

Both clutch and gearset are of Fuller make, the former being of multiple-dry-disk type inclosed in a bell housing and the latter a four-speed selective sliding gear type. The two-piece driveshaft is supported at the center by a bearing. The metal universals are of Blood make.

Driving torque and propulsion are taken through the Detroit springs, the latter being of elliptic type. Both hand and foot brakes are of internal expanding type, operating on the rear wheel drums. The diameter of the drums is 16 inches and the width 3¼ inches.

The rear axle is a Timken product and the front a Columbia.



The new 1½-ton worm-driven Acason model, which is now in full production

Everyway Body Designed to Handle Various Farm Products

Highland All-Purpose Body Is Self-Contained—Warman Radiator Guard—Northwind Spark Plug

FARMERS, raising a widely diversified line of products, will be interested in an all-purpose truck body which has been designed to properly handle the different farm products. The farm truck in most cases has been inconvenient and inefficient, for instance, for the transportation of cattle, hogs, produce and poultry to the market, because the ordinary style of body lacks the fundamentals which meet this need. The Everyway body, built by the Highland Body Mfg. Co., Cincinnati, Ohio, was designed to meet the rapidly increasing demand for a motor-truck body that will enable the farmer to haul cattle one way and grain on the return trip.

This body is self-contained; all parts that go to make up the various designs into which it can be converted are on the truck at all times, thus making it possible to change the body to suit any load at any time and any place. The body is well within the limits of weights recommended by the automotive engineers and at the same time sufficiently rugged to withstand rough usage in country or city service.

The Everyway body is made in four sizes: 62 by 96, at $140; 62 by 120, at $160; 62 by 126, at $175; and 62 by 144, at $200.

All sills, floorboards, slats and stakes are of well-seasoned oak, joints in floors being tongue and groove and panels being rabbeted into the floor; all joints are made up with white lead. This gives a grain-tight body, one that it is claimed will not absorb moisture and deteriorate. All reinforcements have been designed to give maximum strength with minimum weight. When merchandise must be protected against the weather, provision is made for the use of a tarpaulin.

The body may be converted into five different types for use on the farm. It is especially designed to carry cattle. The smooth inside finish makes it easy to wash this body out. The slotted rack is held firmly in place by outside stakes, and the stake tops, which are 60 inches above the platform, are equipped with loops through which a rope may be threaded, thus discouraging the tendency of the cattle to try and climb out. The number of head of cattle that can be transported at a time is only limited by the size of the body, and it is not unusual for six or seven head being transported at one time, for by standing crosswise all available space is occupied.

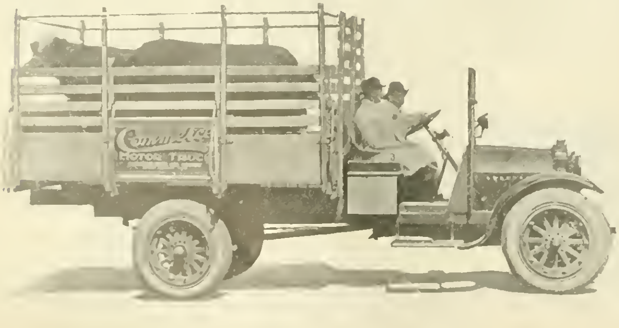
When carrying grain, the body is especially suitable for the work on account of its tightness. By removing the stakes and folding the racks, which are divided into two parts by hinges into one solid piece, which is caused by the upper half filling the empty spaces between the boards of the lower rack, a tight enclosure is effected for the use of carrying loose grain. When the stakes are not needed, as in this arrangement, they are stored in a compartment under the rear of the body.

Holding the closed racks upright are steel supports at the sides which are curved at the lower end so that they can slide to any position. By sliding these down as far as they will go the closed side racks fall toward the outside in a flat position. This style of truck body is used to carry sacks filled with grain, potatoes, fruits and other farm products.

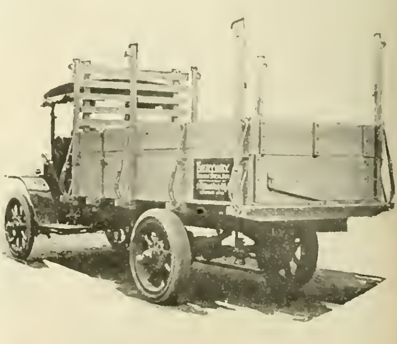
By unfolding the closed racks in this position a back support results, and the interior of the body resembles a passenger-car body with a long seat on each side. This is one of the most useful truck body styles for the farmer, as he can load large quantities of produce, loose or in crates, into it for the city market or use it for carrying workmen from farmhouse to field or from city to farm. The flare boards used with this style of body are 12 inches wide and the vertical extensions to the flare boards are 12 inches high.

The rear end gate is what is known as the Comstock gate, designed to fold in the middle so as to allow the load to be emptied either into sacks or into a bin through a hole specially provided in the floor.

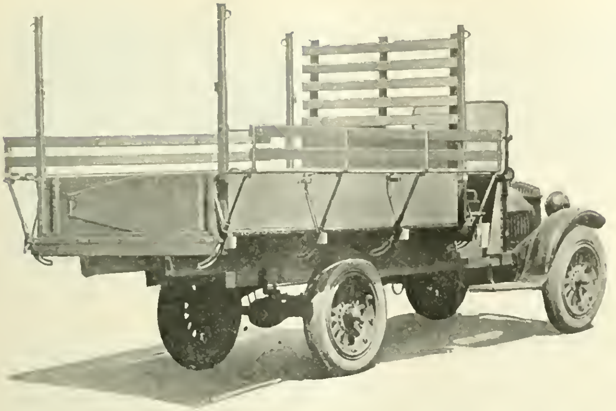
For city use it can be used to transport the raw material on one trip and bring back the finished product. It is also useful as a service pick-up body and for carrying bottles, baggage, express, grain, wood, ice, furniture, hardware, etc.



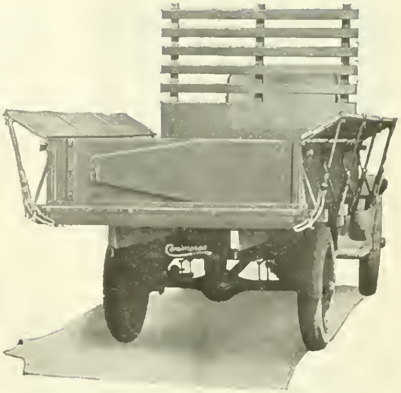
Everyway body used for carrying cattle



Body used for carrying loose grain



Body changed for carrying crates and workmen to the farm



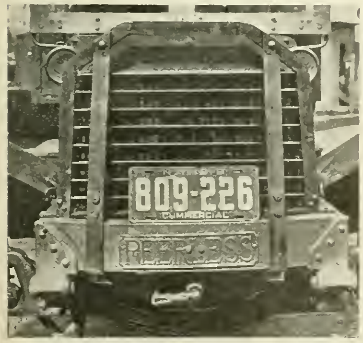
Everyway body adapted for carrying hay

Warman Radiator Guard

FLEET owners who wish to fortify themselves against delayed deliveries and loss of truck use, due to radiator damage, should equip their trucks with radiator guards. A leaky radiator, caused by a blow of any kind, means discontinuance of service. In heavy traffic, especially, accidents from bars, rods, etc., on the truck ahead are likely to occur.

A new radiator guard for trucks has been placed on the market. It can be attached by a driver in a few minutes with an ordinary wrench. The guard is of simple construction, giving maximum protection without boring, drilling, riveting or loss of time for attaching. The device is made in two different styles, one to fit trucks having a cross frame member in front of the radiator, and the other to fit trucks with the conventional spring horn type of frame.

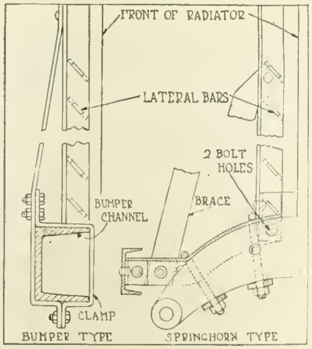
The guard itself consists of a steel frame upon which is mounted a series of horizontal bars, set downward at an angle of 45 degrees to permit free radiation and give maximum resistance and protection. The shape of the frame differs, to conform to the radiator shapes of various makes of trucks. It is braced forward by two pieces of flat iron, riveted to the guard frame at the top and extending down to the frame across member or spring horn, as the case may be.



The Warman radiator guard used on a bumper type of truck

The guard which is used on the trucks having cross frame members in front of the radiator is held tight to the cross member by means of two clamps, each running around the inside of the frame member to meet the front braces, to which they are bolted. The braces are bolted to the top of the frame. From here they extend down to, and under, the cross member, where they are bolted to the clamps.

The guard used on the trucks with the spring horn type of frame is held to the spring horns by two ½-inch U-bolts, which act as clamp attachments on extensions fitting over the spring horns. The braces on this type of guard are bolted to the sides of the guard frame so as to bring them into a straight line with the inner sides of the spring horns.



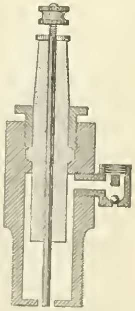
Sectional and side views of Warman guard styles used on bumper and springhorn types of trucks

The use of forward braces instead of rear ones eliminates interference with the hood and furnishes double protection. A blow on the forward brace will pull the guard away from the radiator, rather than pushing it toward it. A blow on the top guard is taken up directly by the chassis and cannot be diverted backward onto the radiator.

The guard is styled the Warman and is manufactured by the Fundamental Corp., New York City. The price is $25, complete.

Northwind Spark Plug

CRACKED spark plug porcelains, due to excessive heat or other causes, not only increase the cost of maintaining the truck fleet, but are likewise troublesome. The Cammen Laboratories, New York City, is manufacturing the Northwind ventilated spark plug, which is so constructed that it is claimed to be automatically protected from cracking the porcelain. On the suction stroke the outside air pressure lifts a little bronze ball and admits a stream of cool air to the inner chamber and past the central electrode. During the rest of the cycle the ball lies snugly in its seat and prevents leakage.



Northwind spark plug

The Editor's Viewpoint

Lengthening Truck Life

ONE of the surest methods of lengthening the life of a motor truck is by giving it frequent and continual inspection to discover small ailments before they grow into big ones. When you hear of the gasoline motor truck which has given 200,000 miles of efficient service, you may be sure that that truck was not allowed to run until something happened to it before it was repaired.

This method of adequate inspection, followed by immediate adequate repair, is the best form of truck insurance that the fleet owner can buy. To be sure, it costs money, but no one can get something for nothing. The truck owner who saves in the beginning is sure to pay at the end. If he neglects the small repairs and thereby saves money, he will pay many times the amount saved initially when his truck will not run and he is forced to put it into the shop for a much longer period than would have been necessary in the first place.

One of the best methods to reduce truck repairs is to employ competent drivers, even though they have to be paid more than the average. In cases of small fleets, drivers may sometimes be relied upon to keep their trucks in the pink of condition. The making of minor repairs and adjustments by the drivers should be frowned upon unless they are really competent. Otherwise drivers are continually tinkering with their trucks, with the result that they often do more harm than good.

When the size of a fleet becomes such that a special maintenance crew is hired, it is better to leave the adjustments to one or two responsible men in the shop and hold them to account for cutting down roadside delays. No matter which plan is followed, the driver should be provided with a daily route card on which he can write down the condition of the various truck parts. Each part should be printed on the card so that in filling the card out at night the driver cannot overlook any of the essential units.

Some owners try to convince others that it pays to leave the truck alone until it will not run and then make all the repairs at once. Operators who believe in this theory generally do not take into consideration the lost profits by reason of the truck not being out on the road during the overhaul period. To prove this to yourself, consider just one case. Suppose a 5-ton truck is worth $30 a day and it is laid up 2 weeks, or 12 full working days, for repairs. That means a loss of income of $360. This is equivalent to 360 hours of work on the part of a mechanic at $1 an hour. Very likely 180 hours' time given to the truck from the time of one overhauling to the next would have kept the truck in the same mechanical condition as that at the end of the 12-day overhaul—and at one-half the cost!

Making the Driver a Partner

IN certain lines of work where the income from a truck is dependent to a large extent on the driver, several concerns have found it a good policy to make each driver a partner in the truck he drives. This is a new thought in truck operation and one which may be productive of good results in lines of business where the obstacles to such a plan at present seem insurmountable.

The plan has so far been worked out successfully in several different lines, among them the transfer business and with concerns which sell motor truck service or haulage as a business. In these lines, the driver is paid a certain percentage of the income of his truck during a day or week, as the case may be. In this way, the amount that he earns is directly proportional to the value of the work done. By this plan the driver sometimes earns double what he would if paid the average driver's wage.

Under the old plan of paying the driver a flat $4 a day irrespective of the amount of work done, one concern found that 25 per cent of its gross income was paid out to drivers. The company then attempted a bonus plan, but gave it up as a failure because of the great diversity of the work engaged in. Next it paid the drivers the minimum daily wage as previously, in addition to twenty per cent of the gross income of the truck.

The latter plan has proved so successful that it has increased the company's business 100 per cent and reduced the driver cost to 20 per cent of the gross income, at the same time permitting the drivers to earn from $8 to $12 per day. This is simply spending money to make more money.

Of course, the ideal plan would be to figure the driver's wages on the basis of net, rather than gross, income. This is more difficult because of the great mass of bookkeeping entailed. However, this difficulty, with a good cost-keeping system installed, should and probably will not prove permanently insurmountable in all lines of business.

The Readers' Forum

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Estimated Production of Trucks Over 2-Tons

To the Editor, COMMERCIAL VEHICLE:

Have you compiled figures showing the number of heavy-duty trucks of 2-ton capacity or over, which will be produced for the year 1919, and what percentage of these will be equipped with dump bodies?—B. D. D., Columbus, Ohio.

It is difficult to get anything more than an estimate as to truck production during the present year. Along in the early part of January we estimated that the 1919 production of trucks would be about 290,000. These would be divided up somewhat as follows, beginning with the 2-ton size:

Capacity	Number
2-tons	11,600
3-tons	23,200
3½-tons	31,900
5 and 5½-tons	11,600
6 tons and over	2,900
	81,200

We know of no manner in which we can arrive at the number of these trucks which will be equipped with dump bodies. We feel, however, that there will be an increase rather than a decrease in the use of dump bodies on account of the great amount of road building work which has been carried on in this country during this summer.

The Pro and Con of Co-Operative Delivery

To the Editor, COMMERCIAL VEHICLE:

In various of your issues during the last year or so you have outlined and given experiences of department store co-operative delivery. At the present time we are in search of new and modern ideas in installing a delivery of this sort in this city. What can you do for us along this line? Can you give us names and addresses of the most successful co-operative deliveries and copies of articles on this subject which have been published in your magazine?—D. R. L., Cedar Rapids, Iowa.

Below is a list of articles published in THE COMMERCIAL VEHICLE from time to time on the delivery equipment of dry goods stores throughout the country. The articles show the pro and con of co-operative delivery.

Achievement of Success in Parcel Work Due to Co-ordinated Efficiency, December 1, 1916, pages 5 to 10. The Clearing House Parcel Delivery Co., Boston, Mass., makes a business of delivering packages for other concerns at certain fixed rates. The company has 150 customers for whom packages are delivered.

More Efficient Co-operative Delivery Demanded by War Conditions, January 1, 1918, pages 21 to 23. In this article the usefulness of co-operative delivery is pointed out.

Cost of Savannah Package Delivery Is Reduced 25 Per Cent by Co-operative System, November 1, 1918, pages 43 to 46. In the city of Savannah all department store deliveries are taken care of by the Parcel Delivery Co., which charges 8 cents per package delivered. By this means, quicker and more efficient service has been secured for all the companies whose deliveries are handled.

Southwestern Dry Goods Store Finds Own Trucks Superior to Delivery by Contract, December 1, 1918, pages 5 to 8. The company mentioned has set aside a certain sum of money on which to operate its fleet of trucks and believes that it is cheaper to do it itself than to contract to have the work done.

War-Time Department Store Economies, January 1, 1919, pages 28 and 29. The George Innes Co., Wichita, Kan., has found it more economical and reliable to operate its own delivery trucks. The methods by which the company was able to economize during the war are described in detail.

Department Store Contract Delivery Eliminates All Labor and Equipment Worries, January 15, 1919, pages 5 to 8. The Kerr Dry Goods Co., Oklahoma City, Okla., has found it better practice to have a delivery company handle its deliveries than to do it itself.

Articles With Which Truck Costs Are Given

To the Editor, COMMERCIAL VEHICLE:

Please advise us if you have published any articles in THE COMMERCIAL VEHICLE which show the average mileage cost of operating motor trucks. We would like to get some information relative to the cost of operating commercial trucks in large fleets, such as are operated by many large concerns, as we wish to eliminate the individual factors which might pertain to the operation of one or two or a small number of trucks.—C. B. MILLS, Sperry Gyroscope Co., Brooklyn, N. Y.

We believe that perusal of the following articles, which have been published in THE COMMERCIAL VEHICLE from time to time will give you the information which you desire on the average mileage cost of operating commercial trucks.

How to Keep Motor Truck Costs, September 15, 1919, pages 121 to 123.

Buffalo Transferman Builds Business on Good Motor Truck Service, August 1, 1919, pages 5 to 7 and 14.

Detroit Public Haulage Men Increase Profits by Giving Surplus Work to Associates, July 1, 1919, pages 12 to 14 and 25.

The Big 8 in Truck Operation, April 15, 1919, pages 26 to 28.

How Fleet Owners May Keep Their Motor Truck Costs in Simple Yet Adequate Manner, April 15, 1919, pages 32 and 33.

Trucks Help 27-Year-Old Contractor to Establish a Profitable Business, April 1, 1919, pages 5 to 9.

Reo Company Operates Own Overland Haulage Line to Get Incoming Goods from Detroit, March 1, 1919, pages 21 to 23.

Department Store Contract Delivery Eliminates All Labor and Equipment Worries, January 15, 1919, pages 5 to 8.

Motor Trucks Enable Lighting Company to Give More Efficient Service Within a 90-Mile Radius, January 15, 1919, pages 25 to 27.

Detroit Truck Owner Finds Success by Developing Motor Line in Poorly Served Territory, November 1, 1918, pages 47 to 49.

Buffalo Industrial Tractor Maker Finds Costs of Road Motor Trucks Indispensable, October 15, 1918, pages 20 to 23.

Gotham Laundry Trucks' Success Due to Reliable Service, October 1, 1918, pages 5 to 9.

Truck Operating and Maintenance Costs in New York City, July 15, 1918, pages 20 to 22.

City of Buffalo Finds Motor Sweepers More Efficient Than Horses, June 1, 1918, pages 5 to 9.

Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton, April 1, 1918, pages 5 to 9 and 20.

Two-Ton Lumber Truck Replaces Three Horse Wagons and Pays for Itself in 1 Year, pages 26 and 27.

With all of the above stories you will find cost figures, shown on sheets of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. These show you the cost per day operated, the cost per day maintained, the cost per mile operated and the total commercial ton-miles or stop-miles covered for different sizes and makes of trucks in different classes of work.

Why Co-operative Delivery Concerns Sometimes Fail

To the Editor, COMMERCIAL VEHICLE:

Are there many co-operative delivery concerns and on what basic policy are they organized? I have in mind a concern that would deliver milk, ice, department store packages, etc., rather than a motor transfer company. What are the arguments against such concerns? They should be efficient and there must be some adverse condition to explain their scarcity.—M. T., Chicago, Ill.

The most comprehensive article which we have published on co-operative delivery concerns appeared on pages 21-23 of THE COMMERCIAL VEHICLE for January 1, 1918.

Theoretically a co-operative delivery system is of great economic benefit in that it eliminates waste. It prevents a dozen delivery wagons or trucks, each with only a partial load, delivering on the same block during the same day, when one fully loaded vehicle with, say, one-twelfth the number of men would deliver the same amount of goods.

Briefly outlining the article referred to above, there are two kinds of co-operative delivery as follows:

1—By merchants, farmers or others combining and agreeing to turn over the delivery work to one concern owned and controlled generally by the several individuals, firms or companies.

2—The establishment of a concern which will agree to deliver packages or bundles of several stores for a certain rate per package or value and contract to do this work over specific periods. In this case, the delivery concern need not be financially backed by the concerns whose products it delivers, but on the other hand be a separate company whose sole business is to deliver the packages for a profit. One of the most recent stories appearing in THE COMMERCIAL VEHICLE treating of a concern making co-operative deliveries as a business was published on pages 43, 44, 45 and 46 of the issue of November 1, 1918.

The reasons for the failure of co-operative delivery concerns may be listed under ten separate heads as follows:

1—Lack of a complete operating knowledge of the types of vehicles used and their repair and maintenance.

2—Lack of knowledge on the part of the man in charge of the co-operative delivery in regard to the interior handling of packages, including routing, sheet writing and other necessary steps in keeping a record of the goods handled.

3—Disinclination on the part of merchants to lose the advertising value otherwise secured when operating their own vehicles.

4—Too low truck delivery prices for various sizes of packages to cover slack periods of the year.

5—Inability to take care of the fluctuating peak loads when packages for a large number of concerns are handled.

6—Jealousy on the part of different members of a co-operatively-owned company, with one member feeling that he is getting a poorer service than his colleagues.

7—Delivery of the most difficult packages to a co-operative company by concerns entering into the co-operative agreement, with the delivery of the less difficult packages made by the individual companies separately.

8—Improper valuation of individual former delivery equipment when turned in to help defray the expense of a new co-operative equipment.

9—Lack of the establishment of a central sorting station in which packages can be handled economically.

10—Inability to solve the C. O. D. problem without loss to the individual concerns.

Repair Costs Govern Second-Hand Truck Sales

To the Editor, COMMERCIAL VEHICLE:

Will you please advise us as to whether or not there is a definite time at which it is cheaper to dispose of a truck, replacing it by a new one, than to pay for further repairs or overhauling. We have in our service some nine trucks, of which four are Kelly-Springfields of from 2½- to 5-ton capacity. The 2½-ton trucks are about 4 years old. We have within the past 6 weeks spent about $500 and over on these trucks so that they are now in pretty fair condition. We are wondering whether it is wiser to trade in the trucks or have them overhauled. Of course we realize that when you trade a truck in you get very little for it, so that it strikes us that trucks are not in the same category as passenger cars.—Q. W. WALES, Brown-Wales Co., Boston, Mass.

It would seem wise that if all of your trucks are about 4 years old, it would pay you to keep them until the repair costs become excessive. On an average the cost of truck repairs on vehicles from 2½ to 5 tons varies somewhere from 2 cents to 5 cents a mile. When the repair cost per mile gets much above the 5 or 6 cent limit over any period of considerable length it may be a good plan to dispose of the trucks and buy new ones, since by that time they will probably have been written off the books if the average depreciation of 20 per cent a year has been adopted.

You are correct in assuming that there is considerable difference between trading in passenger cars and motor trucks. Most passenger cars are traded in because they get out of style very readily, whereas with motor trucks, style is not an important consideration.

Trucks Utilized on Abandoned Railroads

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us data relative to the use of trucks on railroads, including where they are being used; the drawbar pull developed; the cost of operation; whether used for passengers or freight, and whether the trucks are equipped with steel wheels on the regular truck front and rear axle or whether railroad trucks are used. We want to submit data to the Prime Minister of British Columbia that will show him the feasibility of operating motor trucks with trailers on the Canadian railroads for passenger carrying work on short hauls. We will appreciate any data you can send us on work of this kind.—R. SATTERTHWAITH, William L. Hughson Co., Seattle, Wash.

We are glad to be able to cite several instances where gasoline motor trucks are being used successfully to haul both passengers and freight over short-haul railroad lines, or over tracks of steam or electric lines which have been abandoned on account of the high cost of steam transportation when the volume of goods to be moved is comparatively small. All of the instances quoted have been treated of in articles in THE COMMERCIAL VEHICLE.

On pages 24 and 25 of THE COMMERCIAL VEHICLE for November 15, 1916, there was an article telling of how the Chicago, Burlington & Quincy Railroad employed gasoline motor trucks with flanged steel wheels to tear up old railroad tracks in the Black Hills of Montana. The truck used was a White 1½-tonner made by the White Motor Co., Cleveland, Ohio. It was equipped with flanged wheels, sand boxes and a pivoted bolster and hauled a semi-trailer constructed out of an old freight car. The changes in the vehicle were made in the Burlington shops at Havelock, Neb.

On pages 20 and 21 of THE COMMERCIAL VEHICLE for February 15, 1916, there appeared an article regarding a motor truck bus fitted with flanged steel wheels, making daily 100-mile trips over an abandoned steam railway line between Hartford and Monte Cristo, Wash. The truck employed was a 1½-ton White fitted with a body capable of holding twenty-two passengers with comfort and as high as thirty passengers in emergencies. It makes an average speed of 30 miles an hour which can be maintained with the full load over the maximum grades of 2.9 per cent in fourth speed. It is seldom necessary to travel in third speed or in direct drive. From 5 to 7 gallons of gasoline are consumed in the daily round trip of 100 miles. The line is operated by Rucher Bros., Monte Cristo, Wash.

On pages 20 and 21 of The Commercial Vehicle for January 15, 1919, there appeared an article regarding the Holton Inter-urban Railway, which runs between Holtville and El Centro, Cal. The line originally was an electric one and 5 years ago was earning in the neighborhood of $17,000 a year. With the coming of the motor truck and passenger bus, its earnings have been reduced and during the past 2 years showed a loss of between $4,000 and $5,000. Mr. W. F. Holt, whose name is borne by the railroad branch line, decided to attempt to secure some of the freight and passenger business formerly handled by the road by the use of motor trucks. Mr. Holt designed and patented a motor truck wheel equipped with steel flanges on the inner side and having the rubber truck tire on the outer side of a larger circumference than the metal flanged portion, thus enabling the truck to travel on both the rails and the highways. These wheels were mounted on a standard 2½-ton Moreland truck made by the Moreland Motor Truck Co., Los Angeles, Cal. By means of this special wheel, which is sold by W. F. Holt, Holtville, Cal., the trucks pick up the farmer's goods direct at his door and then run to the nearest point of the inter-urban tracks where they mount the rails and travel to the other end of the line in much quicker time than they could by traveling over the original highway. Some of the trucks equipped with the Holt type of wheel are provided with original platform bodies for handling freight and others with bus bodies for handling passengers.

Another interesting use of the motor truck running on steel rails is the case of the Mount Tamalpais, Cal., Motorized Railway. Mount Tamalpais is 20 miles from San Francisco and a White 1½-ton truck is employed to haul a regulation freight car on which passengers and original freight may be carried. The trucks used have a four-wheeled pony truck in front with two driving wheels in the rear. The vehicles are driven out from San Francisco over the common road under their own power and on the original solid-tired wheels. The change to the steel flanged wheels is made when the vehicles mount the rails. Brakes are supplied on each of the four wheels of the pony truck, although the original emergency brakes on the rear wheels are retained. The average grade on the railway is 5 per cent with a maximum of 7 per cent. The longest straight piece of track is only 413 feet. There is one curve of 90 degrees in the length of 70 feet. At another point in the line the track parallels itself five times within 300 feet.

The Verde Tunnel & Smelter Co. at Clarkedale, Ariz., uses four White trucks to haul mail over the old railway tracks.

So far as data concerning drawbar pull, cost of operation, etc., is concerned, we are sorry to have to tell you that we have no accurate data on the subject. The tendency in the use of such vehicles also is to use a higher geared reverse gear; railway type of trucks and sand boxes to help traction in wet weather.

The Commercial Vehicle Cost System for Trucks

To the Editor, Commercial Vehicle:

We are interested in your truck system, known as The Commercial Vehicle Standard Cost Keeping System for Motor Trucks, and should like to obtain it. Do you have these blanks or how are they obtainable?—H. H., Cedar Rapids, Iowa.

The Commercial Vehicle Standard Cost Keeping System for Motor Trucks is furnished complete with a flexible ring binder and a complete set of instructions. There are sixty of the monthly sheets, filled out copies of which are reproduced in The Commercial Vehicle from time to time, furnished in the binder and 500 daily route cards, enough for 5 months for five trucks. The complete system, including the above, is sold for $7.50, which is the actual cost to The Commercial Vehicle.

If the purchaser is a subscriber to The Commercial Vehicle the complete system is sold for $6.50. If bought with a new subscription, the total cost is $8.50. Additional monthly sheets in packages of sixty may be had at cost at $1.50 and driver's route cards in packages of 500 at $3. The system is sold by the U. P. C. Book Co., 239 West Thirty-ninth Street, New York City.

Where To Obtain a Used Truck Market Report

To the Editor, Commercial Vehicle:

I am desirous of obtaining literature giving the prices at which used trucks should be sold. Do you publish such a list or can you tell me where I may obtain one.—A. G. Pooer, Chesapeake & Potomac Telephone Co., Washington, D. C.

The Commercial Vehicle does not publish such a list as you desire, but if you will write to the Chicago Automobile Trade Assn., Chicago, Ill., we believe you will be able to obtain one. That association publishes semi-annually the National Used Truck Market Report and loans it on a yearly subscription basis to firms engaged in the sale or manufacture of commercial motor vehicles. Subscribers must return the previous report to the association upon receipt of the subsequent edition or new book.

Demountable Bodies Are Built On Special Order

To the Editor, Commercial Vehicle:

Will you kindly send us a list of manufacturers of loading platform trucks. That is, the style where the motive power and the loading parts are separate so that the loading portion is left in certain places while the truck is still in operation, thus keeping the truck working the larger portion of the time.—H. F. Beattie, Eaton, Crane & Pike Co., Pittsfield, Mass.

The equipment which would best answer your needs is a demountable body. There is no firm which manufactures demountable bodies only, but we believe if you will write to any of the following body-building concerns that they will be able to build one for you on special order.

Below is a partial list of manufacturers of bodies in your territory:

Abbott-Downing Truck & Body Co., Concord, N. H.
Auto Metal Body Co., Springfield, Mass.
Bridgeport Body Co., Bridgeport, Conn.
Brownell & Burt, Taunton, Mass.
Currier-Cameron Co., Amesbury, Mass.
Gibbons Truck Body Co., Boston, Mass.
Robert Harrison Co., Boston, Mass.
George H. Jewett Co., Worcester, Mass.
Kingsbury-Leahy Co., Albany, N. Y.
Metropolitan Body Co., Bridgeport, Conn.
Providence Body Co., Providence, R. I.
Sargent & Ham Co., Boston, Mass.
Springfield Commercial Body Co., Springfield, Mass.
Stockbridge Body Co., Springfield, Mass.
Walker Carriage Co., Merrimac, Mass.
Woonsocket Wagon Mfg. Co., Woonsocket, R. I.

Where Fleet Owners May Secure Return Loads

To the Editor, Commercial Vehicle:

We occasionally send our 5-ton truck from Philadelphia to New York for some rush material and are desirous of getting return loads. Will you kindly advise what concerns or organizations we should get in touch with in New York City so that we can secure return loads to Philadelphia?—R. M., Philadelphia, Pa.

We believe that if you will get in touch with either or both of the following concerns, which are operating in New York City, that they will be able to secure return loads for you:

Motor Truck Association of America, 1790 Broadway.

Van Owners' Association, 144 Columbus Avenue.

Owner to Conduct Truck Test

Coal Dealer Will Hold Test to Determine What Make He Will Purchase

NEW YORK CITY, Sept. 22—Olin J. Stephens, Inc., a large coal dealer in New York City, operating twenty-two trucks, the maintenance of which was described in the September 1 issue of THE COMMERCIAL VEHICLE, will soon start a contest to determine what new make of truck it will purchase for the enlargement of its fleet. That company operates seventeen Saurers, one Mack, one Garford, and three Autocars, and is desirous of standardizing on one make of truck in all of its future purchases. Accordingly, it has bought a Mack, Packard, and Pierce-Arrow, all of 5-ton capacity, and will conduct the test over a period of 1 year.

According to the conditions of the contest, the three trucks will be run over the same territory, each having an experienced driver, who will operate his truck throughout the contest. A thorough analysis of the cost of operating and maintaining these trucks will be kept, and the most economical make of truck selected to comprise the future Stephens' fleet.

NEW YORK TRUCK SHOW SITE IS INDEFINITE

NEW YORK CITY, Sept. 17—Whether or not present or prospective truck fleet owners in New York City and surrounding territory will have the opportunity of looking over the 1920 models of motor trucks during the week of January 3 to 10, 1920, depends upon the action taken by the Metropolitan truck dealers. The N. A. C. C., under whose auspices the motor truck show is to be held, selected the Eighth Coast Artillery Regiment Armory in the Bronx for the truck exhibition. The dealers, however, have entered a strong protest against this site, claiming that it is too distant from the Grand Central Palace, in the heart of the city, where the passenger car show will be held during the same week.

FINKELSTEIN ASSISTS FENN

NEW YORK, Sept. 16—I. Finkelstein, formerly of the Division of Food and Markets of the State of New York, has been appointed assistant to F. W. Fenn, who is in charge of the motor express division of the National Automobile Chamber of Commerce.

HIGHWAYS BODY TO DISBAND

WASHINGTON, Sept. 16—The Highways Transport Committee of the Council of National Defense, which was largely responsible for the widespread interest in return loads, motor truck freight traffic, and also one of the important factors in the present keen national interest in good roads, will disband in the near future.

Its work will be taken over by the Federal Highway Council, which will be under the supervision of Charles W. Reid, who has been at the head of the Highways Transport Committee since the time that the armistice was signed. Up to that time Roy D. Chapin, president of the Hudson Motor Car Co., Detroit, headed the committee.

The Federal Highways Council has been assured of the co-operation of the various Government departments that have heretofore been co-operating with the Highways Transport Committee. These departments include War, Navy and Agriculture, having worked with the committee for the standardization of traffic rules and the promotion of good roads.

HARMFUL LEGISLATION

CHICAGO, Sept. 16—A proposed ordinance requiring every motor vehicle to come to a full stop at every street car crossing in the city has aroused the ire of Chicago truckmen. Members of the Chicago Motor club have issued a bulletin which states that "any boy 10 years of age would recognize at once the purpose of this ordinance—to relieve the street car companies from liability in the event of serious fatal accidents." The bulletin also protests that aside from carrying the full liability, it is proposed in the ordinance that the Chicago truck owners undertake to observe a rule which would do great damage to their trucks and increase the consumption of gasoline. The club has undertaken a campaign to have the ordinance pigeonholed in committee.

ENGINEERING COURSE FOR N. Y.

NEW YORK CITY, Sept. 16—Truck repairmen and garage superintendents of New York City may avail themselves of the opportunity of enrolling in a course of motor vehicle engineering which will be given at Cooper Union this winter, beginning Oct. 1. This course will include classroom work and laboratory study of engines. No fee will be charged for the course, the laboratory charge being $10. Those wishing to enroll should write for application blanks to the secretary, Cooper Union, New York City.

GOODYEAR PNEUMATIC RIMS WITH LOCKING RINGS

AKRON, Sept. 20—The Goodyear Tire & Rubber Co. is now offering straight side rims with the Goodyear locking ring feature in all sizes up to 44 by 10, the truck sizes being 36 by 6, 38 by 7, 40 by 8, and 44 by 10, accommodating all capacities up to 5 tons. The sidelocking feature for use with pneumatic tires has now been adopted on all steel wheels having the base of the rim cast as a part of the wheel.

N. I. & V. A. TO MEET IN CHICAGO

CHICAGO, Sept. 19—The 26th annual convention of the National Implement and Vehicle Assn. will again be held in Chicago on October 15-17 at the Congress Hotel.

To Sell Groceries on N. Y. Trucks

Ex-Soldier Salesmen Will Be Paid $5 a Day—Retail Shops Undersold

NEW YORK CITY, Sept. 21—Mayor Hylan has endorsed a plan proposed by a group of leading exporters of foodstuffs by which groceries will be sold on the streets of this city from trucks at from 12½ to 40 per cent lower than the Fair Price Committee's quotations. It is strictly a private enterprise on the part of the exporters, encouraged by patriotic motives, to serve the people of New York in an effort to reduce the abnormally high prices of foodstuffs.

The licenses to be granted for the trucks will be the usual venders' licenses, with no time limitation. From one to 500 trucks, or whatever number is necessary, will be used. A plan has been worked out and will be put into effect within 10 days or 2 weeks. Discharged soldiers will be paid at the rate of $5 a day as salesmen. Trucks will be hired and drivers paid a reasonable compensation. The mobile grocery store will be operated throughout the city, particularly where high prices prevail.

The articles to be sold will be direct from manufacturer to consumer and will include general groceries, the surplus from the army food supply and other staples. The exporters who have arranged the plan are trying to induce exporters of eggs, butter and other dairy products to participate in the movement.

N. Y. BUSES REPLACE TROLLEYS

NEW YORK CITY, Sept. 21—New York's newest bus routes, to take the place of four defunct crosstown car lines, began operation early this morning on the Spring and Delancy Street line. The Madison and Chambers streets, the Avenue C and the Third Avenue lines were started later in the morning. Some of the buses were in recent service in Newark. The fare is 5 cents. About forty buses joined the service by the end of the day and twenty more will be added later, making the full quota of sixty required by the Public Service Commission's permit. The buses maintain a 5-minute headway during the rush hours and a less frequent schedule at night.

LIVESTOCK HAULAGE RATES

DES MOINES, IOWA, Sept. 16—The first motor tariff sheet ever filed with the Iowa State Railroad Commission was sent in this week by the Interurban Motor Express Co., Sioux City. That company operates seven routes on a regular schedule out of Sioux City and carries all classes of merchandise. According to the tariff sheet filed, the rate on cattle is 25 cents per 100 lb. for 10 miles or less and that on hogs is 15 cents per 100 lb. for the same distance. The rate on sheep on the same distance is 25 cents cents per 100 lb.

Pa. to Eliminate Glaring Lamps

New Law Defines Restrictions Under Which Trucks Must Operate at Night

HARRISBURG, PA., Sept. 20—The menace of the glaring headlight is to be eliminated in the State of Pennsylvania under the recently enacted road legislation. Section 22 of the new law defines restrictions under which trucks must operate at night. According to this section, no lights of more than 32 candlepower shall be used on any motor vehicle, and all lights in excess of 4 candlepower equipped with reflectors shall be so arranged, designed or deflected that no dazzling rays of light, shall, at a point of 75 feet or more ahead of the lamps, rise more than 42 inches above the level surface on which the vehicle stands.

The new law further provides that the rays from movable spotlights and searchlights, which come under these restrictions, shall at no time extend to the left of the axis of the vehicle. Headlights must illuminate the highway for a distance of 200 feet when the vehicle is in motion. The new law also requires that the road be illuminated for 5 feet to the right at a point 20 feet in front of the lamps.

Violators of the new headlight law will be fined from $5 to $25. Failure to pay the fine subjects the guilty person to a jail sentence not exceeding 5 days. Fleet owners found guilty of a second offense are liable to a minimum fine of $25 and a maximum fine of $50 or 10 days' imprisonment.

RAILROAD GIVES WAY TO TRUCKS

LUDINGTON, MICH., Sept. 16—Motor truck transportation has put the passenger division of the Ludington & Northern Railroad out of business. J. S. Stearns, principal owner, has contracted with Epworth & Hanlin to furnish automotive transportation from trains and boats to the resorts for the next two years, in return for co-operation of these committees in asking the Michigan Public Utilities Commission to enter an order permitting tearing up of the rails.

TRUCKS HAUL LIVESTOCK TO STOCKYARDS

WASHINGTON, D. C., Sept. 16—According to officials of the St. Joseph, Mo., Stock Yards, live stock is now being transported to the Yards by motor truck from a radius of 50 miles, and new construction is found necessary to cope with the increasing business brought about by this new transportation.

When hard surfaced roads become a reality, it is estimated that this radius will be extended from 25 to 50 miles farther, as parties using the motor truck along main thoroughfares, which are in fairly good condition, state it is much more economical to handle their live stock, especialy hogs and sheep, in motor trucks than by rail.

Commenting upon this fact, an official of the Yards says: "We feel that our receipts of live stock by motor truck will grow in proportion to the improvement in our various highways leading to this market. The present condition of our highways is not good. Arrangements, however, are now being perfected, with the aid of Government and State financial assistance, to construct hard surface roadways all over this county, and adjoining counties are taking similar action."

Showing the result of motor truck use, receipts for 1918 and 1917 are quoted:

Year	Cattle	Hogs	Sheep
1918	20,686	121,138	37,137
1917	15,043	56,529	31,094

Investigation made by Government and other authorities show that there is a similar trend toward further utilization of the highways wherever stock centers are located.

JITNEY SERVICE FOR WAYNESBORO

WAYNESBORO, PA., Sept. 19—A jitney line to connect all the suburban sections and run on a schedule is being planned for Waynesboro, in connection with the extensive house-building movement which now is well under way. Such a service would solve the problem of convenient and inexpensive transit to and from the business sections and the outlying local industries. The trolley service has refused to provide loop lines to cover this district. Many railroad grade crossings are a barrier to the electric lines.

TRUCKS TO REPLACE CAMELS

ST. LOUIS, MO., Sept. 18—A fleet of thirty motor trucks, which will be furnished by the Wichita Falls Motor Co., Wichita Falls, Texas, have been purchased by a Chinese transportation company to take the place of camel caravans in China.

W. O. Hansen, of the Wichita Falls Motor Co., recently purchased the motor truck equipment for the garages which the truck line will need.

The route over which the trucks will be used is a round trip of 1000 miles, linking tea, rice and other industries with sea coast facilities. The Chinese merchants estimate that the fleet will replace about 400 camels. The Beck & Corbett Co. of St. Louis will furnish the garage equipment.

SILK THIEVES STEAL TRUCKS

NEW YORK, Sept. 17—Organized bands of thieves operating in freight terminals during the last 6 months have stolen approximately $200,000 worth of silks. Not only have these thieves stolen silk from trucks, but in some instances have also taken the truck. A few of these silk thieves have been caught, and the Missing Property Bureau of the Silk Assn. of America has a large force of investigators at work who expect to round up the rest of these thieves.

Sale of Surplus Army Trucks Delayed

War Dept. Has Not Completed Its Inventory-Sale of Used Trucks Now On

WASHINGTON, Sept. 19—No date or place has as yet been set for the sale of the surplus army trucks by the Motor Transport Corps. All requests, asking for their sale, have been disregarded, on account of the fact that the War Department has not yet completed its inventory, does not know as yet how many trucks will be taken by the various Government bureaus, and has not arrived at any means of disposing of what may be surplus trucks.

It is claimed that there are more than 100,000 army vehicles in the United States, and that 39,723 of these are surplus. Included among those held surplus are 819 unserviceable trucks awaiting sale at auction.

Public auctions are now being held for the sale of these unserviceable trucks at the army camps and storage yards. Inquiries for the dates at which future auctions will be held at the camps and storage depots and for information concerning the equipment to be offered at each, should be addressed to the Motor Transport Corps, Washington, D. C.

ST. LOUIS AIMS FOR ROAD SAFETY

ST. LOUIS, MO., Sept. 19—Education of truck drivers along safety lines and existing traffic laws investigated to obtain greater protection for pedestrians, is the aim of the Committee on Public Safety, this city. This committee, which is composed of sixteen business men and several public officials, is trying to obtain constructive co-operation of all drivers to minimize accidents and fatalities.

ROCKWOOD BUILDS GARAGE

BROOKLYN, N. Y., Sept. 20—Rockwood & Co., a large cocoa manufacturer in this city, which operates a fleet of eleven 5-ton Pierce-Arrow trucks, has built and is now equipping its own garage. Up to the present time the company's trucks were maintained in a public garage, but the increase in the size of the fleet has made it imperative to erect its own garage. The structure is located a few doors from the main plant. It is one story in height and has a floor area of 4116 sq. ft. This will be sufficient for the maintenance of the present fleet of eleven trucks and for four or five more should the business of the company warrant their purchase. The garage is of fireproof construction and has a well-drained concrete floor. The side walls are 20 ft. in height under the roof beams, which will permit the installation of a mezzanine floor or balcony for the various machine tools required and in this way permit the entire floor area to be used for the vehicle storage.

Truck Theft a Felony Under Dyer Law

Taking Stolen Trucks from One State to Another Draws $5,000 Fine

WASHINGTON, Sept. 16—The Dyer motor theft law, making it a felony to take stolen trucks from one state to another, was adopted by the House yesterday on a vote of 200 to 40 and was sent to the Senate, where its passage is expected within two weeks. The House action came after conferences between Representative Dyer of Missouri, who introduced the bill, and Harry G. Moock and C. A. Vane, general manager and assistant general manager of the National Automobile Dealers' Association. Changes were made in the bill then, making the punishment for violation a maximum fine of $5,000 and imprisonment of not more than 5 years instead of 10 years, as it was at first. This was changed because of opposition that had arisen among some Congressmen. The bill was passed under a special rule. Dyer will appear soon before the Senate Judiciary Committee in an effort to hasten its adoption by the upper house.

BEAVER TRUCKS BUILT IN CANADA

HAMILTON, ONT., Sept. 20—The Beaver Truck Builders, Ltd., has been organized here to build trucks. Production has been started in a well-equipped plant. At present the company is confining itself to the manufacture of a 2-ton worm-driven truck.

NEW TRIANGLE 3½-TONNER

ST. JOHNS, MICH., Sept. 16—The Triangle Truck Co. is making plans for the manufacture of a new 3½-ton model. It is considering making an enlargement of its plant to double the present capacity.

TORONTO-HAMILTON TRUCK SERVICE

TORONTO, ONT., Sept. 20—Wilder Transports, Ltd., using Acason trucks exclusively, have inaugurated a truck service between Toronto and Hamilton, Ont., and are insuring all goods against all loss or damage during transportation between these two points.

STEWART SERVICE FOR HARTFORD

HARTFORD, CONN., Sept. 21—Richard Elliott has taken over a service station on Willys Street to give service on Stewart trucks.

WATSON TO MAKE TRUCKS

CANASTOTA, N. Y., Sept. 10.—Plans for a new line of motor trucks to be made by the Watson Products Corp. are completed and the new models will be put on the market within the next few months. Manufacture of these trucks was postponed because of the war.

Exact features and specifications have not yet been given out, but it is understood that the plans call for ¾-ton, 1½-ton, 2½-ton and 3½-ton models.

The Watson Products Corp. is the new name of the old Watson Wagon Co., started 31 years ago to make heavy hauling wagons. On July 1 of this year the name was changed to the Watson Products Corp. and the capital increased from $600,000 to $1,000,000. The company has also bought several concerns in its vicinity to increase its factory facilities preparatory to the production of its trucks.

SEEK LICENSES FOR INTERCITY TRUCK OPERATION

ST. LOUIS, MO., Sept. 22—Negotiations for obtaining permission to grant reciprocal licenses to all operators of commercial vehicles between St. Louis, Mo., and East St. Louis, Belleville, Granite City and other Illinois points are under way by St. Louis and East St. Louis authorities. Meetings have been held to discuss the plans for issuing licenses to operators to permit uninterrupted traffic over the bridges of the Mississippi River, and to eliminate the necessity of paying tolls to go from State to State.

Jackson Johnson, president of the St. Louis Chamber of Commerce, has held conferences with East Side authorities and steps have been taken by them as a result of the requests of motor truck owners to permit East Side delivery of goods in interstate commerce without molestation on the part of the authorities.

NEW TRUCKS FOR PACIFIC

DETROIT, MICH., Sept. 16—J. Neil Patterson, Los Angeles, Cal., is in Detroit completing plans for a new company to be organized to manufacture trucks and trailers at Los Angeles. The company will bring out a truck to be known as the Patterson and made up of standard parts.

Coming Events

1919

Aug. 23-Oct. 6—Toronto Can. Shows of Cars, Trucks, Tractors, Airplanes and Motor Boats, in conjunction with Canadian National Exhibition.

Sept. 24-Oct. 3—New York City, N. Y. Electrical Exposition, Grand Central Palace.

Oct. 6-12—Chicago Dairy Show.

Sept. 24-Oct. 4—Kansas City, Kan State Fair.

Sept. 29-Oct. 4 Muskogee, Okla. State Fair.

Oct. 6-19 Dallas, Tex. State Fair.

Oct. 20-25—Raleigh, N. C. State Fair.

Oct. 22-27—Shreveport, La. State Fair.

Oct. 27-Nov. 1 Detroit Meeting Factory Service Managers, direction of N. A. C. C.

1920

Jan. 3-10 New York City Motor Truck Show, 8th Coast Artillery Regiment Armory, 193d St. and Jerome Ave.

Jan. 24-31—Chicago, Ill. Motor Truck Show, Drexel Pavilion

Feb. 9-11—Louisville, Ky. American Good Roads Congress

Service Managers To Meet in Detroit

N. A. C. C. Meeting Scheduled for Week of Oct. 27 to Revive Interest

NEW YORK CITY, Sept. 16—Garage foremen and transportation managers handling truck fleets should avail themselves of the opportunity of joining the service department of the National Automobile Chamber of Commerce, in order to be able to get a better line on the solution of truck service problems.

Discussions of service problems will form the program of a meeting which that association will hold in Detroit during the week of October 27. Organization of service associations throughout the country was stopped during the war and it is hoped that the October meeting will serve to revive the plan.

M. & S. NOW POWRLOCK

CLEVELAND, OHIO, Sept. 18—The M. & S. Corp., which recently moved here from Detroit, has changed the name of its product from the M. & S. Differential to Powrlock, and has also changed its corporate name to the Powrlock Co.

BIG SCALE CATTLE HAULAGE IN ILLINOIS

OTTAWA, ILL., Sept. 16—The Illinois Co-operative Packing Co. has been organized here and will have a plant in operation early next month. The building will cost $122,000 and will consist of a depot for assembling livestock and other farm products and then shipping them to the metropolitan markets.

The officers were authorized to purchase a number of motor trucks which will be utilized with trailers in picking up all livestock and other shipments desired by stockholders and others who may wish to patronize the company. This truck service will include the cities of LaSalle, Peru, Ogleby, Streator, Marseilles and Morris, with Ottawa, the county seat, as the central point. The working capital will be increased to $175,000.

The object of the company is to facilitate and expedite livestock shipping primarily. Stock owners, desirous of making a shipment are required to notify the manager of the number and kind of animals to be handled and on what date. The company arranges for cars and consolidates shipments to the advantage of the shippers. It has been proven that where such associations are formed the members can save a large sum of money each year and also are in a better position to take care of market conditions through co-operation with like organizations in other counties and the central office in Chicago or other market centers. A similar association was organized last week at Port Byron, Ill., taking care of the farmers and stockmen of Rock Island County.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher.
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The Commercial Vehicle
Read by Fleet Owners
Vol XXI Oct 15 1919 No. 6

SWAPPING TRUCKS

Solves Problem of Slack and Rush Periods in Coal Delivery

Combination Dump Body Devised for Coal and Contractor's Material Like Sand and Gravel

SWAPPING trucks with some nearby contractor is one of the best methods employed by retail coal dealers to solve their peak load problems. Unless this is done, the coal dealer has too many trucks in summer and too few in winter, with the result that some trucks are idle in the summer and all overloaded in the winter. But by maintaining a fleet of trucks sufficient to handle the average deliveries and obtaining contractor's trucks in winter, when most construction work is shut down, the problem may be solved satisfactorily. Of course, this requires the use of a body to carry coal as well as sand and stone as will be discussed in more detail further on in this article. This is the experience of Olin J. Stephens, Inc., one of the largest coal dealers in New York City.

A thorough analysis of local conditions was the determining factor in the selection of a fleet of trucks by that company. The size of the territory, the loading and unloading facilities, and a study of human nature entered largely in this analysis.

Delivery Area the Same

The big point in the operation of the Stephens' trucks is that they are capable of handling the average deliveries and not the maximum deliveries of the company and that no increase in delivery area has been secured by their use. The trucks have not increased the delivery radius because of any inability of the vehicles to cover more territory but to the small margin of profit on coal when it is sold at a uniform price for both near and far deliveries. It was found that in the delivery to points outside of an irregular-shaped territory approximately 100 miles square, except in large orders, the delivery cost almost offset the margin of profit. For this reason the company set itself to the task of making the trucks most efficient in the old territory.

The Stephens company bought its first truck in 1908. Each year since has seen the addition of other trucks. The fleet now consists of twenty-two trucks, consisting of two Saurers and one Garford of 5-ton capacity; ten Saurers and one Mack of 6-ton capacity; four 4-ton Saurers; one 3-ton Saurer, and three 2-ton Autocars. The Saurer trucks have been in operation since 1911. In addition to the trucks, the company has eighty horses and fifty wagons which are used largely for short hauls.

The main plant is off of Manhattan Island, but the delivery area extends as far south as One Hundredth street on

One of the Saurers on the scale preparatory to starting out on its route. The small overhead bin with divisions for different grades of coal is used to make up any shortage in the load without making it necessary for the truck to return to the loading hopper and back again to the scale.

Manhattan Island, about 3 miles away, and includes all of the Bronx to the Yonkers line on the west, about 8 miles, and to Mt. Vernon, about 7 miles, on the east. Six waterfront yards are used to serve this territory, five in the Bronx and one in Manhattan.

A study of the conditions of the New York City coal trade, which is also indicative of the conditions in other large and small cities throughout the country, will bring out the reasons why that company did not purchase a fleet sufficient to handle all of its deliveries with his own vehicles. The volume of business done by the coal companies in New York City varies for two reasons, one of which is due to the procrastination of buyers, who will put off buying as long as possible. The other is due to the fact that more coal is burnt in the winter months than in the summer. As none of the coal-carrying railroads have facilities for handling coal within the city limits, practically all of the coal used annually in New York City is floated to the different retail yards in barges. Because of New York's excellent water facilities, and especially Manhattan Island, which is completely surrounded by navigable waters, there are a very great number of waterfront yards, all in competition with one another.

As a result of these conditions, that company was forced to determine the size of its fleet and the territory which it should cover in such a way that the fleet be maintained economically and at the same time meet the very severe competition. It was found that while horses were reliable in the spring and fall months, they often fell down on deliveries in the hot summer because of the heat and in the winter because of the snow and slippery pavements. An indication of how efficient its fleet of trucks has become is shown in the fact that since 1915, the number of horses has been reduced from 100 to 80, while the fleet has remained the same in size. A large number of the short hauls that were formerly handled by horse delivery are now being taken care of entirely by trucks.

Swaps Trucks with Profit

Despite the use of a minimum number of trucks to take care of the average deliveries during the year, it was found that the winter rush of business could not be handled by the trucks and that the slack period during the months of July and August found nearly all of them idle. That difficulty was overcome in a very practical way. An agreement was made with a Bronx contractor to supply him with the surplus coal trucks in summer when the contractor's work was large and to have the contractor furnish the Stephens concern trucks during the winter months when they ordinarily would be laid up due to the cessation of most contracting work in the cold weather. In order that the body of the truck would be suitable for the contractor as well as the coal dealer, the Stephens company designed a rectangular steel dumping body from which the coal could be chuted to the side or the rear and which could also be used for the contractor's materials, such as sand, stone and cement, by the use of two sets of sideboards. Bodies of this type were fitted on the trucks which became surplus equipment in the slack period. The contractor in turn was prevailed upon to build bodies of this type for his trucks.

Street conditions and a determination of the average size of the loads were big factors in the selection of truck capacities and the method of unloading the coal. The territory served includes streets that in a majority of cases are less obstructed by heavy traffic than those in lower Manhattan. For that reason the company adopted the rear-end discharge for the coal on most of its trucks. This is much faster than the side discharge because of the time saved in putting the chute in place.

Rear-End Dump Bodies

The rear-end discharge of coal necessitates only one motion in sliding out the chute from beneath the body. This method permits the use of a chute 26 ft. long divided into 13-ft. lengths. When pulled out, one length slides out from under the other to form the 26-ft. extension. In the case of discharge of coal from the side, that is, when the trucks must be drawn up alongside of the curb in narrow streets, two motions are needed to couple up the chutes, as they are carried lengthwise under the body and must be lifted out and carried around to the side. The Stephens company uses a number of side-chute bodies to take care of orders in congested districts.

The Stephens company does a large retail, as well as wholesale business, and consequently has adapted the size of its trucks to the local purchases. Glancing over the various capacities of its trucks, it will be seen that eleven out of the twenty-two trucks are of 6-ton capacity; three of 5-ton capacity; four 4-tonners; one 3-ton truck and three of 2-ton capacity. Most of the business is served through large contracts, which is taken care of by the 5- and 6-ton trucks. The rest of the business is proportionate to the number of truck capacities used.

All of the company's trucks are equipped with engine-operated hoists, with the exception of one or two, which are equipped with the hand-operated type. The use of a hoist operated by the engine permits a quick raising of the body to suit the proper angle for chuting the coal. Some of the bodies are equipped with stilt-elevating devices operated through a train of gears by a hand crank on the side of the truck. When fully elevated, the body is inclined at an angle from 30 to 45 degrees. The hand-operated method takes about 4 minutes to raise the body, and but a minute or so with the use of the engine power. Lowering in both cases is a matter of from 20 seconds to ½ minute. Tilting of the bodies this way enables the coal to be discharged in practically every case without recourse of shoveling. Occasionally, the trucks are run up onto the sidewalk in order to facilitate unloading. In order that the weight of the truck will not damage the sidewalk, each truck is equipped with a heavy plank which is placed under the rear wheels for reinforcement. In the same manner, the curb is protected from being damaged by the driving chains to the rear wheels by two small planks which are placed between the curb and the chain.

Combination Tailgates

The Stephens company has equipped most of its trucks with a combination tailgate and chute. The reason for this is that certain conditions must be overcome in the unloading of soft and hard coal. Though all coal bodies will carry soft and hard coal, each grade cannot be discharged at the same rate of speed. On a dry day, the larger coal will run from a truck at a lesser angle than will soft or smaller-sized coal. On account of friction being less on a wet day, the large lumps of coal will adhere, thus impeding the discharge by clogging at the body exit. Under the same weather conditions, soft and small coal will not run as fast. As a result of these conditions, the bodies have been equipped with tailgates which are used for the soft coal and small grades of hard coal. The tailgates are hinged on a cross rod at the top of the body and swing open at the bottom, so that the coal may be discharged speedily in bulk when weather conditions require it.

Time is saved in the yard as well as on the deliveries. The layout of the yard is such that no time is lost in maneuvering the trucks at the pockets. Little backing of the trucks is done. There are separate entrances and exits at each of the yards, so that the trucks can run up to the pockets one way and leave them without reversing their direction. When the Stephens company first decided to install a fleet of trucks, it was found that the coal pockets were too low for the higher type of body used on the trucks. The weighing scales were not wide or strong enough to take care of the trucks. These have all been changed to conform to the efficiency of truck delivery.

The trucks come in through the entrances, load, get weighed at the exit and proceed on their deliveries in from 3 to 5 minutes. In order that no time will be wasted should there be an inaccuracy of the load at the weighing scale, a bin has been mounted overhead with enough compartments to take care of the different grades of coal. As a result, the amount of coal can be increased or decreased right at the scales without any need of the truck going back to the pockets. As a result of this quick loading and unloading, the trucks are kept in motion for the greatest possible time, each truck averaging about 40 minutes for a trip, or from ten to twelve trips a day. The horse vehicles make from four to six trips a day.

No Hand Shovelling

Shoveling of coal from the ground as experienced by the company is very slow work and a losing proposition financially. It takes from 20 to 30 minutes to load 6 tons of coal from the ground. Though the company stores some of its coal on the ground, it has eliminated the time wasted in shoveling by the use of a Haiss mechanical loader, which loads 1 ton of coal per minute.

The operation and maintenance of the trucks are in charge of one man, Ross E. Brown. The orders are taken care of by a shipping clerk in each yard and the weighing of the trucks by a weightmaster. The orders are given to the shipper in whose district they are to be delivered and each night are turned into the main office which superintends the deliveries. The main office reports to Mr. Brown the total orders for the next day, so that he may distribute the trucks among the branches according to the volume of business for the next day. The trucks start on their deliveries at 8 a. m. and continue until 12 o'clock noon, when the driver takes 1 hour off for lunch. Deliveries in the afternoon last until 5 p. m.

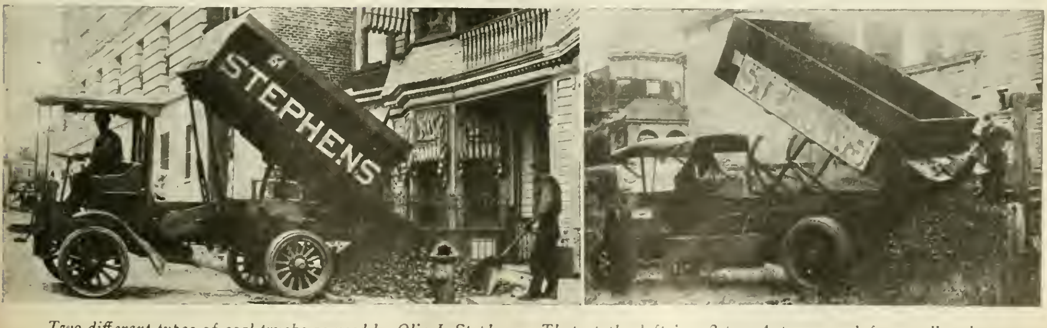
The wages of the men vary according to the size of the truck driven. The drivers operating trucks of 1- to 2-ton capacity receive $34 a week for a 9-hour day. The wages for those driving the 3- to 6-ton trucks are $36 a week. All the drivers receive time and a half pay for working overtime. All the truck drivers have risen from the ranks in the point of service as drivers of the horse wagons.

The Stephens company has found that the men who formerly drove its wagons are far better drivers than men who have driven other types of trucks. The latter have proved a failure because of their unfamiliarity with the conditions peculiar to coal delivery. The first essential quality needed in a coal driver is that he be accustomed to hard work and be familiar with the peculiarities of the coal business. He must be diplomatic with customers, as many disputes arise each day when the coal is unloaded.

The drivers are given a thorough training on the working principles of the trucks and are then expected to detect the least trouble with the running condition of their trucks should any trouble occur. It is up to them to immediately report to the service station. The trucks are stored in two garages, fifteen at the 138th Street yard and seven at the 177th Street yard.

Old Horse Stable Garages

Both garages are former horse stables which have been converted into truck storage use. So that there would be no delay in the exit of the trucks in the morning, these places were stripped of their supporting columns. The trucks are repaired in a service station located next door to the 138th Street garage. The maintenance methods followed by the Stephens company were discussed in an article which appeared in the September, 1919, issue of The Commercial Vehicle.



Two different types of coal trucks as used by Olin J. Stephens. That at the left is a 2-ton Autocar used for small orders. At the right is shown a 6-ton Saurer with the combination coal and contractor's dump body

Grease Cups *vs.* Oil Cups

for Truck Chassis Lubrication

1 Gallon of Oil at 45 Cents Equivalent to 8 Pounds of Grease at Total Cost of $2—Filtered Crankcase Oil Can Be Utilized

GREASE as a chassis lubricant gives satisfactory results, provided the grease cups are given proper attention by being kept full of grease and being turned up often enough, generally once a day. Truck chassis lubrication difficulties when grease cups are used are not due to the grease cups themselves, but to the lack of attention which they receive.

Filling grease cups is a more or less dirty job, especially due to the fact that grease cups employed to lubricate brake shafts, brake shaft connections, radius rods, etc., are often placed in inaccessible positions and require the driver to crawl in under the chassis to get at them.

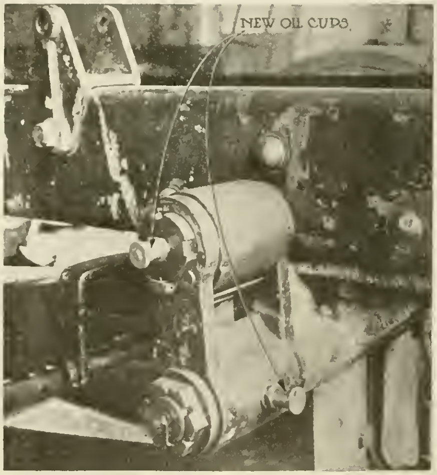
Following passenger car practice, some motor truck manufacturers are now equipping their trucks with oil cups instead of grease cups and providing pipe leads from the inaccessible cups to points outside the chassis frame where they can be reached readily.

This has set truck users thinking, and, as a result, a number of them have decided to make the substitution of oil cups for the grease type, not because of any intensive study on their part as to the efficiency or economy effected by their use, but because their use is becoming more widespread by the truck manufacturers.

The use of both grease and oil have their advantages and disadvantages. One of the distinct advantages of grease is its ability to withstand pressure. Thin oil is useless if it is subjected to a very high pressure owing to the tendency to be squeezed out, or at least concentrated into the depressions of the bearing surface, leaving the high spots exposed to wear. The disadvantages of grease when the cups are not given proper attention are threefold: 1—The tendency of grease to harden and clog the oil leads, as well as its tendency to take the path of least resistance when forced by pressure to bearing surfaces; 2—The grease cup caps rattle off, and 3—The chance for dirt being fed to the bearing surfaces owing to the conventional manner of exposing the grease containers.

The chief advantage of oil as a lubricant is its fluidity. Because it flows so easily, oil can, of course, be fed to the bearings. Among other advantages in the use of oil cups, is the matter of financial saving. When it is figured that about 8 lbs. of grease is equivalent to 1 gal. of oil, the saving in money is apparent. Grease costs, on an average, about 25 cents a pound and oil about 45 cents a gallon, wholesale. Thus there is a saving of $1.55. Fleet owners who filter their old crankcase oil also have an opportunity to utilize this reclaimed oil to advantage when their trucks are equipped with oil cups. A good example of how one fleet owner accomplished this saving in filtered oil was shows in an article which appeared on page 143 of the Sept. 15, 1919, issue of THE COMMERCIAL VEHICLE. Another advantage of oil cups is that they are securely attached, and as a result, there is little opportunity of them shaking off, as in the case of grease cups.

J. L. Black, in charge of the maintenance of 108 Pierce-Arrow trucks, operated by the Atlantic & Pacific Tea Co., Jersey City, N. J., states that a large reduction in bearing surface wear has been effected by the use of oil cups on that company's trucks. Black is now in the midst of the reconstruction of the A. & P. fleet. Each truck is being torn down and turned out as practically a new vehicle. As a result, Black is taking advantage of the opportunity of making the substitution of oil cups for the grease type while the trucks are stripped of their bodies. He is using a cup made by the Bowen Produce Corp., Detroit. Cups of this type, as shown in the accompanying illustration, cost from 12 to 15 cents apiece.



The rear spring bolt and shackle on one of the Atlantic & Pacific Tea Co.'s 5-ton Pierce-Arrows, showing the oil cups installed in place of the grease cups fitted originally. These cups are being fitted to the entire A. & P. fleet as each truck is brought into the shop for thorough rebuilding

There are a number of disadvantages, however, with the use of oil. It must be remembered that fluidity of oil also tends to make it run out of the bearing. Therefore, a lubricant such as grease, which stays where it is put, or at least tends to stay where it is put, has a marked advantage if it is possible to put the grease at that particular point. The tendency for oil to run out of the bearing therefore makes necessary the introduction of some means, such as washers, to prevent the oil leaking away. When oil cups are used, great care should be taken in washing the chassis to see that no water gets in the cups to materially reduce the lubricating qualities of the oil and probably spoil the bearing.

Contrary to general opinion, oil cups do not lessen the vigilance needed with the use of grease cups. Oil cups must be filled just as often as grease cups are turned. One of the fundamental difficulties with oil lubrication is that it is impossible to maintain pressure on the bearing surfaces; that is, the oil cannot be fed under pressure unless there is some sort of circulating system such as is used in the engine. If the oil were to be fed by pressure to bearings such as those of the shackle bolts, the whole supply would soon be lost unless there was some means of trapping the oil working through the bearing and recirculating it.

This tendency to make the lubrication of the chassis easier for the driver is indicative of the importance of the subject and the attention to which all fleet owners should give it. It is the first step toward the ultimate truck which will have its chassis automatically lubricated for weeks or a month at a time. The reservoir wick-oiling system now supplied on some trucks is one of the first steps taken to this end.

How to Make a Homemade Stand for

CLEANING TRUCK PARTS

Working Drawings Shown on This Page Will Enable Fleet Owners to Make Similar Stand

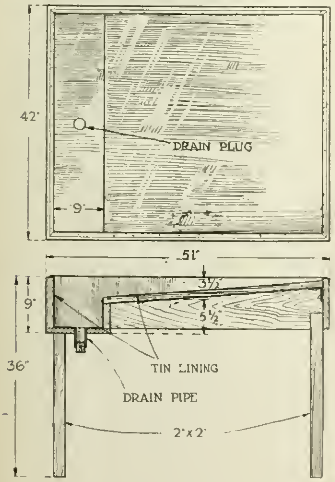
A SIMPLE stand for cleaning engine parts and chassis units when they are taken out of the truck for repair will save a great deal of the mechanic's time and thereby help to reduce the cost of truck upkeep. Too often the cleaning of such parts is done in a haphazard manner, with the result that the cost of the repair shop work is unnecessarily increased.

The need for such a stand increases in direct proportion with the size of the fleet. The larger the fleet, the more of such cleaning work there is to be done and unless this work is carried on in a systematic manner, the cost is higher than it should be.

How one fleet owner solved the problem of cleaning his truck and engine parts in an economical manner is well told by the method pursued by George Heron, Maintenance Superintendent of the Boston Store, Chicago, a department store which operates a fleet of sixty-nine trucks of which fifteen are electries and fifty-four are gasoline vehicles. Mr. Heron's method is built around a homemade stand designed particularly for the work. The stand in actual use and working drawings from which other fleet owners may construct similar stands are given on this page.

The stand itself consists of a table-like top supported on four 2 by 2-in. legs with the top about 36 in. from the floor or at a height most convenient for the average mechanic. The top of the table has a slight incline at the lower end of which is a trough in which the kerosene used for cleaning the parts is poured.

In actual operation, the part to be cleaned is laid upon the inclined table and the kerosene dipped up out ot the trough on a piece of waste or an ordinary paint brush. After the kerosene has been used to wash off the parts, it drains back into the trough which is provided with a drain pipe in the bottom so that kerosene which has collected dirt during the washing operations may be drawn off and clean kerosene substituted. The top of the table and the trough are lined with thin sheet tin.



Working drawings of the stand for cleaning engine parts. The cross-section at the bottom shows the sizes and shapes of the different parts of which the stand is composed. The tray and trough are lined with sheet tin. The trough at the left serves as a reservoir for the kerosene which is dipped up onto the part being cleaned by means of a piece of waste or an ordinary paint brush

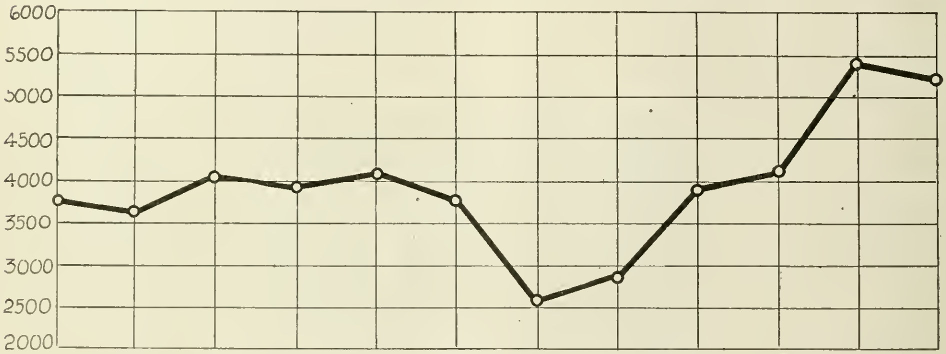
The home-made stand as it looks in actual use. Note the convenient height of the top for the man doing the work

More About Handling

PEAK LOADS

in Department Store Deliveries

Interior Methods, Including Suggestion to Carry Home Small Packages, May Make It Unnecessary to Hire Additional Trucks in Rush Seasons



AVERAGE MONTHLY PACKAGE DELIVERIES OF 1½-TON DEPARTMENT STORE TRUCK

INTERIOR methods, and particularly the suggestion to customers to carry home their small parcels during November and December, are of great value in helping the department store delivery fleet to solve the peak load problem without the need of hiring outside trucks. These interior methods have nothing directly to do with the operation or maintenance of the trucks, yet have such a great influence on their use that all department store executives should give them consideration, particularly at this time when the peak load problem is a pressing one.

What these methods may accomplish is well shown by the experience of R. H. Macy & Co., one of the largest department stores in New York City. Last year the Macy company had its customers carry home a total of approximately 100,000 parcels in one month. This made it unnecessary to hire outside trucks to handle the peak loads during the Christmas rush. While of course the existence of war time conditions lent an added weight to this direct appeal to customers, the method proved so successful that the question of using it again this year is under discussion. The means employed to obtain the customers' co-operation in helping to solve the delivery problem were four: First, signs worded as follows were placed in prominent positions all over the store interior:

> **PLEASE**
> **Carry Small**
> **Parcels with you!**

Second: Two large tables in the front of the store were cleared and then loaded with large, wide-mesh twine shopping bags. These were advertised at 10 cents or about cost price, and signs prominently displayed urging the store's customers to employ them to carry home their own parcels and so insure prompt delivery. Two or three of these bags were stuffed with dummy parcels and hung up over each table to illustrate their purpose and usefulness, with the sign: "Bags make it easy to carry your parcels with you!" Third: Other signs, which read as follows, were displayed above all cash desks:

> **Shop with a**
> **BLUE TRANSFER CARD**
> **If you wish to take**
> **your purchase with you!**

The purpose of the blue transfer card was to enable customers to purchase articles in all parts of the store and upon returning to the ground floor find them wrapped in one parcel and pay for them in one payment. This method made it actually less trouble to the customer to pick up her single parcel and walk out with it, than to stop, give her name and address and arrange for delivery.

Fourth: Booths were opened in the Grand Central Station and Hudson Terminal Building wherein customers arriving in town in the morning could order what goods they required and on returning to these booths on the way home at night, find their parcels wrapped and ready to be taken home with them. All four of these methods were responsible for lifting a tremendous load from the shoulders of the delivery department and the last two were permanently incorporated in the policy of the store, regardless of season.

The bulk of the majority of the goods handled by the Macy company is a large factor in the delivery problem of the store. The vast majority of the merchandise sold is of an unusually bulky nature, which increases the difficulties of efficient delivery and necessarily modifies somewhat the methods employed. While the interior methods mentioned above took care of most of the small parcels, the large ones which are in the majority still remained to be handled by the delivery department during the peak load period. To handle the tremendously increased traffic at this time, it is always necessary to bring the whole delivery system and personnel to the highest pitch of efficiency. For the attainment of this highest efficiency three things are necessary: First, that every truck and wagon in the delivery department be in the best possible condition and ready for service. Second, that there be a sufficient number of trained drivers and helpers available to handle all these trucks. And third, that every truck work to its full capacity. The Macy delivery department accomplishes this end during the peak load period without a hitch by making slight modifications in the usual methods to conform to the special requirements.

All Trucks Work During Peak Loads

Taking these three factors in turn, it is found that all of the company's trucks are at work during the peak load periods. The Macy delivery fleet consists of the following: six 3-ton and 105 1½-ton gasoline trucks, forty-two 1-ton electrics, seventy-five one-horse wagons and fifty-five two-horse wagons. On these self propelled vehicles, all repairs are made during the summer months when the tension of the delivery department is most relaxed. Repainting of the vehicle bodies, overhaul and replacement of parts are also all accomplished at this time, and for this purpose about 10 per cent of the 105 1½-ton trucks are laid off at a time and about five of the forty-two electrics. The entire fleet is taken in rotation and thoroughly overhauled during these months, so that when the rush period comes every vehicle is in the best possible condition and ready for service. During previous years it was found necessary to hire additional 3-ton trucks in spite of the efficiency of the fleet. In order to facilitate this work when necessary, the firm has an arrangement with a large firm of truckmen by which it has first call on from fifteen to fifty 3-ton trucks and the drivers to handle them. But last year interior methods in the store itself were of such assistance to the delivery department that it was not necessary to hire these additional trucks.

Competitive System for Truck Helpers

For the highest efficiency of the whole delivery system the best method of handling the personnel is just as important as the best method of handling the repair of the trucks themselves. A highly competitive system has been found by the Macy company to give the best results, both as regards general efficiency and as a means of insuring a greatly increased staff of efficient drivers, at a time when efficient well-trained drivers are most needed. And well-trained drivers will increase the efficiency of the whole delivery system anywhere from 25 up to 50 per cent. Each garage employee at Macy's is first hired as a helper. They are trained as helpers until they are perfectly familiar with one or more routes. Then, after 6 to 12 months, if they have proved satisfactory, they are advanced to a salary of $19 a week and styled as Junior Drivers. From now on they are allowed to drive when needed, and while driving if they again prove satisfactory, their salary is advanced $1 per month until they receive $24 or a full driver's salary and are styled regular drivers. If they still prove satisfactory their salary is again advanced by $1 after 6 months and then $1 yearly up to a salary of $30. This system is highly competitive. It is calculated to give all the personnel something tangible to work for and to increase their pride in their work. It has produced a personnel of drivers and helpers as smart and efficient as could be desired.

James Woods, traffic superintendent for R. H. Macy & Co. He has been identified with the Macy company for 47 years and as a boy pushed the first Macy delivery hand cart

During the rush period all drivers who are ordinarily helpers are placed on routes with which they have become familiar as helpers. For this purpose, the routes are split up into two and sometimes three shorter runs. The original driver on any particular route is supplied with new helpers from the garage staff and his former helpers are put on as drivers on portions of the same route. To handle the increased number of deliveries on any one route it has been found more effective to split up the route into smaller but equally definite routes rather than put extra trucks on the old route. Out of about one hundred routes, the Macy company split up about fifty into two routes each during the rush period, and about fifty into three routes each. The latter route changes are made almost entirely in the city and the nearby suburban zones in the Bronx, and in Jersey City.

Two Helpers Furnished on All Trucks

On the 3-ton trucks there are always two helpers in addition to the driver, but during the rush period, two helpers instead of one are attached to each of the 1½-ton trucks as well. During the rush period about one hundred extra drivers are promoted from the permanent staff of helpers in accordance with the competitive plan. Also in a general way, all drivers are supposed to be back at the garage with their trucks by 6:30 at night, a system which tends to insure prompt delivery to the customer and enables the traffic superintendent to keep a closer check on the whole system. However, drivers sometimes return to the store later than 6:30 because they have made two trips during the day. Two trips per day instead of one trip are sometimes possible on shorter runs because the majority of the parcels are bulky and take up the full capacity of the body of the truck with a comparatively small number of deliveries. In these cases the 6:30 rule is relaxed somewhat, but the driver's time of leaving and reporting in again at the garage on each trip is carefully noted and checked up with the number of deliveries which he has made during the day.

The bulky nature of most of the parcels handled by the Macy delivery department makes it difficult to increase to any appreciable extent the number of parcels carried per truck per trip. Nevertheless careful loading has made it possible to increase the number of parcels on one truck per trip from an average of 150 to about 200 packages. The accompanying chart shows the average number of parcels carried per month throughout the year by one of the firm's 1½-ton gasoline trucks. The increase shown during the peak load period is partly due to extra trips made and partly to judicious loading.

In the chart shown on the opposite page, the fewer number of packages delivered in December than in November is due to the fact that there are generally more full working days in November than in December. The records of the Macy company show that there are fewer packages delivered in December than in November, even though the average number of packages per truck per trip is greater in December than in November. The fact that a majority of the packages are of a bulky nature is due to the great volume of furniture, crockery, dishes and house furnishings sold by the Macy company.

BRINGING HOME

Fords with Broken Rear Axles

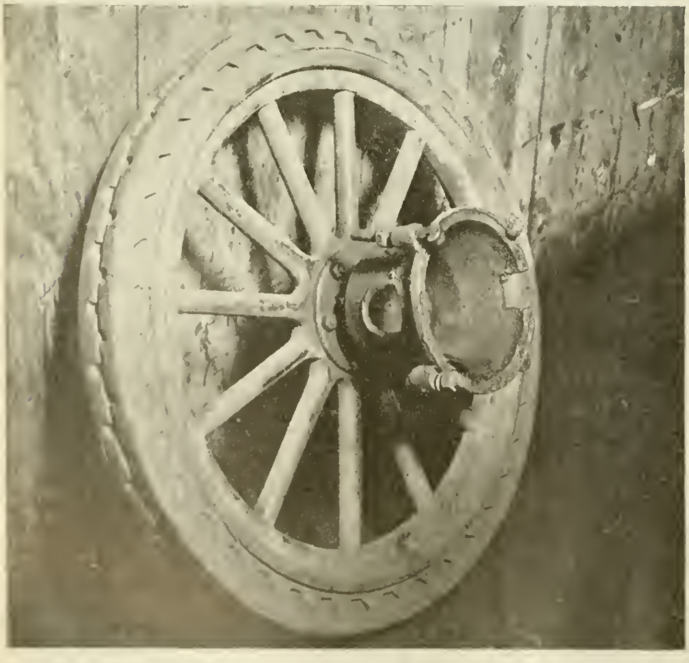
One Fleet Owner Operating Eleven Ford 1-Ton Trucks in Department Store Service Finds Special Ford Device Indispensable

WHEN the rear axle of a Ford passenger car or motor truck breaks while the vehicle is out on its route delivering goods, the problem of making repairs is not one of actually doing the work but rather of getting the damaged vehicle to a place where the work can be done. This condition exists because of the very large number of such Ford vehicles in use and of the consequently large number of service stations located in all parts of the country. No matter where a Ford might become incapacitated for future work, it is generally only a matter of a few hours before some Ford service station can be found equipped to carry on the necessary repair work.

With this condition existing, the problem of getting the truck back into service is one of getting the damaged vehicle to the nearest Ford service station or to the garage of the owner if he is prepared to do the work. This may be done by either loading the damaged vehicle onto another truck and carrying it home bodily or by towing the damaged vehicle by means of some form of wheeled cradle or skid.

Carrying or Towing

The former method of towing the damaged vehicle bodily makes necessary the purchase or hiring of some other make of truck with a body platform sufficiently large to carry the entire chassis intact. While the maintenance of such a vehicle might be found profitable by a large Ford agency in a territory where a large number of Fords were in service and where axle failures were frequent, such a course would be a hardship upon the average fleet owner. With a comparatively small number of Fords and with a comparatively small number of such rear axle failures, the number of times such a vehicle could be used for that particular work would be so few as to make it not worth while to go to that expense.


The complete emergency wheel ready for use. The special Ford cup-shaped casting has a fixed spindle on which an extra wheel is mounted The notch in the casting is to allow for the brake toggle arm

On the other hand, the use of some sort of wheeled cradle or skid would prove more economical, since the apparatus could be carried to the scene of the accident in another of the owner's Fords equipped with the regulation delivery body employed. Once on the scene, it would be a simple matter to unload the apparatus and tow the damaged Ford home. Many of such devices, however, are complicated and are mounted on small metal wheels, so that the speed of towing is reduced to a minimum. In some cases it actually takes longer to get the vehicle home with such a design of equipment than it does to do all the actual repair work.

To overcome such difficulties, the Ford company, Detroit, sells a device, which when mounted on an extra Ford wheel and tire, can be used to tow the vehicle home at a normal speed of 10 to 15 miles an hour. This apparatus may be termed an axle shaft substitute for the reason that it takes the place of the broken axle shaft. It may also be purchased from the Ford distributors in the large cities and sells for $8.50.

It is a very handy thing for the fleet owner who operates a number of Fords to have in his service station or garage, since it makes unnecessary the maintenance of a large truck for carrying a Ford bodily and yet permits the damaged vehicle to be towed at a normal speed. It also eliminates the necessity for attempting to make roadside repairs where the facilities are not so good as in the repairshop.

The device consists of a cup-shaped casting which has at the top or closed end, a regular Ford wheel spindle upon which is mounted a conventional Ford wheel with either a solid or pneumatic tire. The casting and the wheel form an integral unit. Around the open end of the cup-shaped casting are four drilled lugs through which are inserted four bolt clamps, the inner ends of which contact with the dust plate at one end of the Ford rear axle when the wheel and its brake band are removed.

This apparatus has proved of great value to George Heron, Maintenance Superintendent of the Boston Store, Chicago, which operates eleven Ford Model T passenger cars with panel bodies for the delivery of department store packages. He keeps the device in his gasoline truck garage where it is always available to be sent out on the road to tow home a Ford with a broken rear axle. Other fleet owners operating Fords can make equally as good use of the apparatus.

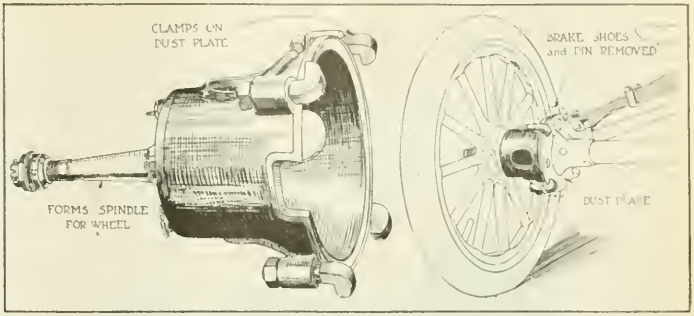
Assuming that the Ford wheel and tire has dropped off the end of the axle at which the axle shaft was broken, there are four distinct steps in the use of the device. In order, they are as follows:

1—Jack up the broken end of the rear axle. With the broken end of the axle resting on the ground due to the wheel at that end rolling off at the time of the accident, it may be difficult to jack up that end with an ordinary jack. If this is the case, a fence rail or a 6- to 10-ft. piece of studding may be used as a lever until blocking can be placed under it to admit of an ordinary jack.

2—With the axle up, the next step is to clean the dirt off of the end of the axle and if necessary straighten the brake drum dust plate which remains fastened to the axle housing.

3—The third step is to then insert the cup-shaped casting over the broken end of the axle.

4—The fourth step is to tighten up the nuts on the bolt clamps so that the cup-shaped casting and the brake drum dust plate are held together rigidly. After this is done, the jack may be removed until the wheel carried on the spindle of the cup-shaped casting serves to support its share of the vehicle weight. Under these conditions the damaged vehicle can be towed home, the wheel of this device serving as a regular Ford wheel except that it cannot be driven. Mr. Heron uses a cushion tire on the wheel of the apparatus since such a tire is always ready for service and there is no delay in repairing the tire or tube such as would be the case if a pneumatic tire were employed.



A close-up of the special Ford casting at the left showing the clamps which fit over the brake drum dust plate that remains in place on the Ford axle as shown in the sketch on the right

TRANSPORTATION HINTS

For Truck Superintendents

MOTOR TRUCKS are potential business builders. Look at them in that light. If they are not building business, it is entirely possible that the type of truck used is not fitted for the work which it has to do or is improperly operated in that work.

THE COST PER TON delivered by means of motor trucks will depend on the truck capacity and the distance hauled, other things being equal. The cost to deliver a ton should decrease as the capacity of the truck is increased. The cost per ton delivered should also increase with the distance hauled.

IT IS CHEAPER to deliver 5 tons of goods on a 5-ton truck than to deliver the same 5 tons over the same distance in five 1-ton loads on five 1-ton trucks. The reason for this is because it does not cost five times as much to operate a 5-ton truck as a 1-ton truck.

IN FIGURING THE COST of truck delivery, neither the cost per ton nor the cost per mile gives the proper interpretation of the truck's work ability.

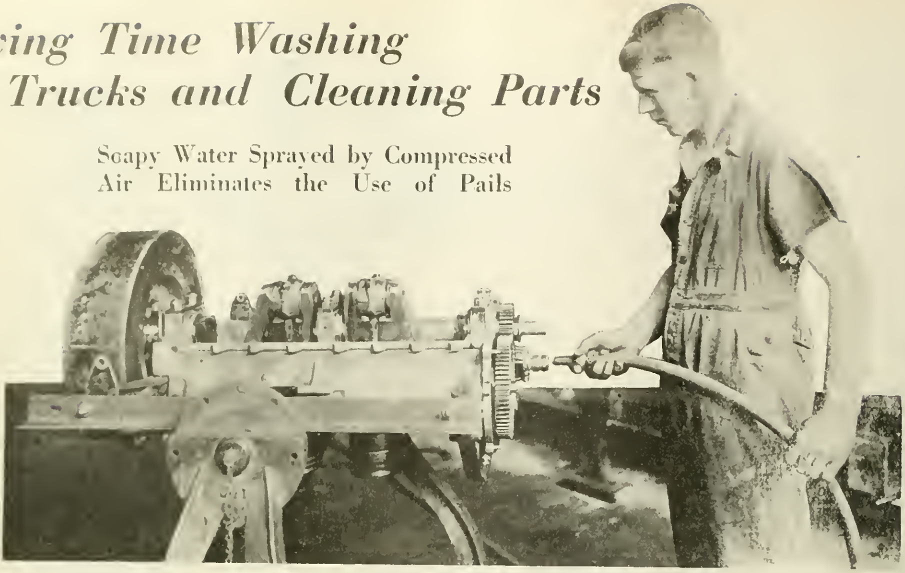
FOR THE SAKE OF COMPARISON, the cost per ton is of no value unless the distance over which that ton hauled is known. It is patent that it costs more to deliver a ton over a distance of 5 miles than it does to deliver it a distance of 1 mile. Without the knowledge of this trip distance, any attempt to compare haulage costs per ton is futile.

THE ULTIMATE COST in motor truck operation is the cost per commercial ton-mile. This unit takes in both tonnage and mileage. The commercial ton-mileage is obtained by multiplying the total tonnage carried on any trip by the mileage of that trip divided by 2. It may also be figured per trip, per day, per month, or per year, by multiplying the total tons carried during any given period by one-half the average trip distance during the same period.

IN FIGURING MOTOR TRUCK COSTS, remember that half records are worse than no records. Half records are, at the best, misleading, and are apt to result in incorrect conclusions that may vitally affect any business in which a part of the sales cost must include the cost of the transportation.

Saving Time Washing Trucks and Cleaning Parts

Soapy Water Sprayed by Compressed Air Eliminates the Use of Pails



By the use of compressed air, such parts as engine crankcases may be cleaned out thoroughly and in a minimum of time

CLEANING trucks is bothersome and time-consuming work and yet is a necessary evil in the operation and maintenance department of a fleet owner. It must therefore be given the same attention as any mechanical operation in the shop if an efficient and well-rounded system is to be expected.

The cleaning may be divided into three main classes of operations, namely: 1——Cleaning truck parts in the shop during the overhauling period. 2——Washing the chassis preparatory to bringing the truck in for overhauling and painting; and 3——The daily washing of the chassis and body.

There are certain drawbacks connected with each of these three cleaning operations, all of which are conducive to a waste of time and effort. For instance, in the cleaning of parts, mechanics will be found washing crankcases, etc., out by hand. This all means a waste of time and labor, as the mechanic is forced to spend much time in getting at inaccessible places where small metal particles, dirt and oil, have collected. Added to this drawback is the labor connected in handling these parts, which are occasionally greasy and cumbersome to move about. In the same way, there are certain drawbacks in washing the chassis preparatory to bringing the truck in for overhauling and painting that are conducive to a waste of time and labor. A truck chassis, after it has been run over the roads for a period of 1 year, is likely to have collected so much dirt, oil, etc., that it is well nigh impossible to give it a good cleaning without considerable time being spent on it. The use of soap and water is not likely to make much of an impression, as far as getting the dirt, etc., off is concerned. When the truck comes in for overhauling and cleaning it is usually prepared for the paintshop. This means that the paint must be scraped off, a tiresome and time-consuming piece of work. The daily washing of the body and chassis, especially where there is a large fleet, is enough to cause the cleaner to be apprehensive about finishing his work. On account of the size of the truck, the cleaner is likely to skip over places in his hurry to finish one and start cleaning the next one. In a majority of cases, the work is only half finished. The reason for all of these drawbacks is that the men have not been supplied with the proper washing devices. Their work, in most cases, is tiresome and laborious because of the many time-wasting steps that have to be taken and because of the manual work connected with the cleaning.

Washing one of the 5-ton Pierce-Arrows by means of soapy water and compressed air forced through a hose. This enables the operator to clean the under portions of the chassis in a minimum of time

To overcome these drawbacks, J. L. Black, in charge of the maintenance of 108 Pierce-Arrow trucks operated by the Atlantic & Pacific Tea Co., Jersey City, has installed in the garage and machine shop, washing devices the use of which require a minimum of labor. The labor connected with washing parts in the shop during the overhaul periods has been cut to the minimum by the use of air pressure and a solution of lye, soda and water in combination with live steam. With an air pressure of 120 lbs., such as is used in the A. & P. machine shop, it is a matter of minutes instead of hours in cleaning such parts as crankcases, etc. Air pressure is indespensable in a machine shop, according to Black. Its application in blowing out pieces of small metal particles, dirt and oil, that have collected in places too small to get at with a brush, is so successful that its use is warranted in a machine shop that is equipped with air pressure. The mechanic is saved much time and effort in searching for dirt and small particles that have collected during the bearing grinding work.

Cleaning such parts as gearset cases, brakes, etc., is accomplished through the use of live steam and a solution, made up of 10 lbs. of lye and 25 lbs. of soda in 50 gal. of water. This solution is held in a special vat into which the parts are dropped. The steam is fed to the vat through a pipe and when turned on, the cleaning solution is heated so as to make it more efficacious in breaking loose all oil and dirt accumulations on these parts. Such parts are cleaned in from 10 to 15 minutes. Those that are too heavy to carry by hand, are put on a small truck and are lifted off this by means of a chain hoist fastened to the ceiling above the vat. The latter is equipped with an overflow pipe, as well as one for cleaning out purposes. The overflow water goes over the garage floor into a drainhole nearby.

A New Pressure Tank

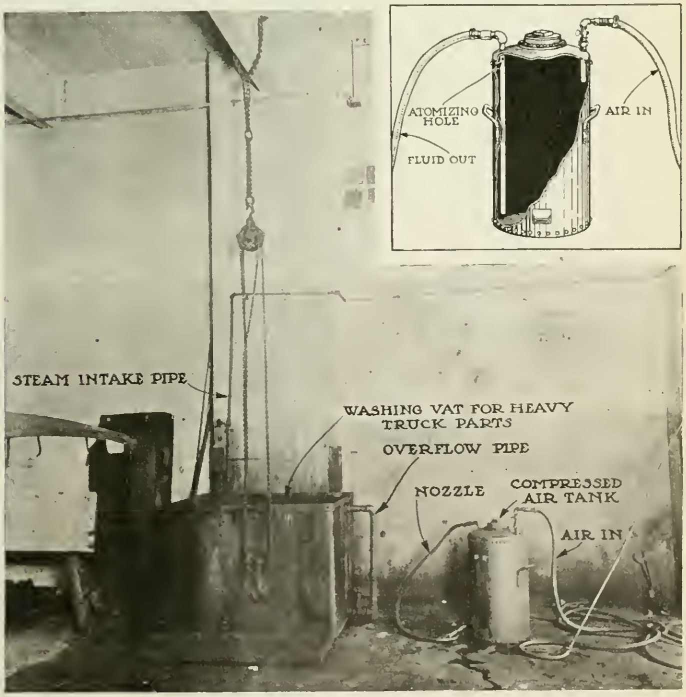
Cleaning a chassis preparatory to bringing the truck in for overhauling and painting, is a matter of but 3 or 4 hours work, under the Black method. Realizing that soap and water is not strong enough to loosen dirt and oil accumulations, Black has used the same solution of lye, soda and water that is used in cleaning the gearset cases, etc., in combination with the 120-lb. air pressure. The air under pressure, which is forced into a 50-gal. cylindrical tank holding the washing solution, sets up a spray that is strong enough to work loose any mud or other accumulations that have collected on the wheels or the under parts of the trucks. The chemical action of the lye and soda on the chassis paint is strong enough to make a clean and speedy job of this work.

The tank, which is portable, is equipped with a 10-ft. flexible hose for the fluid and an air hose leading from the main line to the tank. Both pieces of hose are connected to the tank at the top. The piece of hose used for the fluid is equipped with a 6-ft. piece of piping that may be easily projected under the truck or any other inaccessible place so as to bring the strong spray into closer play on the part to be cleaned. There is no need of stopping to get at the inaccessible parts of the truck. The vital part of this tank and that which is responsible for the atomizing or spraying action set up at the end of the 6-ft. piece of piping, is a $\frac{3}{8}$-in. pipe inside the tank through which the fluid is fed to the hose. At the top of this pipe is a 3/16-in. hole, located above the upper level of the fluid. A certain amount of air escapes from the air hose through to this small hole, thus setting up an atomizing action. Without this hole, the compressed air would force a solid stream of fluid up through the pipe and onto the truck.

The same tank and air supply are used for the daily washing of the body and chassis, but without the use of the soda and lye, which, as stated before, is chemically strong enough to eat the paint off the truck chassis. Instead, ordinary soft soap and water are used in the tank in combination with the 120-lb. air pressure. The spraying action set up, as in the case of the soda and lye solution, enables the workman to get quick action in loosening up dirt and other accumulations on the wheels and body, as well as the chassis.

Truck Cleaned Quickly

Only 20 to 30 minutes time is needed to clean a truck, compared with 1 to $1\frac{1}{2}$ hrs. by the hand method. The big feature of this method of cleaning is that little manual labor is connected with the operation. The spraying action takes the place of the application of soap by hand to the various parts of the truck. The 6-ft. pipe, used for directing the spray, enables the cleaner to get at all inaccessible places under the truck without the need of crawling under or stooping, as the case would be were he forced to get at the same places by hand application of the soap. With the sprayer, the workman is given more incentive to make a thorough job of the cleaning operation because of the comparative ease of the work.



Above are shown two of the cleaning devices used in the A. & P. truck garage. At the left is shown the vat into which parts are dipped by hand or by the block and fall. At the right is shown the small tank used for spraying a lye solution to take off paint. The same tank is used to spray soapy water under air pressure for body washing. The insert at the right top shows the interior of the tank

Cutting Loading Time from 30 Minutes to 10 Minutes

St. Louis Grocer Finds Demountable Bodies Increase Truck Work and Reduce Labor Costs

ONCE upon a time, so long ago that it really seems like a myth, the Scudders-Gale Grocery Co., one of the largest St. Louis wholesale grocery houses, used teams and wagons to distribute its groceries. Of course, in the age of efficiency experts, nobody connected with the company likes to mention those days. Talking about a delivery system of which horses and wagons are the main ingredients, is something like speaking of the old favorite indoor sport, "Hiding the liquor," will be in 1930: it simply isn't done by the best people. But to show how much the Scudders-Gale company has progressed in the last 6 years, it will have to be done here.

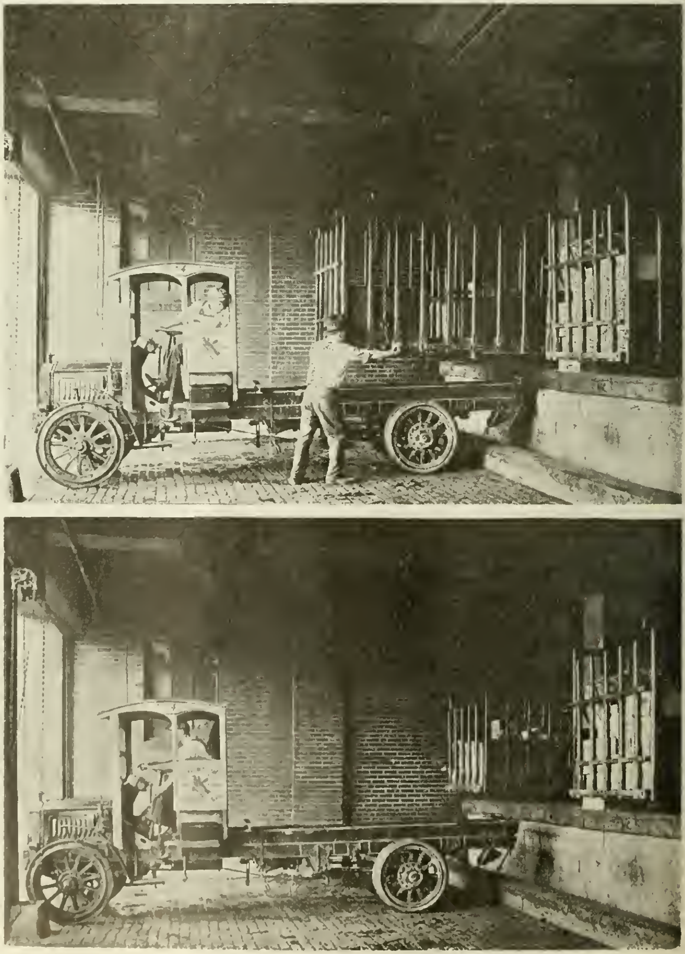
Six years ago the Scudders-Gale people had a large, smelly, dirty stable, for stables were always that way, no matter how much care was given them. And in that stable thirty-six horses were kept: thirty-six horses to be harnessed in the morning and unharnessed at night: thirty-six of them to be curried and fed and watered. And during the day the three dozen did all the slipping and sliding on the cobblestoned hills of St. Louis that equines consider necessary. Six years ago, however, even buying more horses and putting on more drivers would not take care of the widespread orders that were coming to the company in constantly increasing volume. So exit the horse and enter the motor truck.

The Problem Stated

For a while a fleet of eight trucks, five 2 ton Packards and three 1½-ton Autocars took care of the business that eighteen teams had been unable to cope with. Trips were made far out into the county with the trucks in half a day, and which had taken the teams a whole working day of 8 hours to make. Slipping and sliding on cobblestones and blocking up traffic was a thing of the past: currying was done with a hose and a handful of waste; feeding and watering was a mere matter of turning on a faucet and holding a gasoline [illegible] to the tank without any danger of foundering a valuable horse.

Finally circumstances demanded either that more trucks be purchased and put on the runs or that the equipment then used be forced to deliver more work per truck. Garage space is necessarily limited in the crowded portion of St. Louis where the Scudders-Gale company is located and land values are high. Even though all the space needed had been available, the cost of buying the site and building the garage, to say nothing of the investment in new trucks, plus the pay of the additional drivers and added maintenance, would have swelled the overhead on the delivery system to a point where the stockholders would have asked for some sort of accounting. This was the problem that K. H. Meyer, superintendent of the company's fleet of trucks, was facing a year ago. How could the work of a fleet of twelve trucks be done with a fleet of eight trucks, without adding a single item in the way of labor, and with only incidental expense?

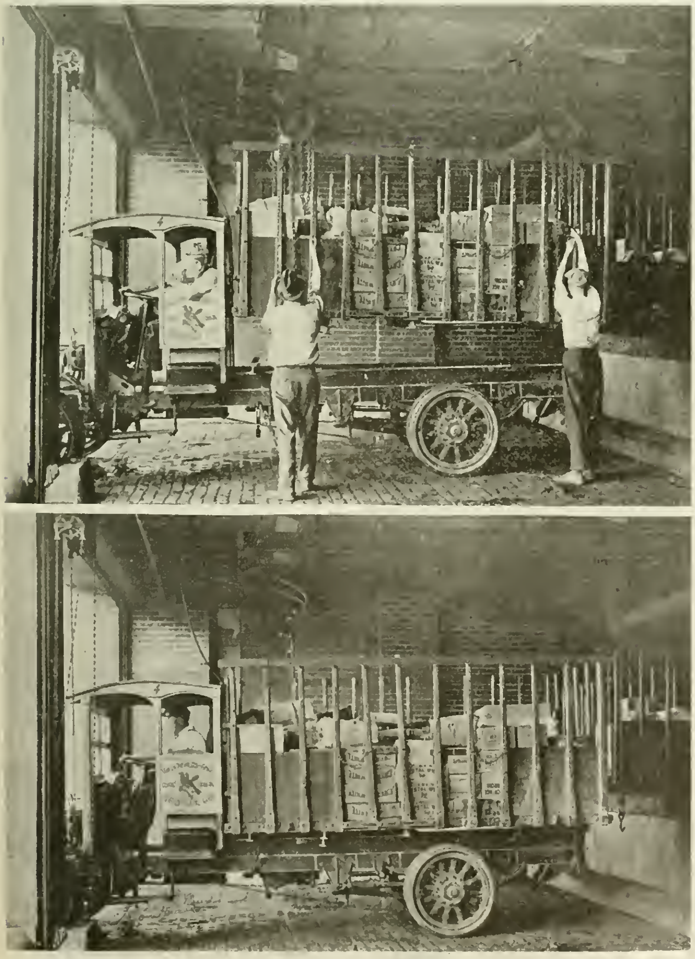
How this superintendent solved the problem without adding another truck, and in fact with saving the labor of three



Taking the empty body off is shown at the top. Below, the body is entirely off the chassis and the driver is just about to pull ahead and then back in to a new position at the platform for loading a full body men, is a study in truck-fleet efficiency and contains much that will help other fleet operators, whose business is walking away from the ordinary working capacity of their present fleet.

Mr. Meyer's answer consisted of devising a body which could be swung on and off the chassis of the truck as easily as a coat is put on and taken off. That raiser of operating costs, idle time, the waiting around while the goods are loaded on the truck, is an unknown quantity under the new demountable body system. Extension of driver's delivery slips and checking of goods, while valuable minutes are lost, have been done away with. There is no more hurry, no more bustle, and, best of all, no worry about forgetting to load goods because of a necessity for rushing. The loaded body is waiting for the driver the moment he returns from a trip; his slips have all been extended, the goods are all checked, and there is nothing left to do but transfer the bodies. All that is up to the driver is to back into one bay of the outbound platform, get rid of the empty body, drive out and back into another bay for a loaded body, and be off on the next trip.

The operation to get rid of the empty body is started by the driver just before he backs into the empty bay. Four turnbuckles are secured to the chassis of the truck, one on each side at the front and rear. Each of these has a lower ring end which is passed through an eyebolt riveted to the chassis. On the body are four more eyebolts to which the turnbuckles are secured when the body is in position by means of a pin passed through the eyebolt and the clevis at the upper end of the turnbuckle. The pin is chained to the chassis frame so that it is not lost when removed from the turnbuckle clevis. When tightened, these turnbuckles hold the body so securely in position that there is no rattling or squeaking. In addition to the turnbuckles, safety is further assured by two sets of I-beam lugs which are attached to the ends of the I-beam body cross sills at the front and rear of the body. These lugs contact with projections on the side of the chassis frame and prevent side sway. When the truck is in position to back into the empty bay, the truck is stopped, the turnbuckles are unscrewed and the pins taken out, leaving the body free to be swung off.



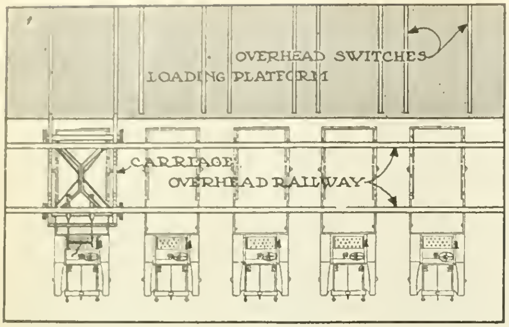
At the top, the loaded body is being lowered onto the waiting chassis. At the bottom, the body is completely lowered and held to the chassis by four pivoted turnbuckles, two on each side. The truck is then ready to begin its trip

Switching the Bodies

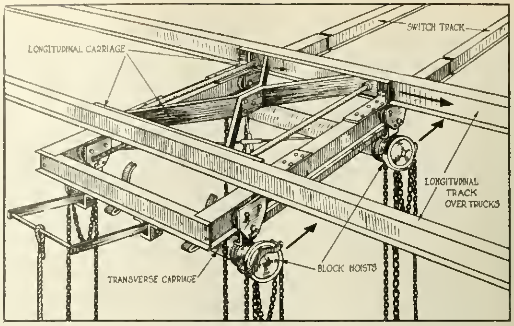
The outbound platform is divided into five bays, each 2 feet wider than the width of the truck to allow for a little meneuvering if the truck has not been backed in quite accurately. Parallel with the platform and just beyond its edge runs an overhead railway. It extends the full length of the five bays and is secured to the roof of the platform so strongly that the weight of load makes little difference. On this overhead railway, paralleling the edge of platform, is hung a carriage which can be moved to any one of the bays. The system in this respect can be compared to a railroad turntable, for at right angles to this overhead railway run five other overhead railways, one for each bay. These switches are fifteen feet long and extend well back over the platform so that bodies, when taken off the trucks, are moved onto the switches and then deposited onto the platform floor. Each body is suspended on a second carriage which is hung from the carriage running parallel with the platform edge. The body is raised up off the chassis frame by means of two Yale & Towne block hoists, one near the front and the other at the rear. When an empty body is being taken off a truck, the block chain hooks are engaged in iron eyes on the sides of the body. The latter is then freed and the second carriage is pushed back over the switch until the body swings over the concrete platform, when it is let down, and the second carriage is pushed off the switch. The top carriage is then pushed down to the bay where the loaded body is waiting, the operation is reversed, the body swung aboard and secured, and the driver is off for another trip.

Loading Time Cut 66%

Two bodies are used with each truck, one being loaded while the other is out. Under the old system it took from 30 to 35 minutes to back the truck in, load it so as to eliminate roundabout routes, extend the driver's slips, check the goods and get away, the extra time depending upon whether the load was billed to one



Plan view of the loading bay, showing the five sets of switch tracks over the platform and the moving carriage and tracks for shifting the empty and loaded bodies



Close-up of the two carriages, one moving longitudinally in front of the platform edge and the other transversely to the switch tracks over the platform proper

customer or a number. The use of demountable bodies has enabled the company to cut the time for receiving, loading and sending out a truck to never more than 10 minutes and usually from 5 to 7 minutes.

Moving More Groceries

In addition to this great saving in time, the labor of two loaders and one checker has been done away with, saving the company approximately $375 a month on the item of wages alone. Even now, with a greatly increased business, there is just enough to do to keep the lessened force comfortably busy all day. Formerly there was nothing the men could do but loaf until a truck came in and then things had to be done in such a hurry that mistakes and oversights were frequent.

The average gain in work done under the two-body system, the company found, is two and three-quarter loads per working day, counting Saturday as a half-day, on the five 2-ton Packards which have been equipped with the double bodies. This is the average for the first six months of 1919. This means that 408 loads more were moved with the double bodies than could have been moved by using the ordinary truck body. Since each load, according to cost sheets of the company, averages slightly over 3000 pounds, the double bodies enabled the company to move 1,224,000 more pounds of groceries with practically the same truck fleet than it could have moved with the common type of truck and truck bodies.

There are many days when all the trucks get in three trips a day, though on some days only one or two of them manage to make the three trips, the others having gone out in the morning or afternoon on long hauls into St. Louis County. Before the demountable bodies were installed, no more than two trips a day were made with any truck and there were a great many times when only one trip could be covered on account of the long haul involved or the difficulties of load-loading. The record for the fleet was established in July when one truck made three trips, stopping for delivery of articles fifty-two times, and piling up a distance covered of 49 miles. This was done between 7:45 a.m. and 4:45 p.m., with the noon-hour counted as idle time. In loading the bodies it is a rule that there will never be more than thirty stops to the load, the stops being distributed as evenly as possible among all the trucks. Another practice followed is giving the longest trip to the first truck in. When this truck returns, it is given one of the shorter trips. In this way the mileage on all the trucks is divided as equally as possible. This method of assigning trips is a help to the drivers also, as they receive a bonus for every trip over twelve a week that they make. The highest bonus is $3 and it is given for a weekly total of twenty trips.

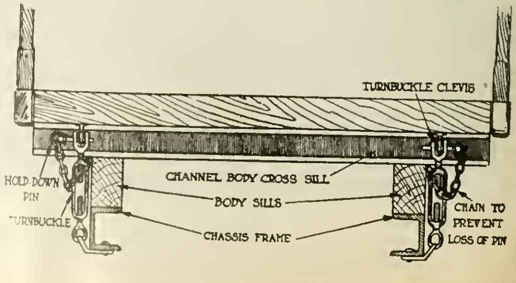
Cost of Installation

The cost of installing the overhead system a year ago was $1800 and the cost of maintenance is practically nothing, since it is so sturdily constructed that a weight of 3 tons, which is larger than any load carried, can be lifted with safety. The bodies a year ago cost $275 apiece for the Packard 2-ton trucks and a price approximately 25 per cent lower was made on bodies for the Autocars, which are not yet equipped, there being no overhead system ready for them now.

This installation of demountable bodies is characterized chiefly by the unusual construction of the two-part carriage for handling the bodies while being taken off and put on. While this carriage at first seems decidedly complicated, this is not the case when it is considered in its two parts, the first for moving the body perpendicularly to the edge of the loading platform, and the second part for the transverse motion parallel to the edge of the platform. This motion is only brought into play after the empty body has been deposited on the platform or a loaded body onto the truck. This transverse carriage is moved to correspond with one of the five sets of switch tracks carrying the carriages which move perpendicularly to the edge of the platform. Details of both of the carriages and the five overhead switches above the platform are shown in the two illustrations at the top of this page.

The construction of the bodies themselves and the method of their attachment to the truck chassis are also somewhat unusual. The features of design which are new, are the use of turnbuckles for fastening the body rigidly to the chassis and the use of rubbing blocks and I-beam lugs to prevent side sway while the truck is in motion. The turnbuckles, with their upper ends in the form of clevises, provide a means of fastening which is simple and yet effective. Chaining the pins which are inserted through the clevises and the eye-bolts screwed into the bottom of the body, prevent them from dropping out while the truck is in transit or being lost or misplaced during the operation of

Cross-section through the body, showing how it is held to the chassis by means of pivoted turnbuckles. A pin, held against loss by a chain, is used to make the turnbuckle fastening

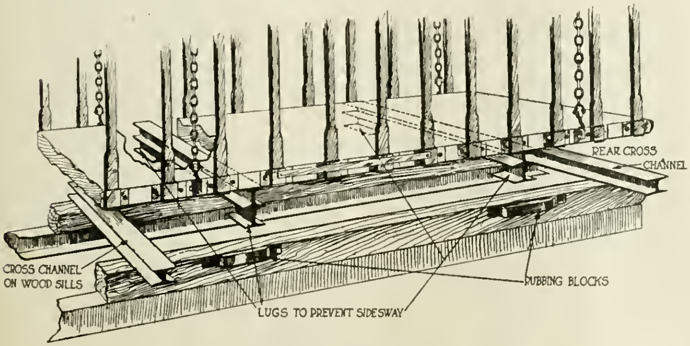


A line-up of the Scudders-Gale Packard trucks in front of the company's plant

changing from an empty body to a loaded one.

The shape of the rubbing blocks, two of which are attached to the longitudinal frame sill on each side of the chassis, is not new, the new feature of the apparatus being the I-beam lugs which contact with the rubbing blocks. The I-beam lugs are about 4 in. long, and are fastened to the bottom of two crosswise I-beam sills of the same size, bolted directly to the bottom of the floor of the demountable body. By attaching the lugs to these sills, any strains which may be put upon them while the truck is in motion are not localized at any point of the body platform, but are transferred over all of the longitudinal floorboards of which the platform of the demountable body is composed.

This entire demountable body installation is but another example of what can be accomplished by an analytical study of truck operation. While the installation is of particular interest to wholesale grocers such as the Scudders-Gale company, its lessons apply equally as well to any other motor truck installation in which the loads are composed of a large number of small packages which require almost individual loading. Considering the saving in truck time and the labor in loading the vehicles, the cost of the demountable body installation is small, and will pay for itself within 1 year or 2 years, at the most.



Details of the method of supporting and lifting the demountable body. Hooks and chains are used for lifting. Cross channels are provided at front and rear to support the body and rubbing blocks and lugs are employed to prevent sidewise slippage while the truck is in transit; these lugs are made of I-beam iron bolted to the body cross sills

Bay State Trucks Must Now Have Mirrors

BOSTON, Oct. 5—The Massachusetts Highway Commission has issued a warning to owners of motor trucks that they are not living up to the law on mirrors, and cautioning them that they had better do so. In a statement issued by Commissioner James W. Synan, he says:

"The Massachusetts Highway Commission finds a great many owners of motor trucks who are not using any judgment in attaching mirrors to their trucks in carrying out the intent of the Mirror law recently passed by the Legislature.

"The inspectors of the commission find a great many very heavily-loaded trucks with very wide bodies equipped with a very short arm on the mirror, the result being that the operator cannot see the road in the mirror of his truck any better than if he had no mirror at all.

"What the truck owners must do is to put a sufficiently long arm on the mirror so that the mirror will project beyond the width of the truck and show the road to the rear. It may be necessary to have a 2-ft. or longer arm on the mirror to comply with this provision on certain trucks and an 18-in. arm on many trucks."

New Sterling Service Station Opened in Chicago

CHICAGO, Oct. 9—The Sterling Motor Truck Co. will build a one-story service station in this city at 2707 Michigan Avenue.

COLD-WEATHER HINTS In Truck Operation

Care of Cooling and Lubricating Systems Is of Greatest Importance for Successful Operation. Methods That Will Save the Fleet Owner Much Worry, Time and Money

No. 2—COLD-WEATHER CARE OF PACKARD TRUCKS

IN maintaining any make of truck in winter weather, the care of the cooling system and of the lubricating system is of the greatest importance.

In the care of these systems there are certain fundamentals and methods which should be well understood and carried out by the motor truck fleet owner. While some of the data printed here are particularly applicable to Packard trucks, the information may be put to good advantage also by the owners of other makes of trucks. It is accordingly set down in the following order, taking up the cooling system first and then the lubricating system.

The Cooling System

1—The engine of a motor truck will run most efficiently during cold weather when the heat under the engine hood most nearly approaches the same temperature as that obtained during the summer months.

2—During cold weather the truck operator must pay particular attention to the setting of the levers regulating the admission of air and gasoline to the carbureter in order to produce a mixture which will easily ignite at the lower atmospheric temperature.

3—In extremely cold weather as much as possible of the heat generated by the motor should be conserved by the use of radiator and engine hood covers.

4—In starting in extremely cold weather it may be necessary to shut off both the primary and auxiliary air intake, in this manner obtaining a very rich mixture that will ignite readily. In trucks like the Packard, which is provided with a button below the radiator at the right side, this button should be pulled forward to temporarily cut off the air supply. After the engine is started, the button should immediately be pushed back into position. In the manipulation of this button a word of caution should be heeded. In warm weather, or when the engine is warm, pulling out the button may give such a rich mixture that the charge will not ignite.

THIS is the second of a series of articles pointing out some of the best methods which fleet owners may follow in the maintenance and operation of their trucks in freezing weather. Some of the methods apply particularly to the Packard trucks, while others apply equally well to all makes of trucks. The third article, in the next issue, will give cold-weather hints for Kelly-Springfield trucks.

5—Never race a cold engine immediately after it has been started. If this is done before the oil has an opportunity to regain its full fluidity, after being partly congealed on account of the cold, it may result in scored pistons and cylinders. It is also a good plan to idle a cold engine after it has been started before attempting to run the truck. The heat thus generated will allow the engine to run on a leaner mixture and will insure the greatest possible gasoline efficiency and the most satisfactory lubrication. If the truck is operated with the carbureter adjusting lever at or near the choke position, it will cause a waste of gasoline, accumulation of carbon and other unsatisfactory results.

In trucks like the Packard, which is provided with a control board under the steering wheel on which is mounted an air and gas lever, moved over a segmented scale, the lever should be moved toward the gas end of the scale in starting. With the engine operating, the lever should be gradually moved back a few notches toward the air end of the scale. No hard and fast rule can be followed for setting the lever, which of necessity must be varied to compensate for different atmospheric conditions and for the temperature of the engine. Experience will dictate better than anything else the proper running position. It should be borne in mind, however, that even though a richer mixture is required while the engine is cold than after it has become warm by being driven, it should be given as much air as it will take. Too much air will cause a pop-back in the carbureter.

6—Before stopping the engine in cold weather, the throttle should be closed to reduce the speed and the gas lever moved half way up to the full open position. This will produce a very rich mixture, which will assist in starting the engine the next time.

7—Priming the cylinders with gasoline may be necessary if the engine cannot be started after following the directions given in the preceding paragraphs.

8—Water in the lubricating oil is also a problem in freezing weather. To solve it the crankcase should be drained at frequent intervals, to be certain that no water is present. If this is not done, the oil pump springs may become frozen and the pump made inoperative, thus preventing the proper oil circulation.

Cooling System

1—During freezing weather the water circulation system should be filled with an anti-freezing solution. The Packard company recommends solutions made up in the following proportions:

For a temperature not lower than 5 degrees below zero:

Alcohol	15 per cent.
Glycerine	15 per cent.
Water	70 per cent.
Total	100 per cent.

For a temperature not lower than 15 degrees below zero:

Alcohol	17 per cent.
Water	66 per cent.
Glycerine	17 per cent.
Total	100 per cent.

Alcohol should be added occasionally to make up for evaporation. Glycerine does not evaporate. According to the Packard company, the foregoing solutions have been found entirely practicable. A simple solution of alcohol, while it is not injurious, lowers the boiling point of the water. Consequently, on warm days, with the truck standing and the engine running, the solution will tend to boil easily and evaporate. The boiling point of denatured alcohol is about 10 degrees higher than that of wood alcohol.

The use of glycerine raises the boiling point of the solution. It is more expensive than alcohol and is slightly injurious to rubber. This drawback is somewhat reduced by a combination solution of both alcohol and glycerine in water.

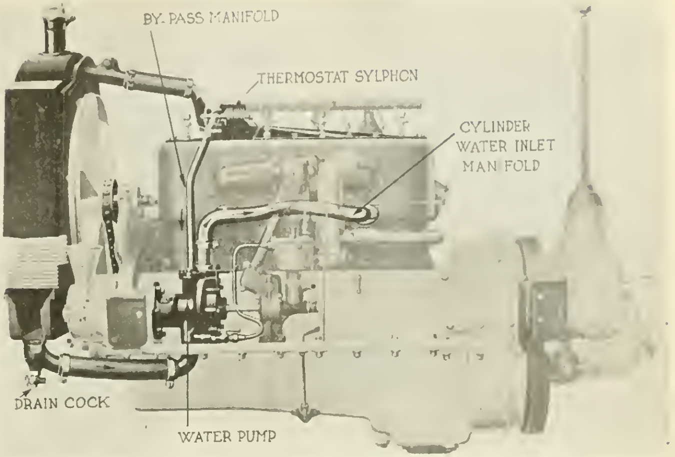
2—Do not use an anti-freezing solution of calcium chloride or any alkaline solution, as these are injurious to the metal parts.

3—Anti-freezing solutions should be tested frequently to prevent a too rapid evaporation of the alcohol. This may be tested by drawing off a small quantity of the cooling fluid from the radiator and allowing it to stand outside. If it thickens, new alcohol should be added.

4—The capacities of the cooling system of the seven Packard models are as follows:

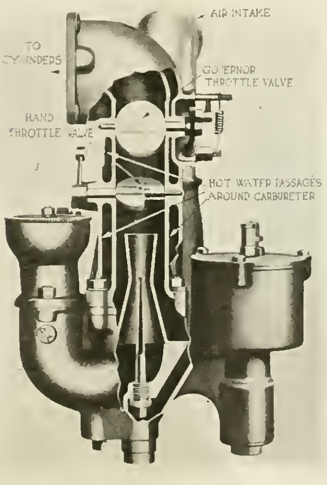
	Gal.
1-ton	7¼
1½-ton	7¼
2-ton	7¼
3-ton	9¼
4-ton	9¼
5-ton	9¾
6-ton	9¾

5—The Packard truck engine is characterized by the use of a thermostat. The purpose of this thermostat is to keep the temperature of the cooling water at a point found to give the best thermal or fuel economy results, no matter what the temperature of the outside atmosphere. This temperature is between 140 degrees and 180 degrees Fahrenheit. The action of the thermostat is automatic and it has no adjustments. In brief, the thermostat prevents some of the cooling water from circulating through the radiator by bypassing it direct to the pump until the proper temperature of the water is reached. When this has been done the thermostat automatically closes the bypass valve and permits the water to be cooled by passing through the radiator core in the regular manner.



Part sectional view of the Packard truck engine, showing the thermostat fitted to automatically keep the cooling water at a temperature to produce the most efficient engine operation in both cold and warm weather

In detail the thermostat consists of a sylphon which is located at the forward end of the water outlet header at the top of the cylinder block. A sylphon is a nest of concentric but continuous series of metal disks which contract and expand in proportion to the temperature of the water in which the disks are in contact. A bypass tube connects the thermostat housing with the inlet side of the water pump. The entrances to the radiator tank at the top and to the bypass tube are controlled by valves carried on a shaft actuated by the movement of the thermostat sylphon. Normally when the water is cold, the radiator valve is closed and the bypass inlet valve opened. This allows the water to circulate through the cylinder jacket and back to the pump without entering or passing through the radiator. As the water becomes heated, the expansion of the sylphon causes the radiator inlet valve to open and at the same time closes the bypass valve. This makes it necessary for all the water to circulate through the radiator. This cycle of operations is automatically repeated, thus keeping the temperature of the cooling water practically constant and at a temperature which gives the most efficient engine operation.



Sectional view through the Packard carbureter, showing the hot-water jacket and the two throttle valves, one operated by the governor and one by hand

The Lubricating System

1—For winter use where cylinder oil is specified—namely, in the engine, spring bolt oilers, clutch pedal oiler, steering worm shaft oiler, steering knuckle bolt oiler, radius rod oiler, radius rod and rear axle spring trunnion oilers, hand brake rod clevises, change speed and foot pedal connections, motor control connections, and all other working joints not provided with oil cups—the Packard company recommends an oil having the following properties: Cold test of 0 degrees; gravity test of 60 degrees Fahrenheit (Baumé 25); viscosity test 100 degrees Fahrenheit (Saybolt 230-235); and fire test 495 to 500.

2—During the first 2000 miles of service, either with a new truck or after overhauling, the oil in crankcase should be drained and a fresh supply put in every 500 miles. After 2000 miles of service, this is necessary only at 1000-mile intervals.

3—If during winter weather some of the unvaporized fuel has worked its way down past the piston rings into the crankcase, the oil should be tested more frequently and renewed when there is any indication of the loss of its lubricating properties.

4—For the gearset housing, a heavy mineral oil free from acid should be employed. During winter weather this oil should be mixed with cylinder oil just as is used in the engine in equal proportions of cylinder oil and gearset oil.

5—For the rear axle housing, the Packard company recommends 600-W steam cylinder oil as produced by the Vacuum Oil Co. Similarly, during cold weather this oil should be mixed half and half with cylinder oil such as is used for the engine lubrication.

6—During the first 2000 miles of service, either with a new truck or after overhauling, the oil in the rear axle housing should be drained and a fresh supply put in every 1000 miles. After 2000 miles of service this is necessary only at 5000-mile intervals.

7—When draining the gearset housing the oil should be allowed to drip out thoroughly. The casing should then be flushed with kerosene and refilled with fresh oil to the level of the screw plug in the side of the case.

8—In renewing rear axle housing lubricant the casing should be drained thoroughly and then flushed with kerosene. After this has been done the housing should be filled with fresh oil to the level of the overflow plug at the rear.

9—On the Packard truck a gage is provided on the dashboard to show the oil pressure in the engine. The normal running pressure when the engine is warm is 10 pounds at 1000 r.p.m., or at the maximum speed as controlled by the engine governor. Failure of the gage to show pressure after the engine has been running for a few minutes is an indication of lack of oil in the crankcase reservoir or the clogging of the strainers or oil pipe. When the gage does not show pressure, the engine should be stopped immediately and the cause determined. When the engine is cold, the pressure will be higher until the oil thins down.

MAINTENANCE HINTS

FOR TRUCK MECHANICS

WHEN YOU WIPE OFF YOUR ENGINES, do not use ordinary cotton waste. Some of the threads of such waste easily become detached from that held in the hand, and not being noticed, finally work their way into the air inlet to the carbureter where they cause sticking of the needle valve or throttle valve.

* * *

IF YOUR TRUCKS ARE LIABLE TO RUN SHORT OF OIL on long trips, it is a poor plan to rely upon the driver getting the proper kind of oil at some wayside garage. It is much better to fit an auxiliary lubricating oil tank on the side of the chassis, just above the runningboard. This always insures a sufficient supply and does not permit the driver to claim that he ran short because he had no money with him; could not get credit or could not get to a garage before bearing trouble developed in the engine.

* * *

IN STARTING YOUR TRUCK ENGINE in cold weather, do not race it. Let it idle slowly for a few minutes to permit the lubricating oil to thaw out and regain its full fluidity. If the engine is raced immediately after it is started, it is liable to result in scored pistons and cylinders because the oil is too thick until it gets heated up sufficiently.

* * *

IF THE CLUTCH PEDAL GRABS TOO QUICKLY when the wet plate or disk-in-oil type, easier engagement may be secured by holding the pedal down for a few minutes after the engine has been started, but before putting it into gear. This allows the oil to circulate freely between the disks so that they grab with less abruptness.

* * *

WHEN TRUCK ROLLER OR BALL BEARINGS BECOME WORN, do not throw them away as junk. There are several companies which make an exclusive business of regrinding races and fitting new balls or rollers. This work gives a new bearing practically as good as originally at a small percentage of the cost of a new bearing.

IN PAINTING A TRUCK BODY, it is a poor plan to be saving on the paint. Rather use too much than too little. At least three coats should be applied and covered finally with a top coat of finishing varnish that is impervious to moisture.

* * *

IN STORING TRUCK PARTS in the garage stockroom, it is a good plan to mark the bin number on the catalog from which the parts are ordered. This saves considerable time in locating a part in stock. Care should also be taken to group parts according to the truck unit to which they belong.

* * *

WHEN COMING TO A STANDSTILL in winter weather, always release the brakes just before coming to a full stop. This will avoid the formation of ice under the wheels which causes them to spin when starting.

* * *

ONE-MAN RESPONSIBILITY FOR TRUCK GREASING works out very satisfactorily when the fleet numbers ten or more vehicles. When one man is hired for this particular purpose, although he may do other work, the responsibility is centralized upon one person instead of ten or more, as is the case when each driver is expected to turn up his grease cups regularly.

* * *

IN REPAIRING OR INSPECTING A TRUCK, it is a good plan to do the work on a fixed cycle of operations. At first, this cycle should be very complete and set down on a card in list form so that no essential part may be overlooked. After the mechanic has become accustomed to his work, the list may be reduced in length and just the main heads put down for greater convenience.

* * *

IN MAKING TRUCK REPAIRS, have a plan for doing the work. Try to determine upon the best method to follow in doing any particular job and then make the mechanic follow that plan. This course may cut out many unnecessary moves and operations.

If You Operate Fords, Be Sure to Read This Article

TRUCK ORGANIZATION

Required to Deliver Groceries from Widely-Separated Retail Chain Stores in Smaller Cities and Towns

Centralization of Management and Decentralization of the Operation and Maintenance Responsible for Truck Business

THIS story concerns a fleet owner who delivers groceries with ninety-three Fords to customers in 344 cities and towns in New York, New Jersey, Rhode Island, Connecticut and Maryland. The big feature in the operation of these Fords is that the company has been able to cover a wide territory without the need of establishing a large number of stores to reach its customers. The 344 cities and towns are taken care of by only eighteen stores. In a majority of cases, the territory covered by each store extends out from 15 to 25 miles. Without the use of the quick Ford delivery, it is apparent that it would be impossible for that company to take care of the business it now handles, nor could it make as many deliveries per week as at present. In addition to these facts, it is also apparent that without trucks, these outlying towns could not be efficiently served, unless more stores were opened.

In the selection of a fleet of Fords for grocery deliveries, four cardinal points were uppermost in the minds of the purchasers, namely: 1—Size of the body; 2—Speed of the truck; 3—Cheap repair service, and 4—Quick repair service.

Selection of the size of body to take care of local deliveries as well as those to outlying towns, required study of the average loads that would ordinarily be taken care of on one trip. As a result of this study, it was found that a Ford delivery body 4 ft. wide, 4½ ft. high and 7 long, was sufficiently large to take care of all the delivery demands without the necessity of the truck making more than one trip daily to the same locality. The speed of the Ford truck was such as to enable a driver to make his deliveries quickly and get back to the store to take care of small orders that may have come in during his absence.

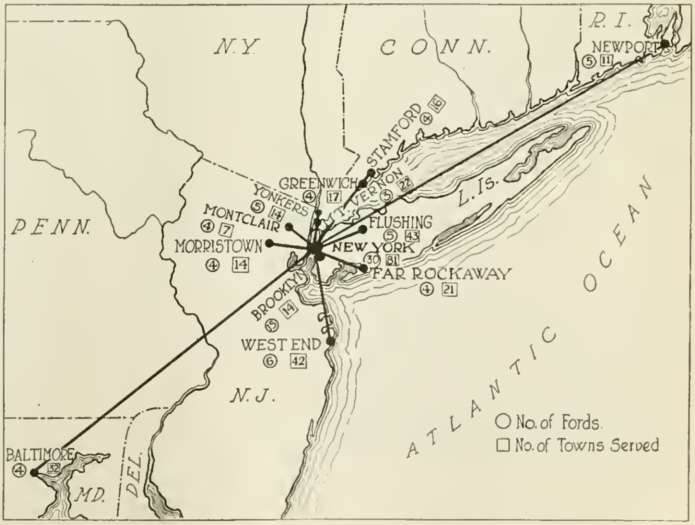
It is obvious, that with a larger and slower moving truck, there would be a lack of economy in taking care of the small orders, even though the capacity of the body might enable more packages to be carried. Another point in the selection of the Fords was that parts could be bought cheaply and in every one of the cities in which the stores are located.

Five Big Problems

This meant a large saving in repairs and also meant that the truck owner did not have to worry about the establishment of his own repair stations with their consequent expense. In addition to the economy effected through the purchase of parts, there was the point of quick service. Each Ford service station is equipped to take care of a repair in a minimum of time. Consequently, the trucks would not be taken off the delivery work long enough to make an appreciable interruption in the delivery schedule.

The fleet owner mentioned, the Acker, Merrall & Condit Co., New York City, operates the ninety-three Fords in thirteen cities as follows: Seven in New York; fifteen in Brooklyn; four in Far Rockaway, L. I.; five in Yonkers, N. Y.; three in Mount Vernon, N. Y.; four in Montclair, N. J.; four in Morristown, N. J.; six in West End, N. J.; four in Greenwich, Conn.; four in Stamford, Conn.; five in Newport, R. I.; and four in Baltimore, Md.

There are five problems in a delivery system, such as Acker, Merrall & Condit employs. These are as follows: 1—Keeping track of the Fords; 2—Supervision of the drivers; 3—Truck maintenance; 4—Delivery schedules, and 5—De-



Map of the territory served by the ninety-three Fords used by Acker, Merrill & Condit to deliver small retail grocery orders from eighteen stores serving 344 small towns and cities livery from the warehouse to the stores. Keeping track of the running condition of trucks when they are widely scattered in a large territory is a problem that is solved only through centralized supervision. The driver situation, on the other hand, is a matter of local supervision, as are the maintenance and delivery schedules. Delivery from the warehouse to the stores, though of prime importance, is a separate and distinct operation that must be studied from an angle other than the delivery from store to customer operation. Though both operations are closely connected, the delivery conditions under each operation are such as to warrant splitting them up into two departments.

The Acker, Merrall & Condit company keeps track of its Fords by means of a weekly report, sent in by the store managers to the New York headquarters. These reports are gone over by the branch superintendent, who is in charge of the retail deliveries. His office is at the main warehouse headquarters in New York City. These reports, which cover fuel and oil consumption; mileage; repairs; etc., obviate the need of sending out inspectors to visit each store in order to ascertain the running condition of the trucks, because the reports come in often enough for the branch superintendent to quickly size up any situation that may arise.

Spare Fords in New York

The manager at each of the stores is in charge of the drivers and the delivery schedules, the latter being governed according to the number of towns served. Acker, Merrall & Condit has arranged its delivery schedules throughout the various districts so that local deliveries will be made at least once daily. Deliveries to the outlying towns are made from two to three times weekly, depending upon the distance away from the stores and the amount of business received. The maintenance of the Fords is taken care of by public garages in the same cities as those in which the stores are maintained.

The Trucks are overhauled and painted once yearly. All of the Fords in the New York City district are painted in the company's own paint shop. Not only is the painting work done, but there are facilities for carrying on all body repairs. In order to take care of grocery deliveries while these trucks are being overhauled, the company has four extra Fords, called floaters, which are used by the various stores near New York City when their fleets have been decreased during the overhauling period. Overhauling of the Fords at the Newport and Baltimore stores does not necessitate the use of reserve trucks, as this work is done during the winter months when there is a let-up in business.

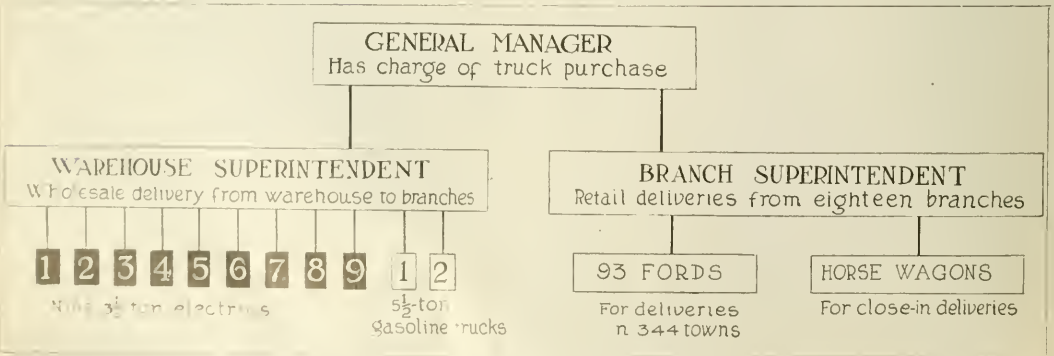
With the exception of the Newport and Baltimore stores, all of the stores are taken care of by truck delivery from the warehouse in New York City. Groceries from the warehouse to Newport and Baltimore are sent, respectively, by boat and rail. Deliveries from the warehouse to the various other branches are made on the average of twice a week. Nine 3½-ton G. V. electrics, a 5½-ton Mack and a 6½-ton Packard are used for the warehouse deliveries. Supervision of the routing, operation and maintenance of the warehouse trucks is under the warehouse superintendent. The maintenance of the gasoline trucks is taken care of by the local service stations of the Mack and Packard companies. The electrics are maintained in the company's own garage where all battery work is done.

The purchase of the Acker, Merrall & Condit trucks, as in the case of the operation and maintenance, is also centralized. This department is in charge of the general manager, who also supervises the work of the warehouse and branch superintendents. All purchases are governed by the reports sent in by the store managers to the branch superintendent in regard to the amount of new business and the consequent need of more trucks to take care of the increased deliveries. Warehouse truck purchases are likewise governed by the report of the warehouse superintendent on delivery developments. The delegation of this authority is shown in the chart published on this page.

The accompanying map shows the territory covered by the Acker, Merrall & Condit stores together with the number of towns served by each store and the number of Fords used by each.

The management chart shown at the bottom of this page indicates graphically the manner in which the trucks operated in the large territory extending from Newport, R. I., on the north, to Baltimore, Md., on the south, are supervised from the central headquarters in New York City. The operation of the large-capacity trucks employed to handle goods between warehouses is entirely different from that of the Fords used for the final deliveries, and is accordingly supervised by a separate department, of which the warehouse superintendent is the centralized head. He has charge of nine 3½-ton electric trucks and two 5½-ton gasoline trucks. The former are used exclusively in New York City and the Metropolitan territory, while the gasoline trucks are sent on longer trips to such points as Yonkers, 11 miles distant; to Flushing, approximately 15 miles; and to Montclair and Morristown, N. J., approximately 40 miles away. While the warehouse superintendent has direct charge of these trucks, he is under the authority of the general manager. The latter's connection with the truck operation and maintenance is solely in an administrative capacity, for he attends to many other of the business and sales details for the Acker, Merrall & Condit Co.

The entire operation of the ninety-three Fords and horse wagons employed for the retail deliveries to the customers is under



The management of ninety-three Fords for retail deliveries in 344 towns and cities and eleven warehouse trucks requires a simple yet effective system. The above chart shows this system graphically with the delegation of authority from top to bottom of the organization the supervision of one man carrying the title of Branch Superintendent. As shown in the map at the bottom of page 215, the Fords are operated from eighteen branches, which serve 344 different towns. The number of Fords operated from each branch are also given on the same map.

This map, together with the organization chart at the bottom of page 216, should be of great value to any fleet owner operating Fords. In most cases, owners of Fords do not devote the same thought and analytical study to the operation of Fords as they do to larger trucks, because the initial investment and the running costs are comparatively small. As soon as a fleet of Fords reaches the size of that employed by the Acker, Merrall & Condit Co., the proper operation becomes an important item, because the cost of delivery must be included in the sales price of all goods sold by the company. One small leak in operating efficiency becomes of major proportions when multiplied by the number of Fords in service. Thus, a small waste of $10 per Ford per month becomes $930 per month for the entire fleet, or $11,160 a year.

One of the ninety-three Ford Model T passenger cars used by Acker, Merrall & Condit to deliver retail grocery orders in 344 towns and cities from eighteen branch stores, from Newport, R. I., to Baltimore, Md.

Interesting Fleet-Owner News Items

Stolen Truck Bill Passed

WASHINGTON, Oct. 13—The Dyer bill to punish the transportation of stolen motor vehicles in interstate or foreign commerce and passed by the House has been passed by the Senate with two amendments which sent the bill to conference of the House and Senate committees.

One amendment by the Senate abolishes the provision which would bar further prosecution in event of acquittal or conviction. The other amendment eliminates the words "with the intent to deprive the owner of possession thereof" from Sec. 4, which provides a fine of not more than $5,000 or 5 years imprisonment for any one who receives, stores or sells a truck in interstate or foreign commerce, knowing it to have been stolen.

Big California Truck Tour

SAN FRANCISCO, CAL., Oct. 10—The first California highway motor truck train ended its 1,100-mile journey over California highways in this city yesterday morning. Leaving this city on Sept. 25, it made the round trip to Los Angeles via the valley route and return over the coast highway. The purpose of the tour was to demonstrate to farmers and small town merchants throughout the state the present vital need for motor truck transportation. Thousands of tons of California's fruit crop have rotted on the ground this year for lack of freight cars to haul them and while the motor truck has helped in many respects to overcome this condition of affairs, it is found that the shipping public really did not comprehend the extent of the motor truck's usefulness.

New Weather Service

WASHINGTON, Sept. 25—All motor truck operators should take advantage of the Highway Weather Service, one of the new enterprises of the United States Department of Agriculture, operated through the organization of the Weather Bureau. Kansas City, Mo., established a road or highway reporting service April 1 of this year. It has proved equal to the most practical service the office can otherwise perform. The Highway Weather Service was begun as a war measure in aid of motor transportation and was conducted with emergency money until the end of the war. Though Congress made no appropriation for its continuance during the present fiscal year, the demand for it is such that the department is endeavoring to continue it without special funds to meet the expense.

$45,490 Army Trucks Sold

WASHINGTON, Oct. 11—Two hundred unserviceable motor vehicles, chiefly passenger cars and Nash-Quad trucks, were sold for $45,490 at Camp Holabird, Baltimore, Md.

Additional sales will be held each Thursday at Holabird until all the unserviceable vehicles have been sold, and about 200 will be offered for sale each week. Next week's list includes Peerless, Nash and Garford trucks. Eighty-four Ford passenger cars and trucks, Pierce-Arrow, Nash and Kissel trucks will be sold Oct. 17 at Camp Meade.

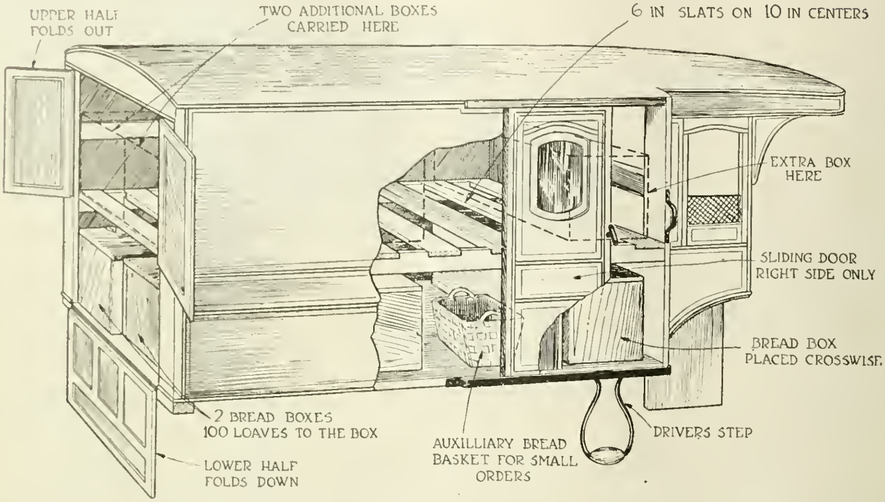
Official reports received by the Motor Transport Corps from ten sales held at different camps show that $50,960 were realized from 270 vehicles, including 218 cars, trucks and ambulances and fifty-two motorcycles and bicycles. The range of prices has been wide, running from $1 for a Chevrolet passenger car to $2,200 for a Kelly-Springfield truck.

Famous Price Cut $155

ST. JOSEPH, MICH., Oct. 2—The price of the Famous Model B-12, 1½-tonner has been reduced from $2,250 to $2,095, effective Sept. 15.

BODIES *for* *Retail Bread Delivery*

Side Door and Interior Slat Shelf Increase Carrying Capacity and Save Driver's Time


UPPER HALF FOLDS OUT
TWO ADDITIONAL BOXES CARRIED HERE
6 IN SLATS ON 10 IN CENTERS
EXTRA BOX HERE
SLIDING DOOR RIGHT SIDE ONLY
BREAD BOX PLACED CROSSWISE
DRIVERS STEP
AUXILLIARY BREAD BASKET FOR SMALL ORDERS
2 BREAD BOXES 100 LOAVES TO THE BOX
LOWER HALF FOLDS DOWN

Phantom view of one of the special bread bodies, showing the interior slat shelf; the position of the bread boxes; the location of the auxiliary bread basket; the side door and step for quick unloading and the two-way opening rear door

ONE of the main considerations in the operation of a fleet of bread trucks is the design of the body. Each body must be designed to expedite loading as well as delivery and built so as to give complete protection to the bread from dust and inclement weather.

With these cardinal principles in mind, the Shults Bread Co., operating 165 trucks in New York City and surrounding territory, designed its bodies so that they would come within the needs of its truck operating system. That company operates ¾-ton Fords and also Lippard-Stewarts, Hurlburts and Autocars of a 1½- to 2-ton capacity. As a result of the difference in the size of the bodies used on Fords and those of the larger trucks, it was necessary to use two different types of bodies. Both, however, are of the panel type, thus following out the dust-proof principle. In addition, both are equipped with rear doors that reach to the roof.

Floors Flush with Platforms

The height of the bodies on the Fords and the larger trucks is such as to make the floor flush with the loading platforms, thus minimizing any lifting effort when the boxes are being loaded into the trucks.

In the case of the Ford, the vehicle may be backed up to the loading platform and all of the boxes to be carried may be shoved up to the front of the body with little effort. As a result, none of the Ford bodies are equipped with side doors. On the other hand, the effort and waste of time in climbing up into one of the bodies on the larger trucks, in order to place the bread boxes at the front end are considerable.

Therefore, in order to cut down any wasted effort during the rush of the loading and delivery period, each of the large truck bodies is equipped with a side door. This is placed on right side directly in

One of the Fords used to deliver bread on the zone system. The Fords are employed in the area between two circles with diameters of 12½ and 20 miles, respectively. Two-ton trucks are employed beyond the 20-mile circle back of the driver's cab and enables the driver to quickly load his truck, as well as make quick deliveries. It obviates the need of going around to the back of the truck and hauling out empty boxes to get at those in the front end of the body. A majority of these side doors are of the sliding type, while a few pivot on hinges, swinging open from the side.

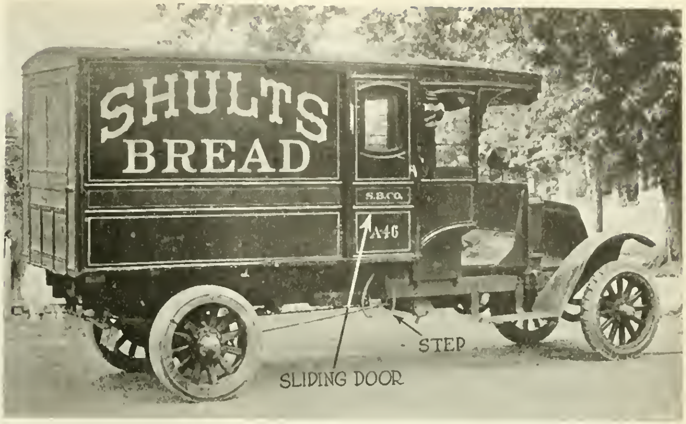
As stated before, both types of bodies are equipped with rear doors that reach to the roof of the body, so that there is no open space at the top through which dust might enter. The rear door on the Fords is of two-piece construction, each section swinging open from hinges on the sides of the body. The large type of body is equipped with a two-part rear door, the lower half of which swings downward on a hinge attached to the floor of the body, and the upper half of which swings open at the middle upon hinges mounted on the sides of the body.

In order to eliminate any waste effort in getting at the boxes in the forward part of the large body a step has been provided on the body in front of the side door.

Instead of piling the boxes in a haphazard manner in the bodies, they are arranged in an orderly fashion so as to attain the maximum loading capacity of the body. Each body is equipped with 6-inch wooden slats, which are laid crosswise on supports in the sides of the body to form a second floor for additional boxes. By using these slats, the driver does not have to lift any boxes in order to slide out the lower ones, as would be the case were the upper boxes carried directly on the lower ones.

The Ford body is 4 feet wide, 4 feet 6 inches high, and 7 feet long. The larger body is 5 feet wide, 5 feet high, and 9 feet 6 inches long. The side door is 2 feet wide. The bread boxes are 20 inches wide, 17 inches deep, and 3 feet 8 inches long. By arranging the bread boxes lengthwise in the Ford body, four bread boxes can be loaded. In the same manner, four boxes can be loaded at the rear of the larger body, two on the floor and two above on the slat supports. In addition, there is room for two more boxes in front of the side door, thus making six boxes in all. At a capacity of 100 loaves to each box, the body capacity is thus 600 loaves.

Both of these bodies, and especially the type fitted on the company's 1½-ton trucks, are good examples of the body builder's art as applied to the bakery industry. The phantom view at the top of the opposite page shows clearly the manner in which the body is constructed down to the last detail. Particular attention should be paid to the side door, its location and method of hanging. The door slides backward and forward, parallel to the centerline of the chassis, instead of swinging on hinges as ordinarily.



A 1½-ton Stewart used to deliver bread within a radius of from 10 to 30 miles from each branch bakery. It has a side door for easy and rapid unloading

While the construction of the bodies has considerable to do with the degree of success which the Shults Co. has had with its fleet of trucks, their method of operation on the zone system has also been of equal importance. As told briefly in a previous issue of THE COMMERCIAL VEHICLE, all deliveries are made on the zone system, with horse wagons for a zone approximately 12½ miles in diameter. Fords and small Ward electrics are employed in the territory between the 12½-mile circle and a 20-mile circle, these trucks being suited for work in this intermediate ring because of their greater speed as compared with horses and their ability to make extra trips as necessity arises.

Operating Important Link

However, when deliveries have to be made beyond the 20-mile zone, the 1½-ton gasoline trucks are employed because of the longer routes and the necessity for carrying larger loads.

The loading conditions, which affect the design of the bodies, are practically the same in each zone. All of the trucks begin work on their routes at 12 o'clock midnight. The times of their returns on the following morning depend upon the length of each route and the number of stops made. The Fords and Ward electrics make from two to three trips a day. The electrics do not cover more than 45 miles a day on account of their storage battery limitations. The 1½-ton trucks operating in the zone beyond the 20-mile circle make only one trip a day. Each one of these trucks makes about eighty stops to the trip.

The Shults company operates in all 165 trucks in New York City and the surrounding territory. This territory comprises about 150 square miles and is served from fourteen bakery plants. Four of these plants are located in Brooklyn; four in New York City proper; three in Hoboken, N. J., one in Mt. Vernon, N. Y.; one in Jamaica, N. Y., and one in West New Brighton, Staten Island, N. Y. These plants are widely separated in order to cover the territory without overlapping of the truck routes from the different plants.

Trucks are operated from only nine of the fourteen plants, the five remaining establishments taking care of the business which is limited to their particular districts within a radius of 6½ miles. These deliveries are made by horse wagons.

The selection of the truck drivers has also had an important bearing on the successful truck operating by the Shults company. All of the Shults drivers are salesmen who are paid a salary for driving plus a commission on the amount of the bread sold. With both salary and commission, the drivers earn on an average of from $45 to $100 a week. It is therefore evident that the amount of bread which each driver sells is dependent upon the condition of his truck and its ability to cover the route regularly, except when provision is made in advance for overhauling the trucks. While nine of the plants use trucks for the delivery of their goods, the trucks themselves are maintained at garages at only six of the plants. Five of these plants have specially-built garages which are separate from the bakery buildings. The sixth plant, or that in Brooklyn, from which thirty-two Ward electrics are operated, stores the trucks in the same building occupied by the plant. Charging facilities have also been installed at this plant, so that the batteries of the electrics may be charged during the night while the trucks themselves are backed up to the loading platforms. This arrangement of the charging facilities also permits of noonday boosting charges.

Simple System to Prevent Loss of Packages

Triplicate Forms Lessens Chances for Delivery Errors

THE loss of articles through wrong delivery, misplacement or some kindred form of inefficiency is a serious problem with the operator of a fleet of trucks engaged in the delivery of packages as a business. This is true also of concerns using horses for package delivery, but not to so great an extent because of the greater speed of the motor truck, its many trips per day and its larger volume of business. Insurance companies fight shy of insuring goods in the process of delivery or else make the rates so high as to be prohibitive. The two ways of mitigating this trouble are either for the company to carry its own insurance or take every precaution to prevent packages being lost.

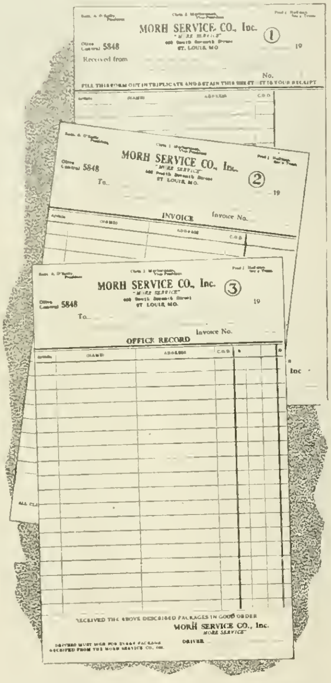
The Morh Service Co., Inc., St. Louis, Mo., had little trouble in this respect until its fleet expanded from two to five trucks. When, however, the three trucks were added, the volume of business became so large that under the ordinary system of duplicate receipts, packages were being lost. A great deal of the business handled by the company is small package business, which is harder to handle and, as a rule, intrinsically more valuable than bulky goods. Soon after the expansion, the company began casting about for a way to stop this loss and a triplicate system of receipts was devised.

The Triplicate System

The first sheet is, as it is in the duplicate system, a receipt for the customer, or the company whose packages are to be delivered. It is printed on white paper. The customer can either fill it out himself or have the driver fill it out for him. It is ruled with spaces for the number and description of articles; the name and address of the man or company to which the delivery is being made; and a column for the kind of delivery, whether C. O. D. or not. This sheet is kept by the customer for his files.

The second sheet, on pink paper, is ruled in the same way, except that it is marked Invoice. These sheets are filed under the customer's name in the company's office and at the end of every month are inclosed with the monthly statement, which is not itemized, the invoices serving to itemize it.

The third sheet, on green paper, is ruled like the second sheet, with the addition of columns for checking receipt and delivery of packages. In the use of this sheet lies the advantage the system has over the one of duplicate receipts. In the duplicate receipts system, either the monthly statement must be itemized or, if the invoices are sent to the customer, the company's files are very incomplete. In the first case there is involved a large amount of clerical work and in the second, the records of the company are practically nil.



MORH SERVICE CO., Inc. ①

Central 5848

ST. LOUIS, MO

Received from

No.

MORH SERVICE CO., Inc. ②

"MORE SERVICE"

Central 5848

To

INVOICE Invoice No.

MORH SERVICE CO., Inc. ③

"MORE SERVICE"

Central 5848

ST. LOUIS, MO.

To

Invoice No.

OFFICE RECORD

RECEIVED THE ABOVE DESCRIBED PACKAGES IN GOOD ORDER

MORH SERVICE CO., Inc.

DRIVER

The triplicate system which the Morh Service company employs to prevent the loss of other people's goods handled by its trucks

Under the Morh company's system, there is practically no clerical work beyond the figuring of the statement from the invoices and the addressing of the envelopes, while it retains for its files a complete record of every transaction, with every delivery and receipt checked and the record signed by the driver. In this way a package could be traced, as far as the company is concerned, a year after it was handled. It has proved very valuable in preventing the loss of packages while being handled by the company, not one package being lost in the 5 months of its operation, despite the fact that the addition of the three trucks almost tripled the number of packages handled.

Seek to Name All St. Louis Motor Trucks

ST. LOUIS, Oct. 10—A request that the ordinance requiring the name and address of owners to be painted on all vehicles used in the city for commercial purposes be amended has been made by the Eisenstadt Jewelry Co. The letter containing the request explained that the trucks of the company are used for delivering articles of great value and that by painting the name of the company on the machine they would be laid open to attack and robbery at any time if the name were displayed prominently on the cars. The request has been forwarded to the City Counselor for action and it is believed the ordinance will be amended in this respect. Another difficulty that has arisen in connection with the law is whether it is necessary that the street numbers of large firms who use only St. Louis on their address on letterheads be painted on their trucks.

Tower to Make New Model

GREENVILLE, MICH., Oct. 6—The Tower Motor Truck Co. will bring out a new truck on Dec. 1. It will have a capacity of 1½ tons and will be equipped with pneumatic cord tires.

New Truck Line Formed

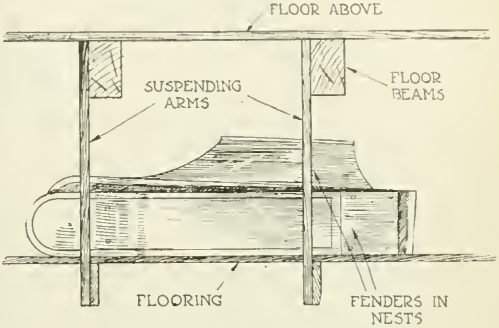
GRAND RAPIDS, MICH., Oct. 9—The Western Michigan Motor Transit Co., has completed organization with an increase in the capital stock from $100,000 to $300,000 and plans have been formulated for opening the line Oct. 15 to Fremont, Hesperia, Muskegon, Grand Haven and Hastings and intermediate points. The route will be extended later. F. S. Piowaty is president and C. T. Hedges traffic manager.

New Badger Service Shop Motor Trucks

PORTAGE, WIS., Oct. 9—The Slinger Foundry and Machine Co., Portage, which is equipped to re-build any make of motor trucks, has completed a new building covering virtually a square block for its automotive department.

Saving Space Storing Fenders

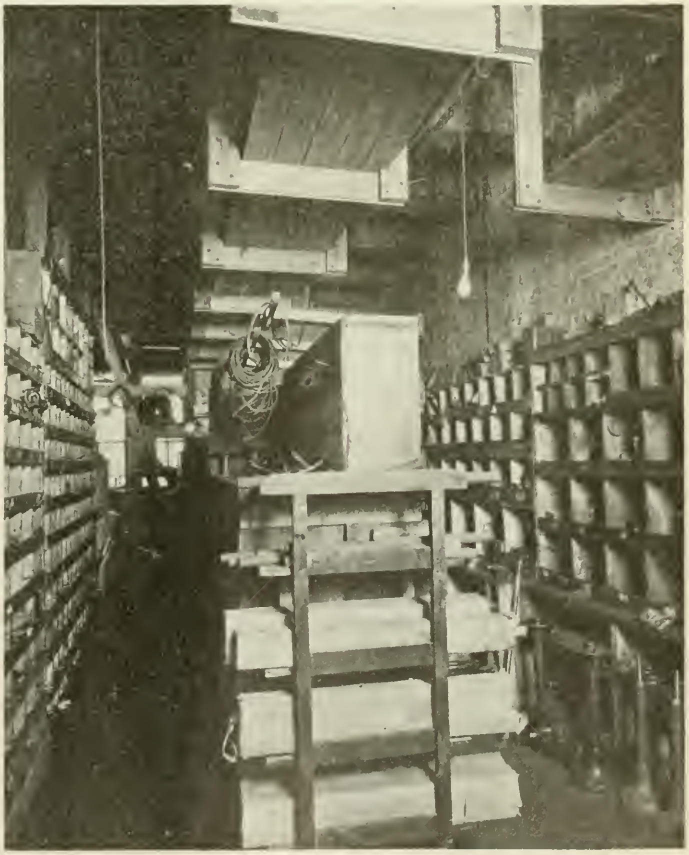
Maintenance Superintendent Solves Problem of Storing Them By Using Platform Suspended from Ceiling—This Arrangement Saves Valuable Floor and Bin Space



Looking at the platform from the side, showing how it is supported and how the fenders are nested

FENDERS for motor trucks can best be kept in the stockroom by nesting them on an overhead platform as shown in the accompanying illustrations. Fenders are difficult to keep in stock because of their size and general shape and the large amount of space which they occupy. Still, they must be kept on hand if the truck owner wishes to keep his vehicles looking spick and span. Fenders, especially on the smaller sizes of trucks, are the most vulnerable part of the chassis because a misjudgment of an inch in coming to a stop or the least carelessness in backing into a garage stall at night may result in a dented or broken fender. And nothing gives a truck a more decrepit appearance than badly dented fenders. They are the first thing which attracts the eye and it may be assumed that a truck with broken-down fenders also has other parts requiring attention.

George Heron, Maintenance Superintendent of the Boston Store, one of the largest department stores in Chicago, solved the problem of storing his fenders in the manner shown on this page. A platform made up of ordinary 1-in. boards is hung from the girders of the floor above by shorter lengths of the same size of board. The connection between the flooring proper and the supporting arms is made by stringers stood on edge crosswise of the platform at the bottom. This leaves a clear space in which the different sizes of fenders may be nested. They are thus out of the way where they are not subject to damage by kicking as when an attempt is made to store them on the floor in one corner of the stockroom. Again, the valuable floor space is conserved for bins and aisles.



Overhead is seen the platform on which the truck fenders are nested for storage. The platform is hung from the floor girders overhead. It saves valuable floor space

Engine Test Stands Reduce Time of Overhauls

Engine Testing Can Be Carried on Simultaneously With Chassis Repairs and Lengthy Road Engine Tests Eliminated

A FLEET owner who wishes to place his machine shop on the same plane of efficiency as that of a truck manufacturer's service station, so far as equipment is concerned, will first consider the installation of an engine testing stand. Truck engines must be overhauled and when a fleet owner pays for having this work done in his shops, he wants the work done correctly and at a minimum of cost. An engine testing stand is as necessary in a garage as any of the other equipment. It will cut the labor cost, save time, and help produce a higher grade of workmanship. At the present high cost of skilled labor, the saving of time during the overhauling period will soon pay for the installation of one of these stands.

Fleet owners using one of these stands, save time during the overhauling period by having their engines overhauled and tested while the rest of the truck is being torn down and re-assembled. The work on both the engine and chassis is finished at the same time, and does not require the usual waste of time of sending the truck out on the road to tune up the power plant after the other work has been completed. Road tests usually add from 1 to 2 days to the time ordinarily required when the engine has been tested on the stand at the same time the other chassis repairs were made. It is readily seen that the time saved figures in no small way in reducing labor costs.

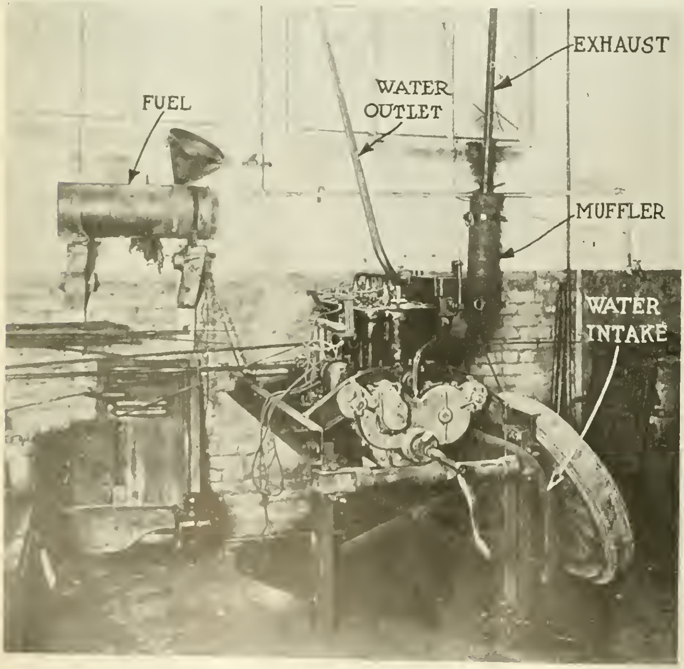
A Help to Better Work

Every facility should be given the mechanic to produce a high grade of workmanship. He cannot accomplish this when tuning up an engine by being hampered in getting at inaccessible parts. No mechanic can do efficient work when it is practically impossible for him to get at or see the parts on which he is working. An engine placed on a testing stand enables the mechanic to get at the component parts of the powerplant and to make all necessary adjustments in the minimum of time. There are no obstructions to the front or rear of the engine when it is on a testing stand. The camshaft, timing gears and flywheel can be readily removed, should there be need for doing so.

In the case of a large fleet owner who standardizes on one make of truck, he is given the opportunity of always having one spare engine on hand. This means a big saving in time not only during the overhauling period, but also during the period when every truck is needed for deliveries. Breakdowns through broken crankshafts, etc., are likely to happen when the trucks are out on their routes and this is where the value of a spare engine is most apparent.

A good example of how one fleet owner has cut down the time usually required in testing truck engines is shown in the experience of the Atlantic & Pacific Tea Co., Jersey City, N. J. That company operates fifty-two Pierce-Arrows at its warehouse in that city and a total of 108 throughout the Eastern territory. The company has installed in its machine shop a testing stand of simple design. It consists of two horizontal side channel frame members upon which rest the two cross supporting members of the engine; two vertical channel frame supports, bolted to the two other horizontal members and acting as a support at one end; and a hollow cross member, bolted to the two vertical supports. The hollow cross member is also used as a support for the starting crank. The horizontal members are supported in the brick wall at the other end. Additional reinforcement is given the stand at the front end by two strips of iron, which are bolted to the vertical members.

Fuel is supplied by gravity to the engine from a 10-gallon tank placed on supports on the wall. No radiator is needed, as the water is supplied through a hose from the water supply line and, instead of being circulated as in the case of the use of a radiator, it is drained off through another hose and out an adjoining window. The exhaust from the muffler is led through a pipe out of the same window.



How the engine stand is used to test out repaired engines while work is still being done on the chassis in which it will be installed Note also how the fuel, water and exhaust connections are made

TEAR OUT

THE TWO FOLLOWING PAGES

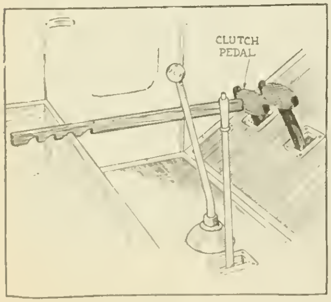
IF you are more interested in the operation articles in this issue than in the Repairshop Shortcuts shown on the two following pages, tear out these pages and send them to your truck maintenance superintendent. He and his mechanics may be able to save hundreds of dollars yearly by carrying out the ideas expressed on these two pages.

PIN UP THESE TWO PAGES IN YOUR GARAGE SHOP

Better Truck Repair and Maintenance

No. 23—Jack Attachment to Save Axle Truss Rod

WHEN lifting the rear axle of a truck, the jack should never be placed under the truss rod, as this course is likely to strain the axle itself or bend the truss rod. Nevertheless, some mechanics attempt to place the jack under the truss rod ,especially on small ¾-ton to 1-ton trucks. A jack attachment which permits the axle of a small truck to be raised without applying the jack under the truss rod is shown in an accompanying sketch. It is made up of a U-shaped piece of flat steel bent in a curved form at the bottom of the U and welded or hammered into two cylindrical shoulders at each end. In use, the top of the jack lifting bar has two holes drilled into it into which the round ends of the U-shaped member is first inverted and slipped over the truss rod and the round ends then inserted into the top of the jack lifting bar. By this means the lifting strain set up when the jack is raised is transmitted directly to the axle. Care should be taken in making the U-haped member that the height of the arms of the U is greater than the distance between the lower side of the axle casing and the truss rod, so that the truss rod itself does not bear upon the top of the jack when it is raised.—Motor World, J. S. PERKINS, Pittsburg, Pa.



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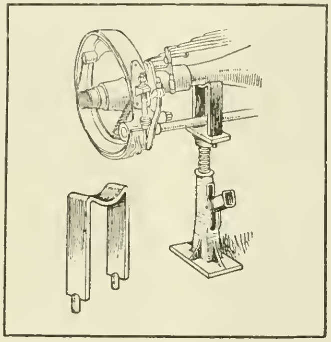


No. 23

No. 24—Stick for Holding Clutch Pedal Down

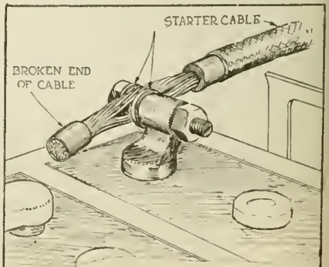
CLUTCH or brake pedals may be held down so that the clutch is thrown out or the foot brake applied during repairs or adjustments by means of a short notched stick. The end of the stick which is laid on the pedal is flat, while the other end is provided with several notches on the lower edge. By removing the driver's seat cushion, the stick may be notched over the front edge of the seat riser to hold the pedal in any desired position. More than one notch should always be cut in the stick so that it may be used for either the clutch or brake pedal.—Motor World, L. W. SOYER, Dunkirk, N. Y.

O help motor truck owners and operators to save money in the maintenance and repair of theis trucks, COMMERCIAL VEHICLE *prints on these two pages better methods of maintaining trucks and the latest ideas in making quick repairs.*

THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 25—Repairing Broken Battery Cable Connection

ON trucks equipped with storage batteries for either lighting or starting purposes, the ends of the battery cables sometimes break off. When this occurs, it is often difficult to get hold of a new battery connection quickly. When this is the case, an emergency repair can be made readily by first stripping the insulation back on the cable for a short distance and prying the strands of the cable apart. The cable can then be slipped over a bolt inserted through the battery connection and washers placed on either side of the cable to hold it tightly on both sides.—Motor World, H. D. MAXWELL, Kinkhill, N. C.



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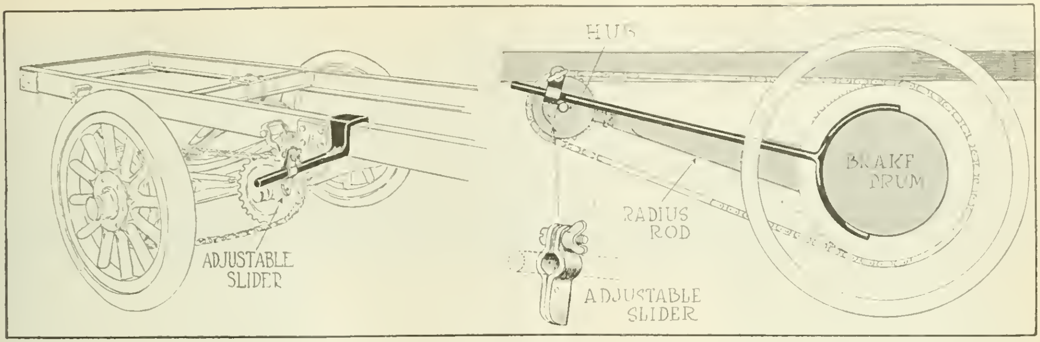
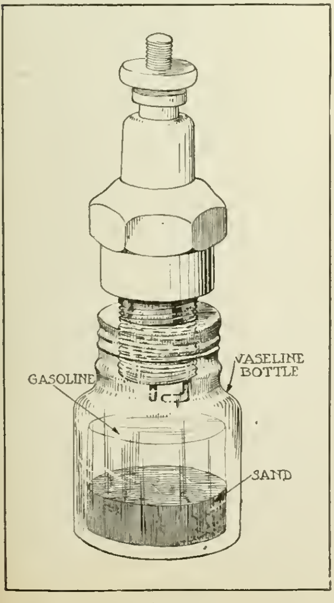


No. 26

No. 26—Two Gages for Fitting Ford Adapters

WHEN the owner of a Ford or other type of passenger car is desirous of converting it into a motor truck by means of any of the chain-driven adapters or attachments now offered on the market, he must make sure that the rear axle is trued up in relation to the frame length added and that the driving sprockets are lined up in the same plane on each side. If this is not done, there will be considerable lost power, due to the increased strain on either one side or the other, if the axle is not true transversely or because of the increased friction set up by the driving and driven sprockets being out of the same straight line. Two simple gages to accomplish these two ends are shown in an accompanying sketch. The first gage is used to adjust the radius rods to the same length on each side. It is made of a bar of 3-8-inch iron or steel with a semi-circular band at one end and a sliding marker on the other. The circular band is of the same diameter as the exterior of the brake drum. In setting the radius rod, the circular band is slipped over the brake drum and the sliding marker moved along the other end until it hits the front side of the jackshaft hub. The marker is then screwed in place and the other side tried in the same manner until the distances on each side are equal. The second gage is bent to fit over the side frame member to check the distance between it and the face of the two driving sprockets. It has a sliding marker which can be screwed up to hold it in position, in order to readily determine and make the distances the same on each side.—H. R. MARKEL, Columbus, Ohio.



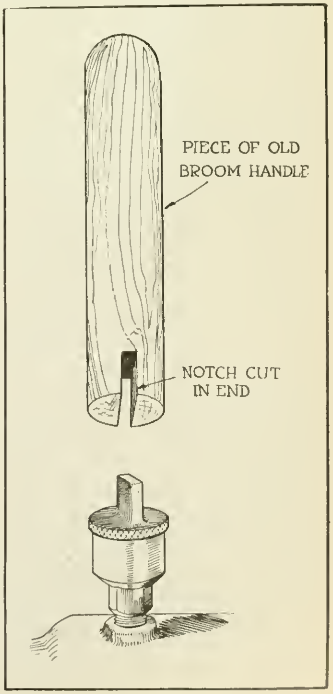
No. 28

No. 27—Wood Handle for Turning Grease Cups

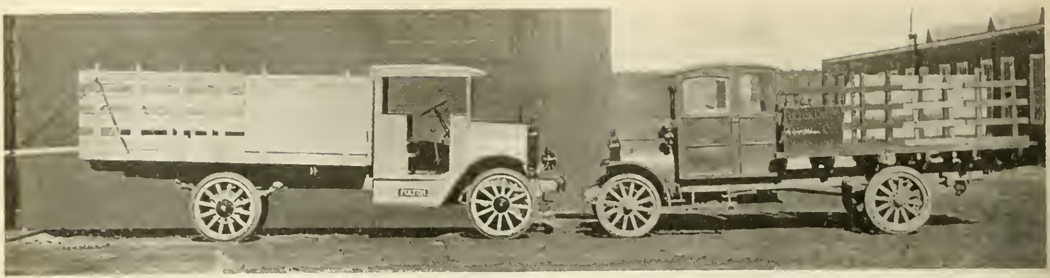
A CONVENIENT handle for turning down the various grease cups fitted on a motor truck chassis may be made from an ordinary broom handle. A slot is cut in the flat end so that the thumb lug or nib of the grease cup will just fit into the slot. The use of such a handle permits the truck mechanic to get at grease cups which are otherwise inaccessible.—Motor World, ROBERT LEIBRICH, Indianapolis, Ind.

No. 28—Cleaning Spark Plug in Bottle

INSTEAD of cleaning the carbon out of a spark plug by means of scraping with a knife, a simpler method is to make use of a small bottle filled with gasoline and sand. Any kind of a small bottle with a screw top will do. A hole is first cut into the metal top or cap and the spark plug screwed into it so that the electrodes are emersed in the gasoline with which the bottle is filled. A small quantity of sand is also placed in the bottle and falls to the bottom, as shown in the accompanying illustration. With the spark plug in place, the whole outfit is then shaken vigorously. The action of the gasoline and the sand cleans the plug easily. The final step is to then rinse the plug in clean gasoline. The gasoline poured in the bottle may serve for cleaning two or more plugs, after which it can be emptied out and fresh gasoline inserted.—Motor World, R. FRANCIS, Los Angeles, Cal.


PIECE OF OLD BROOM HANDLE
NOTCH CUT IN END

No. 27



The Fulton 2-tonner on the left superseded the 1½-ton model shown on the right. The inclosed cab comes as standard equipment on the 2-tonner

Comfort of Driver Considered in Improved Fulton 2-Tonner

FULTON SPECIFICATIONS

Chassis, tons	2
Price	$2,350
Wheelbase, inches	137
Tires, front	34x4
Tires, rear	34x6
Bore, inches	3¼
Stroke, inches	5
N. A. C. C. horsepower	16.9
Speed, r. p. m.	——
Miles per hour	——
Ratio in high gear	10.2 to 1
Final drive	Inter-Gear

THE comfort of the driver has been considered in the Fulton Model C 2-ton truck because a convertible inclosed cab is furnished on each truck as part of the standard equipment. The Fulton Model C, which sells at $2350, has a capacity of 2 tons and replaces the Fulton Model FX which had a rating of 1½ tons.

The Fulton 2-tonner was built with a definite purpose in view, this purpose being to meet the transportation requirements of concerns in the largest number of industries in which 2 ton loads are the maximum under average conditions. The 2-ton truck was considered to meet these requirements better than the 1½-ton truck and the Fulton Model FX of 1½-ton capacity was therefore replaced by the present Model C of 2-ton capacity. The new 2-tonner was also designed to meet the requirements of the farmer and special thought was given to this important class of truck user by devising a set of Ground-Grippers for attachment to all four truck wheels to increase the area of the wheel tread so that the truck may be run over very poor country roads and even through soft ground in the field. These Ground-Grippers come in a set of four and may be purchased as extra equipment at a cost of $100.

The inclosed cab which is furnished as standard equipment on the 2-tonner has one important characteristic not shared by any other form of cab. This new feature is a flexible side curtain which opens up like a door. This is made possible by supporting the curtain at the top from a horizontal rod pivoted at the edge of the permanent cab top. The door curtain has a pocket at the top into which the pivoted rod is inserted. With this done, the curtain may be closed or opened just like a door and held in a closed position by regular curtain snappers along the lower edges.

The characteristic Fulton radiator has been retained but the capacity increased from 5 to 7 gal.

Nor is the cab itself the only item which has been considered for making the driver more comfortable in his work. The upholstery of the seat is 8 in. in depth and the lazy-back of the seat has a wide cushion with springs. A handy space has been left in the back of the seat for the driver's receipt book, papers or gloves. Furthermore, the use of curtains to inclose the cab are of great convenience in that they may be carried permanently at the underside of the stationary cab top so that they are always available for instant use. They do not get lost or damaged, as is sometimes the case when the cab inclosures are made of glass in frames that have to be stored away during the summer months and brought out again at the approach of cold weather.

The auxiliary wheels furnished for the use of the truck in farm work consist of metal rims which are attached to the regular wheels on the outside by means of bolts inserted through lugs on the inner circumference of the bands and through spacers placed between adjacent spokes on the inside of the wheels. The metal bands used on the front wheels are 4½ in. wide with plain treads, and those for the rear wheels, 9 in. wide with diagonal angle-iron lugs, as shown in the illustration at the top of page 227. It is not necessary to remove these Ground-Grippers when the truck has to run over a hard-surface road because the Ground-Grippers do not come into contact with the road owing to the clearance between the regulation rubber tires and the grippers themselves.

The requirements of the user have been further met in the merchandising of the

When the Fulton 2-tonner must run over muddy country roads, these Ground-Grippers may be had at a cost of $100 for a set of four, one for each wheel

trucks in that pneumatic tires, 35x5 in the front and 38x7 in the rear, can be had at a very low additional cost provided the order for such tires is given at the same time as the order for the truck. No electric starting or lighting is furnished as standard equipment, although a special Fulton acetylene searchlight, which may be attached to the cowl in such a manner that it may be operated from the inside of the cab when entirely inclosed, may be had on special order.

When used with a panel body the truck chassis permits the use of a body 12 ft. long. If a dump body is used, its maximum length is 8 ft. 6 in. For express bodies, a 3 ft. tailgate can be used without a detrimental effect through too long an overhang about the rear axle.

The Fulton 2-tonner, Model C, replaced the Fulton Model FX, 1½-tonner offered until the middle of 1919. While following the same general line and employing the same size motor, clutch, gearset and rear axle, the 2-ton truck has many improvements and refinements. The wheelbase has been increased from 136 in. to 137 in. The front tires have been increased from 34x3 in. to 34x4 in. and the rear tires from 34x5 in. to 34x6 in. The characteristic Fulton radiator shape has been retained, although the cooling capacity has been increased from 5 gal. to 7 gal. The filler cap has been changed from a circular cross section to an oblong in order to permit easier filling. The radiator cap is hinged and cannot be lost. Another improvement is the use of thick rubber pads under the radiator casing to absorb road shocks.

Still another improvement made with the user of the motor truck in mind has been the provision of a power takeoff on the gearset housing for hydraulic hoists when dump bodies are used, and for winches, and for mechanical tire pumps when giant pneumatics are employed.

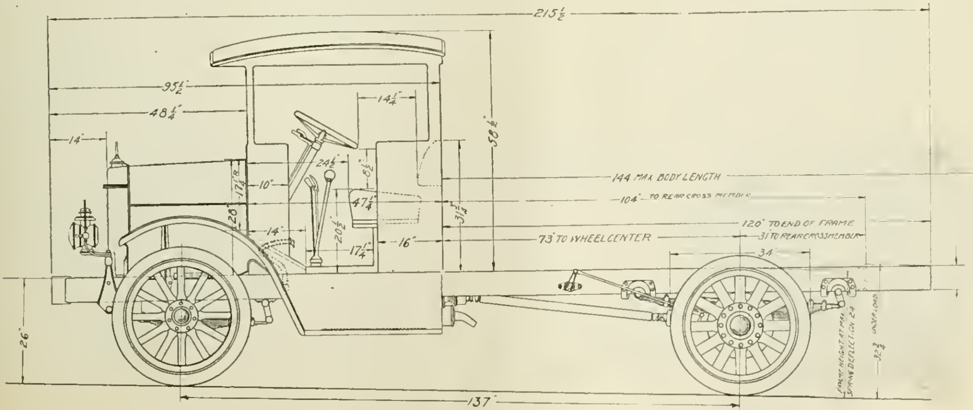
Larger Gasoline Tank

Another improvement is the use of a two-piece propeller shaft with three universals, thus decreasing the angularity of that portion of the propeller shaft nearest the rear axle and of preventing whipping. Provision has also been made for a center bearing with a lubrication sufficient for 5000 miles at each oiling. The service brakes are on the rear wheels but the emergency brake is on the propeller shaft immediately in back of the gearset.

This is the inclosed cab furnished as part of the 2-ton Fulton equipment. Note how the side curtain may be swung like a regulation door

It is 8 in. in diameter and 3 in. wide. Other improvements include a 6-in. steel bumper built in as part of the chassis frame and an increase in the gasoline tank capacity from 13 gallons to 20 gallons with the tank in the dash.

Insofar as the units employed are concerned, the truck is an assembled model using a Herschell-Spillman engine under a curved top bonnet and driving through a Borg & Beck dry-plate clutch to a Durston three-speed selective gearset mounted in a unit powerplant. From the gearset the drive is to a Russel internal-gear-driven rear axle with the springs taking both the torque and propulsion on the Hotchkiss plan. The Lavine steering gear is inclined at the left with the gearshift and brake levers in the center.



Outline of the Fulton 2-ton chassis showing the maximum panel body length of 12 ft. An 8 ft. 6 in. dump body with hoist may be fitted. The inclosed cab dimensions are also given.

Universal Bearing Repair Devices for Ford Fleet Owners

Moss Tire Tool—Continental Table or Machine Shop Work Guaranty

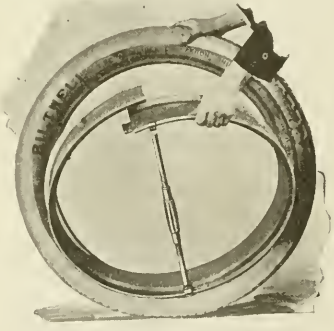
Power Hoist and dump Body for Ford Truck

TRUCK owners operating a fleet of Fords, who wish to save time and money in their maintenance work, will find that they can do so by installing a babbitting jig and boring tool for bearing work. With this equipment, a fleet owner may save time by obviating the need of sending a cylinder block away for replacements. This compels him to be without his truck for several days, or even weeks. With one of these equipments, the truck can be out the same day, the actual work requiring only 20 minutes.

One of these equipments is made by the Universal Tool Co., Detroit. It includes a furnace, firepot, metal pot, tool ladles, babbitting jig and a self-aligning boring bar with clamps. The babbitting jig is also self-aligning and made up of three split bearing moulds and a bar. It provides 1/32 inch of metal for finishing all bearings.

No cutting is required to release it after the metal has become solid, and furthermore, the metal is prevented from entering the tapped bearing stud-holes. The fixture which aligns the boring bar gets its location from the camshaft holes. This is accomplished by a solid bar that extends the entire length on the outside at both ends of the cylinder casting. The locating arms also act as the bearing for the boring bar. The boring bar has three cutters so arranged that all three bearings are machined in one operation. A duplicate set of cutters is part of the standard equipment.

It requires about 10 minutes of turning to complete the bores. Either automatic or manual feed can be used, this being accomplished through a cam on the boring bar. The feed screw advances .01 inch per revolution and has a rapid return of four threads to the inch. The cutters are inserted in the bar and held in place by headless set screws. The price for the complete equipment it $140.



Moss tire tool being applied

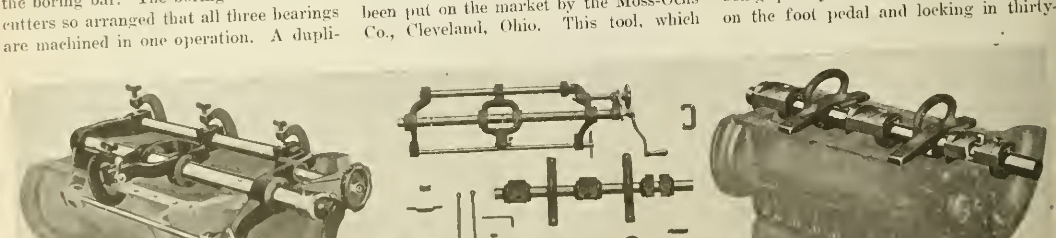
Moss Tire Tool

FLEET owners who have experienced trouble in changing tires on split rims, will be interested in a tool that has been put on the market by the Moss-Ochs Co., Cleveland, Ohio. This tool, which weighs about 3 pounds, is but 12 inches long and sells for $2. No prying or hammering are needed in its operation. A tire can be taken off or put on quickly by simply clamping the tool on the rim, twisting a buckle to expand or contract the rim. The tool consists of three pieces, a buckle and two hooked rods which are threaded to screw into the buckle at both ends.

Continental Shop Table

WASTE of time and effort in a fleet owner's machine shop are instrumental in increasing maintenance costs. Feet owners, who wish to solve this problem, should equip their machine shops with equipment that will speed up work and eliminate waste efforts. On ordinary assembly, jig and die work, welding, and all kinds of bench work, an assembly and welding table, such as is made by the Continental Auto Parts Co., Knightstown, Ind., will be found valuable. The table is designed to bring the work to the man instead of the man going to the work. It is heavy enough to stand rough treatment and is finished so that it may be used as a face plate and layout table.

When this table is being used, for instance, for layout work, all parts of the work are quickly brought to the most convenient position and to the best light. The table revolves on ball bearings and being quickly released by merely pressing on the foot pedal and locking in thirty-



Universal babbitting jig and boring tool for bearing work on Ford engines. The boring tool is at the left of the illustration, the complete equipment in the center, and the babbitting jig at the right six different positions, does not make it necessary to remove the hands from the work while changing the position of the table. On the ordinary type of work bench it is necessary to constantly lift and change the work in order to get at the various parts. A great amount of valuable time is lost. Besides, the effort required tends to tire out the mechanic.

In welding work, the Continental table will speed up production and a greater saving will be effected in gas, for usually the welder allows his torch to burn while making the necessary changes in the position of the article which he is welding. The top of the table being machined, makes lining up of the parts to be welded very easy. In hand riveting operations, the revolving table allows the entire job to be turned instantly, without delay to the welder and without loss of gas. The table is heavy enough to use as an ordinary anvil.

The Continental table being used for welding work. Note the foot pedal revolving the table

The tables are made in two sizes of 24- and 32-inch diameters. The smaller size sells for $70 and the larger for $85.

Guaranty Hoist for Fords

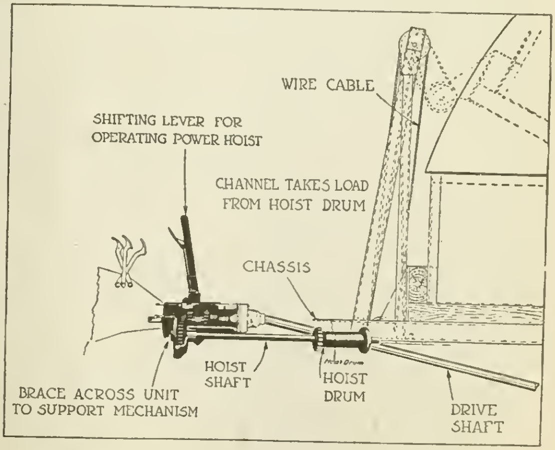
FLEET owners operating a line of Ford trucks, who wish to equip these trucks with a power hoist and dump body, will be interested in a hoist and dump body equipment which has been put on the market by the Guaranty Motors Co., Boston, Mass. This hoist is designed for installation on the Ford in such a manner that the engine low-speed raises it and the reverse lowers it. The equipment consists of a cast steel housing in which are incased the chrome nickel steel gears and shafts which are attached to the rear of the Ford transmission.

Leading out of this housing is a shaft having a drum on its rear end. On this drum is a cable which winds up in connection with an upright channel steel beam on which are pulleys. A ratchet operating on the drum serves to hold the body in a raised position to facilitate spreading the load, etc.

Operation is effected by placing the Ford high-speed lever in a neutral position, throwing the hoist lever forward and pressing the low-speed pedal. The power is directed through the gears to the pulley and cable and the body is raised to its unloading position in a few seconds. It is lowered by the use of the reverse pedal. The cost of the complete hoist is $200; or with 40 or 70 cu. ft. capacity dump body, $400.

The body and hoist can be attached to any truck having a Ford power plant, including the Ford 1-ton worm-driven truck.

Guaranty power hoist and dump body installed on a Ford 1-ton truck chassis


WIRE CABLE
SHIFTING LEVER FOR OPERATING POWER HOIST
CHANNEL TAKES LOAD FROM HOIST DRUM
CHASSIS
HOIST SHAFT
HOIST DRUM
BRACE ACROSS UNIT TO SUPPORT MECHANISM
DRIVE SHAFT

Mechanism and method of installing Guaranty power hoist, driven from the Ford engine

The Editor's Viewpoint

At Last—A Real Truck Show

FOR the first time in the history of the motor truck industry in the United States, present and prospective owners of trucks will in January of next year have an opportunity of visiting a real motor truck show—that is, a real show from the truck user's viewpoint. Too many of the previous shows have been makers' and dealers' shows rather than users' shows, with the result that the number of real truck owners and prospective owners who visited such exhibitions has been very small. Truck owners have benefited little from such shows for the reason that no attempt was made to do anything but exhibit inanimate objects, such as vehicle chassis, which could just as well have been seen at the showrooms of the respective makers.

In 1920, the plans now being made for the motor truck shows in both New York and Chicago have something entirely different in store for the present truck owner, whether he operates one truck or a fleet of 100, as well as for the prospective fleet owner—the businessman who now uses horses and is looking for a way to replace them with motors.

This something different to be given at the 1920 truck shows consists of Highway Transport Conferences at which all important topics affecting the choice, operation and maintenance of large and small fleets of motor trucks will be discussed by authorities in each respective branch of the work. These conferences will be held each afternoon and evening during the progress of the shows in both cities. They will not interfere with the practice of examining the various truck models exhibited with a view to determining what progress has been made in design since the last show, but will actually help to make this study of the trucks of more value because the chassis will be looked at from the operation and maintenance angles rather than as a mere piece of machinery.

There will be talks on why and how to keep truck operating costs; how to route trucks in different lines of business; how to load trucks with different classes of goods in a cheap and quick manner; on the value of giant pneumatic tires and different types of trailers and on how to establish and operate rural motor truck express lines and overland haulage companies. In addition to these topics there will be many others, including a discussion of truck maintenance problems. The plan is to make both the Chicago and New York shows of real value to the truck owner. With this intent, every fleet owner should take advantage of the opportunity by sending his traffic manager and maintenance superintendent to each of the sessions for what they add to their fund of operating and maintenance knowledge.

Controlling Truck Drivers

THE labor unrest now so prevalent throughout the country is at last penetrating the ranks of the truck drivers and helpers, as exhibited by several serious strikes of these men during the past month. This problem has become so serious that fleet owners should make an analysis of the methods used to handle their men.

The problem of labor control is a big one and one which cannot be solved by a mere wave of the hand. It needs study, and lots of it. Speaking broadly, the great majority of truck drivers are well paid, although there may have to be a slight increase in wages to help offset a part of the increased cost of living. Aside from that, there is one fundamental which helps to reduce labor unrest. That fundamental is to make the work of the driver as easy as possible and make him as comfortable as possible during the performance of his work. Full loads, elimination of work duplication and closed cabs, heated by utilizing the exhaust engine gases, may go a long way in making more contented drivers. Then there is the method of making the driver a partner in the truck he operates. All these things help. But the big question is, What are you doing to make the lot of your drivers and helpers more easy, to keep them contented and prevent costly strikes?

The Fleet Owners' Forum

> *DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.*

Officers of the Bay State Motor Truck Club

To the Editor, COMMERCIAL VEHICLE:

Please give us the names of the officers of the newly formed Motor Truck Club of Massachusetts. Please also give the address of the association.—M. M., New York City.

The officers and directors of the Motor Truck Club of Massachusetts are as follows:

J. S. Hathaway, President; J. W. Maguire, Vice-President; Day Baker, Treasurer, and Chester I. Campbell, Secretary.

Directors—J. S. Hathaway, J. H. MacAlman, Day Baker, H. W. Bowman, J. W. Maguire, A. T. Fuller, E. A. Gilmore, C. P. Rockwell and N. H. Halliday.

The correct name of the association is the Boston Commercial Motor Vehicle Assn., Inc., with offices at 5 Park Square, Boston, Mass.

Five Kinds of Motor Truck Insurance Policies

To the Editor, COMMERCIAL VEHICLE:

Will you please give us answers to the following questions regarding insurance on motor trucks:

1—To what extent to truck owners in America carry insurance?

2—What forms of coverage are most generally carried?

3—To what degree is the carrying of insurance influenced by location?

4—Are blanket policies issued covering all risks in one policy?

5—Can a fleet owner secure a blanket policy covering all risks for all his trucks or certain risks for all of his trucks?

6—What is the average cost for the various forms of coverage?—MOTOR AGE, Chicago, Ill.

Answers to your questions in the order given are as follows:

1—The question of motor truck insurance as the sixth item of the Big 8 in Truck Operation was discussed on pages 14 and 15 of THE COMMERCIAL VEHICLE for July 15, 1919. In general, there are five separate and distinct forms of motor truck insurance and policies, including:

1—Liability.
2—Collision.
3—Fire.
4—Theft.
5—Insurance on the goods carried.

A great majority of motor truck owners carry only three of these different types of policies, including liability, fire and theft. These three forms of policy generally cost as much combined as the collision policy alone. Insurance on goods carried is taken in only a small number of cases, particularly by lines of public carriers.

2—See answer to question No. 1.

3—Location has considerable to do with carrying insurance, especially in the determination of the premium rate.

4—Blanket policies are issued covering all forms of risk. The A. A. Cervantes Co., La Salle Bldg., St. Louis, Mo., is one company which writes blanket policies for trucks.

5—A fleet owner can secure a blanket policy covering all risks or certain risks for all his trucks.

6—It is impossible to give the average cost for the forms of coverage because what might be a high rate in one case might be exceedingly low in another. Motor truck insurance rates are determined under four main heads, as follows:

1—The class of business.
2—The cost of the truck and its age.
3—The particular business in which the truck is engaged.
4—The particular locality in which the truck works.

In the first class, all businesses are divided into seven general classifications under which almost any given business can be placed. In the second instance, it is evident that the rate of interest should be more on a high-priced truck than on a low-priced one. It is also evident that the question of the age of the truck when insured should be taken into account. The business in which the truck is engaged also affects the rate, since the risk in some businesses is far greater than in others. In regard to the factor of location, it is evident that in some sections of the country where there are a large number of trucks in use, with consequent vehicular congestion, there is a greater liability of damage due to collision.

The A. A. Cervantes Co. mentioned above writes a blanket $3,000 insurance policy on goods carried on the trucks of the Progressive Transfer Co. for a $75 premium, as told in greater detail in THE COMMERCIAL VEHICLE for July 1, 1919.

Industries Which Use Fleets of Motor Trucks

To the Editor, COMMERCIAL VEHICLE:

Please give us the answers to the two following questions.

1—What capacity, type and make of motor truck predominates in New York City and environs?

2—What lines of industries are users of motor trucks to the extent of fleets?—C. B. S., Clintonville, Wis.

We have no records which show what makes of trucks predominate in use in New York City and its environs. In fact, we do not believe that there is any one make which predominates, for the reason that there are so many lines of industries in which trucks are used in New York City which require trucks of small, intermediate and large sizes that a great many makes will be found to have equal representation according to capacity. If you want to determine which make of truck is in greatest use, irrespective of capacity or industry, we can suggest one method by which this data can be obtained. That is to have some one at the registration office in the state capitol at Albany go over the entire list of approximately 100,000 trucks in use in New York State and pick out those registered from New York City and environs, putting down these registrations according to the make of truck.

This work can generally be done by someone in the Secretary of State's office at a nominal sum of from 1 to 2 cents per name. Or the Secretary of State may suggest the name of some concern to do the work.

2—There are almost an unlimited number of industries in which motor trucks are now operated as fleets. However, THE COMMERCIAL VEHICLE has endeavored to simplify this list and has reduced it to thirty-nine different heads as follows:

1—City Transfer
2—Overland Hauling
3—Passenger Transportation
4—Government Service
5—Municipal Service
6—Farmers
7—Mining
8—Food, Wholesale
9—Food, Retail
10—Fuel
11—Oil
12—Lumber
13—Packers
14—Millers
15—Drug, Chemicals
16—Textile
17—Machinery
18—Road Construction
19—Building Construction
20—Paper Manufacturers
21—Containers
22—Publishers
23—Leather Products
24—Hardware, Paints & Oils
25—Glass Manufacturers
26—Beverages
27—Feed & Grain
28—Department Store
29—Wearing Apparel Manufacturers
30—Household Goods
31—Tobacco
32—Livestock Hauling
33—Ice
34—Ice Cream
35—Confectioners
36—Laundries
37—Florists
38—Motor Trade
39—Miscellaneous

Articles on How to Get Rid of Horse Wagons

To the Editor, COMMERCIAL VEHICLE:

I note on page 90 of the September 1, 1919, issue of THE COMMERCIAL VEHICLE that there is an article entitled "Getting Rid of a Mixed Fleet of Horses and Trucks." I will appreciate it if you will tell me in what other issues of THE COMMERCIAL VEHICLE similar articles have appeared regarding the replacement of horses by either gasoline or electric trucks.—A. P. LEKKHART, Utica City Ice Co., Utica, N. Y.

A second article on "How a Lumber Merchant in a Small Town Got Rid of His Horses" was published on pages 140 and 141 of THE COMMERCIAL VEHICLE for September 15, 1919. Other articles telling how concerns in different lines of industry have replaced their horse-drawn equipment by trucks will be published in succeeding issues of this magazine.

Makers of Hoists and Truck Engine Stands

To the Editor, COMMERCIAL VEHICLE:

Will you please give us the names of concerns which manufacture the following truck garage equipment:

1—Hoists or cranes for lifting engines out of truck chassis.

2—Stands for testing engines.—P. L. CRIBLET, Baltimore, Md.

The following list gives the names and addresses of firms prominent in the manufacture of portable cranes such as can be used for lifting engines out of truck chassis:

Canton Foundry & Machine Co., Canton, Ohio
Cleveland Chain & Mfg. Co., Cleveland, Ohio
Keystone Garage Equipment Co., Boston, Mass.
Klemme Mfg. Co., A. C., Davenport, Iowa
Franklin Moore Co., Winsted, Conn.
New Jersey Foundry & Machine Co., New York, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
U. S. Auto Bumper Co., Chicago, Illl.
United Engine & Mfg. Co., Hanover, Pa.
Weaver Mfg. Co., Springeld, Ill.
Wengraf Auto Hoist Co., Naugatuck, Conn.

Some prominent makers of engine repair stands are as follows:

Central Brass & Fixture Co., Springfield, Ohio.
Continental Auto Parts Co., Knightstown, Ind.
Hershell-Spillman Motor Co., North Tonawanda, N. Y.
Showalter Mfg. Co., Springfield, Ohio.
United Engine & Mfg. Co., Hanover, Pa.

Truck Increase in Four States for 6 Years

To the Editor, COMMERCIAL VEHICLE:

Will you please publish in your Fleet Owners' Forum Department the following information:

1—The increase in the motor truck registration for the four States of New York, Massachusetts, Connecticut and New Jersey from 1912 to 1918, inclusive.—MR. ELLIOTT, New York City.

Below are the registration figures for the States of New York, Massachusetts, Connecticut and New Jersey for the years of 1912 to 1918, inclusive:

NEW YORK

Year	*Registered Trucks*
1918	92,979
1917	55,402
1916	34,653
1915	23,288
1914	14,864
1913	9,000
1912	7,606

MASSACHUSETTS

1918	33,011
1917	26,964
1916	18,194
1915	11,960
1914	8,236
1913	5,948
1912	4,087

CONNECTICUT

1918	15,051
1917	9,702
1916	7,759
1915	4,847
1914	2,395
1913	[illegible]
1912	[illegible]

NEW JERSEY

1918	15,601
1917	9,662
1916	5,000
1915	3,616
1914	*
1913	2,000†
1912	1,000†

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*No registration figures given for trucks separate from passenger cars.

†Estimated registration.

Articles on Tags and Forms for Package Delivery

To the Editor, COMMERCIAL VEHICLE:

Will you please tell us in what issues of THE COMMERCIAL VEHICLE there have been articles describing and illustrating the various forms, receipts, tags and operating and maintenance sheets used in connection with motor trucks in department store deliveries. —C. F. NELSON, Merchants Assn. of New York, New York City.

Articles with which forms, receipts, etc., for department store work were published in the following issues:

June 1, 1918, page 23. An article on the organization of a co-operative delivery system for small retail merchants such as grocers, shoe dealers and the like, as well as department stores. Reproductions of the tags and forms used form part of the article.

November 1, 1918, page 43, has an article entitled, "Cost of Savannah Package Delivery Is Reduced 25 Per Cent by Co-Operative System." That article tells how a co-operative delivery company serving all of the department stores in Savannah uses electric trucks for the rural delivery and hand trucks to transfer the packages from the various stores to the co-operative company's sorting plant. Filled out forms such as are used by the parcel delivery company are reproduced in full.

December 1, 1918, pages 5 to 8, include reproductions of the driver's paid and charge route sheets, the C. O. D. sheet and the two-part call sheet as used by the Gus Blass Co., the leading department store of Little Rock, Ark.

No Hub Odometer that Gives Duration of Stops

To the Editor, COMMERCIAL VEHICLE:

Will you please tell us where we can purchase a motor truck hub odometer which will give the time of stops as well as the trip mileage and daily mileage. We have searched for weeks and have been unable to locate the maker of such a device.—FRED J. SMITH, Oshkosh, Wis.

After a thorough search of our records we find that there is now actually on the market no device which registers the time of stops as well as the trip and daily mileage. However, such a device was made in 1914 by the Knopf Bros. Mfg. Co., New York City, and the apparatus was described on page 32 of THE COMMERCIAL VEHICLE for July 1, 1914. The Knopf company has apparently gone out of business, as we have been unable to reach it either by telephone or letter.

As described in THE COMMERCIAL VEHICLE for July 1, 1914, the device was mounted directly on the wheel hub and driven without the use of driving gears, shafts or cable connections. Every movement of the vehicle was recorded upon the paper tape, showing the time the vehicle left the garage; the number of miles covered; the number of stops made and the duration of each; the number of miles covered between stops; the rate of speed; the time the vehicle was returned to the garage; the total time consumed and the total mileage covered. The total mileage was shown not only on the paper tape but also in figures in the form of a mileage counter which registered up to 10,000 miles and which automatically repeated but which could not be reset at will.

Of course, the July 1, 1914, issue of THE COMMERCIAL VEHICLE is long since out of print, but you can have access to it at the Chicago Public Library.

Gasoline and Oil Mileages by Truck Size

To the Editor, COMMERCIAL VEHICLE:

There has been some discussion here regarding the average mileage attained by motor trucks and the average fuel and oil consumption. We are taking the liberty of asking you for your opinion regarding these items.— L. A. JACOBS, Texas Co., New York City.

It is very difficult to give any accurate average figures on gasoline or oil consumption of motor trucks because these vary greatly, even with the same makes and capacities of trucks according to the conditions of loading and roads. For instance, some truck owners who load their 3-ton trucks with 3½ to 4 tons of goods naturally have a higher gasoline and oil consumption per mile than do other truck owners who carry only 3 tons of load in 3-ton trucks and others whose trucks run only partly loaded on one leg of the trip and empty on the return run.

Roads also have a considerable influence on gasoline and oil consumption as it is evident that trucks running over well-paved city streets will naturally consume less gasoline per ton-mile than the same vehicles would traveling over semi-improved country roads.

The following figures may be taken as a rough approximation of the gasoline and oil consumption of the various sizes of trucks:

Truck Capacity Tons	Gasoline M. P.G.	Oil M. P.G.
½	12 to 14	200
1	10 to 12	200
1½	9 to 11	180
2	8 to 10	175
3	6 to 7	150
3½	5 to 6	150
5	4 to 5	100

If by mileage obtained you mean average daily mileage, we would say that it is generally assumed that motor trucks of all capacities have an average daily mileage of somewhere between 30 and 40 miles. This is of course a mere estimate, since the great diversity of motor truck use requires that some vehicles cover 100 miles in a day on long-haul work and others in city deliveries, only 10 or 15 miles.

If by average mileage obtained you mean the life of the truck in miles instead of years, we would say that it is becoming customary to gage the life of a truck by the number of miles it will run rather than the number of years. This is due to the fact that, as a general thing, a truck wears out in proportion to the number of miles it is run. Some trucks which cover a small mileage yearly will undoubtedly last longer than those which cover a greater mileage, so that the mileage basis gives a more scientific method of estimating truck life and truck cost.

The total mileage which any make of truck might be expected to cover before being worn out is a very difficult question to answer because of the great variety of the work in which the trucks are engaged. As a general rule, however, the mileage life is assumed to be somewhere between 100,000 and 150,000 miles. The White Co. has recently advertised that it has many trucks which have run far in excess of 100,000 miles and are still giving service. The Packard Co. figures that its trucks should give at least 150,000 miles of good service if maintained with proper care and supervision.

The mechanical condition of a truck also has a great deal to do with the number of miles which can be obtained from a gallon of gasoline or a quart of lubricating oil. Some five-ton trucks in operation in New York City today only average between two or three miles to a gallon of gasoline. This is due principally to the poor condition of the truck engine. Then again the character of the work performed has a large influence on the gasoline consumption. Trucks which are operated on short routes where the stops are frequent and where the engines are allowed to idle while the deliveries are being made, naturally have a smaller mileage per gallon than the same make of truck operating over a long route with but a few stops.

In figuring the miles per gallon obtained from engine lubricating oil, the frequency at which such oil is drained from the crankcase and replaced by new oil has a considerable influence. Some truck owners renew their oil completely every five hundred miles, while others change at 1,000-mile intervals.

Pride Makes Plea Against Overloading To Save Trucks and Highways

EDITOR'S NOTE: *Mr. Pride is well known among large fleet owners as the president of the Heavy Haulage Co., New York City, which operates a fleet of ninety trucks in all kinds of difficult highway transportation. Mr. Pride was one of the regional directors of the Highway Transport Committee of the Council of National Defense and in that capacity had an excellent opportunity to study highway transportation in all parts of the country. He also used a fleet of fifty 2- and 5-ton trucks in the building of the big United States explosive plant at Nitro, W. Va., and is especially well qualified to discuss the necessity for sane loading for the sake of the truck fleet owner as well as to preserve what roads we have until new and better ones can bebuilt.*

To the Editor, COMMERCIAL VEHICLE:

The writer would like to draw your attention to one of the present menaces to the welfare of the motor truck user, and also to the general condition of the highways of this country. The writer has been very active in investigating hauling conditions in several states, more particularly New York, Connecticut, New Jersey, Pennsylvania, Massachusetts and Ohio.

He has found that almost universally throughout these various states the local authorities paid no attention whatsoever to the enforcement of the law regarding the gross weight of vehicles permitted to operate over the highways. It apparently made no difference whether a 5-ton truck carried a 5-ton load or whether it carried a 9-ton load, although even the most ardent partisan of motor trucks will acknowledge that an overload on the truck not only seriously damages the truck and tires but causes an infinitely greater damage to the highways as time goes on. The reason for this overloading is very apparent.

During 1918 many people who never operated motor trucks before engaged in that business with the idea that it was very lucrative. With the coming of the armistice and cessation of war activities, a great number of people who had purchased motor trucks on the partial-payment plan were confronted with the probability of little or no business, but payments on their trucks were still to be made regularly. The consequence was that the owners of such trucks became panic-stricken, and in most instances rather than accept a lower compensation per day, endeavored to hold their business, or increase it, or develop it in other lines where the work would only be done at a certain price per day, provided the trucks were grossly overloaded. Very rapidly the purchasers of truck service realized that with little or no pressure they could develop a greater output from the trucks they were hiring by insisting on overloading.

Persistently, but with great rapidity, this problem of overloading has swept throughout the country. In many cases, however, this overloading has declined within the last few months owing to the fact that many of the operators of motor trucks who permitted this practice have been forced out of business due to the breakdown of the trucks and also to the fact that the purchasers of this kind of service who had good business judgment rapidly realized that they were getting a much lower grade of service with increased breakdowns and increased lack of lubrication, owing to the abuse of the trucks which are not made with a sufficient margin of safety to permit much, if any, overloading.

The writer is also of the opinion that, in one or two instances where motor trucks are manufactured in the cities where this overloading exists, motor truck manufacturers from other territories have made a concerted drive to oust the local trucks from their home city. This has led to a concerted acquiescence on the part of all the truck agents to the overloading of the trucks which they are selling their customers in those cities. The most interesting thing about this development, however, is that the writer found practically no trucks more than a year old in these two particular cities. Everything else had gone to the scrap heap very rapidly, and the scrap heap seems to show every sign of greatly increasing in size because these new trucks through this overloading are becoming junk momentarily.

It would seem to the writer that your paper could confer a great benefit on the owners of motor trucks, the commercial public which uses motor trucks and greatest of all, the general public who pays for the highways on which the trucks are operated, by insisting that the law regarding weight limitation be enforced in each community in accordance with the regulations in the statutes.—GEORGE H. PRIDE, President. Heavy Haulage Co., New York City.

New Packing Rules in Effect Dec. 10

New Ruling Regulates Type of Container According to Weight of Package

NEW YORK CITY, Oct. 3—Fleet owners who handle goods to be shipped by express, should not accept from shippers goods which are not packed according to the new ruling of the United States Railroad Administration that goes into effect Dec. 10, 1919. Briefly, this new ruling makes it necessary for shippers to use containers of wood or fibreboard, pulpboard or corrugated strawboard of a specified test strength, for all shipments over 25 lbs. This means that hereafter paper wrapping and ordinary paper boxes will only be permitted for packages up to the 25-lb. limit.

Slade Receives Discharge

NEW YORK CITY, Oct. 10.—Arthur J. Slade, who organized and directed the Engineering Division of the Motor Transport Corps, has received his discharge from the army after 2 years' service in the United States and American Expeditionary Force. He has resumed practice as a consulting engineer at his offices in this city. Mr. Slade was also in the Army of Occupation, during which time he made a collection of German military trucks of all types for the purpose of engineering research by the War Department.

Packard to Increase Output

DETROIT, Oct. 10—Both an increase in output and a more uniform production of the various sizes of the truck it builds will follow the completion of an addition now under construction at the Packard Motor Car Co.'s factory. With these expanded facilities, the Packard company will be able to turn out three sizes of trucks, for instance, its 2-, 3-, and 5-tonners, simultaneously. So far, the Packard company has had to run on one size until a sufficient quantity was on hand, then change over its tools, jigs and fixtures for a run on another size. This limitation affected manufacturing costs and was more keenly felt in the matter of deliveries. The Packard company is planning for a steady production of about 1,000 trucks a month.

Buses for St. Louis

ST. LOUIS, MO., Oct. 10—Motor bus companies will be permitted to operate in St. Louis in competition with street cars, according to City Counselor Danes, who has just granted permission to the Fifth Avenue Coach Co. and the National Motor Bus Co., both of New York City, and the St. Louis Motor Transportation Co. Each company submitted plans to the city officials for the operation of 150 buses on nine routes and said they would be ready to operate within 90 days. Two types of buses will be used, one seating fifty-two passengers and the other eighty-four passengers. The fare will be 10 cents. The same fare will be charged for an entire trip or any part.

When each bus has its entire seating capacity filled the doors will be closed, no strap hangers being carried. The cost of each bus will be $10,000. All will be double-decked, the upper deck being reserved for smokers. The weight of each bus, fully loaded, will be 19,000 lbs.

New St. Louis Bus Line

ST. LOUIS, MO., Oct. 10—A license has been granted the Progressive Transfer Co., St. Louis, for the operation of a motor bus line between Belleville and Scott Field, Shiloh and O'Fallon, all suburban towns within 25 miles radius of East St. Louis. A 5-cent fare will be maintained between the Belleville Public Square and points along Illinois Street and Lebanon Avenue, Belleville. The fare to Scott Field and O'Fallon will be 25 cents and to Shiloh 20 cents. Construction of a cinder road from Shiloh to Scott Field, a distance of 1½ miles, has been started. The Progressive Transfer Co. has hitherto confined the operaton of its truck fleet to the transfer and heavy hauling business in St. Louis and nearby points.

St. Louis Mechanics Unionize

ST. LOUIS, MO., Oct. 10—A mass meeting of truck mechanics and helpers, held at Central Trades and Labor Union Hall, St. Louis, Oct. 9, was attended by over 600 mechanics, more than 500 of whom applied for membership in Local Union, No. 41, International Assn. of Machinists. This is the first time this class of machinists have been organized in St. Louis, although many have been members of other organizations. There was a general discussion of the different wages paid in different shops, although both classes of workmen do the same kind of work in all shops. There will be a movement looking forward to standardization of pay and efforts will be made to organize truck drivers for large business houses that carry on their own repairs.

Packard Service in Atlanta

ATLANTA, GA., Oct. 2—The Packard Motor Car Co. has opened a parts supply depot in this city, to take care of the truck service work in Tennessee, North Carolina, South Carolina, Alabama, Mississippi, Georgia, Florida, eastern Louisiana and a portion of Virginia and Arkansas. Packard fleet owners in all of these states will be able to save 10 days to 2 weeks on freight shipments from the Detroit factory. R. J. Henderson is in charge of the depot.

Gimbel Eliminates Sidewalk Loading

New Addition Enables Company to Relieve Congestion of Transfer Trucks

NEW YORK CITY, Oct. 14—Sidewalk loading at the Gimbel Brothers department store in this city will be a thing of the past after Nov. 15, 1919. At that time, a new addition will have been completed by means of which all of the truck loading will be inside instead of on the sidewalk where pedestrians and inclement weather have made the loading most inefficient ever since the store was opened 9 years ago.

In the new addition, the loading of the gasoline trucks used for transfer work between the main store and the sub-stations in the outlying territories has been segregated from the loading of the electric trucks used for city deliveries. The transfer trucks are loaded in a runway level with the street, the trucks entering from one street and leaving on the next. This reduces vehicular congestion in that there is no crossing of the lines of entrance and exit. The trucks in this runway are loaded from hampers brought from the delivery department by means of two large elevators and pushed to the truck tailgates.

The electrics are loaded in the subbasement of the new addition which is three stories below the street level. They are carried to the sub-basement by means of two large elevators in the runway level with the street. One elevator is used to take the electrics down and the other to bring them up, so that there is no crossing of the incoming and outgoing vehicles. A more complete article with illustrations showing the runway layout will be published in one of the coming issues of THE COMMERCIAL VEHICLE.

Newark Service Association Formed

NEWARK, N. J., Oct. 3—Fifteen service managers met here last night and effected the temporary organization of the Newark Automotive Service Assn. The new association will be patterned after the New York City association, which was formed in the early part of September. That association was organized with the avowed purpose of improving and facilitating co-operation between the automotive industry and the owners of its products through efficient service by promoting: 1—Meetings for discussion of problems and solutions. 2—Education and welfare of automotive mechanics. 3—Interchange of ideas, and 4—Establishment of kindred organizations.

Truck Weights Are Limited in Illinois

New Law, Effective Jan. 1, Also Regulates Width of Truck and Load on Tires

CHICAGO, Oct. 9—Detailed regulation of motor trucks is provided for in the new Illinois Motor Vehicle Law, which becomes operative Jan. 1, 1920, and copies of the measure which have been presented to motor truck manufacturers and owners by the Chicago Motor Truck Owners' Association are being studied carefully.

The weight limitation stipulated is 16,000 lbs., or 8 tons, on any axle of any vehicle; the gross weight, including the weight of the vehicle and the maximum load, must not exceed 800 pounds per inch of the average width of tire of the road wheels; and the width of the truck must not exceed 8 ft., except in loads of loose hay, or similar farm products. Where trailers are used the combined length of the truck and trailers must not exceed 65 ft., except by special permits.

Flanges on metal tired motor trucks are prohibited, and rubber or other resilient tires are required. Certain types of anti-skid devices so constructed as to come in contact with the pavement are also prohibited.

Under the new law, trucks are taxed according to their gross weight, instead of by horsepower, as before. Under the old law, trucks with engines of 10 hp. or less were taxed $4.50; of 10 to 25 hp., $6; of 26 to 35 hp., $9; and of 36 to 50 hp., $16. Under the new law, the license fees vary according to the weights of the trucks, as follows:

(a) Vehicles having a gross weight of 5,000 lbs. or less, $12.

(b) Vehicles having a gross weight of more than 5,000 lbs., $22.50.

(c) Vehicles having a gross weight of more than 12,000 lbs., $35.

(d) Vehicles having a gross weight of more than 15,000 lbs., $60.

Penalties ranging from $10 to $100 are fixed for the violation of certain sections of the law, and a lien is created for damages. The usual regulations about number plates, lights and dimmers or anti-glare devices are included.

Speed regulations specify that in the case of light trucks of 5,000 lbs. or less, the rate may be 25 m.p.h., if equipped with pneumatic tires, or 20 miles if equipped with rubber tires. Trucks having a gross weight of 5,000 to 12,000 lbs. are allowed a rate of 20 m.p.h. with pneumatic tires, and 15 m.p.h. with rubber tires. For trucks which come in the classes over 12,000 lbs., 12 m.p.h. is permitted. Special permits may be obtained in particular cases for the waiving of weight regulations.

The provisions for safety and for prevention of the theft of trucks occupy many pages of the law. Certain sections prohibit the destruction, altering or defacing of the engine, and the sale, ownership or possession of motor vehicles where the engine or other numbers have been destroyed. Public garages are required to keep records of vehicles garaged and make reports to the proper authorities.

The law creates a road fund for the disposition of license fees, and provides that this fund be used to discharge the bonded indebtedness of the state incurred in the construction of highways, and any surplus for the improvement of the state highways.

Daily Road Bulletins

ROCHESTER, N. Y., Oct. 5—The Automobile Club of Rochester has adopted a method of notifying the police department daily as to the condition of the roads leading out of the city. A copy of this report is furnished to traffic officers, also a route card showing the best routes within a 100-mile radius of the city.

New Weston-Mott Axle Service

DETROIT, MICH, Oct. 2—Owners of trucks using Weston-Mott axles will now have to obtain parts from the Puritan Machine Co., which has purchased from the General Motors Corp. the axle business of the Weston-Mott Co., Flint, Mich. The Puritan company will move the stock to its main plant in Detroit.

Ship-By-Truck for St. Louis

ST. LOUIS, MO., Oct. 8—The St. Louis Chamber of Commerce has plans to make October 25 a ship-by-truck day and is attempting to proclaim the day as such. A parade of motor trucks will be the feature of the celebration.

Louisiana to Complete Road Sections

NEW ORLEANS, LA., Oct. 2—Completion of the Louisiana sections of two of the large transcontinental highways passing through the state by Jan. 1, 1920, is promised by the State Highway department. These roads are the Jefferson Highway, virtually completed through seven states, and the Southern National Highway, better known as the Old Spanish Trail, which begins at Jacksonville, Fla., and runs across the continent to San Diego, Cal. The average cost of these highways is $10,000 a mile, and the money is in hand for the construction of both links within Louisiana.

Vim Service for Wilkes-Barre

WILKES-BARRE, PA., Oct. 5—McAvoy Bros. in this city established a repair and service station for Vim trucks used in Luzerne County.

Owner Conference for Both Truck Shows

Topics of Interest to Be Discussed Daily — A New Idea in Truck Exhibitions

NEW YORK CITY, Oct. 10—The 1920 National Motor Truck Shows in New York and Chicago will be different from any other motor truck shows ever held in the past in that Highway Transport Conferences will be held every afternoon and evening while the shows are on in each city. This is a brand new idea in connection with motor truck exhibitions, although it was well worked out early in 1919 by the Colt-Stratton Co. under the direction of John R. Eustis. He will have charge of the conferences at the two coming shows. These two shows will be of much greater interest to present and prospective motor truck fleet owners than any shows in the past for the reason that topics of vital interest in the operation and maintenance of trucks will be discussed at these conferences by men who are considered authorities in their own particular lines.

While the program of the Highway Transport Conferences during the week of Jan. 3-10 at the Eighth Coast Artillery Armory in New York City and at the Stockyards Amphitheatre at Chicago, Jan. 24-31, are still in the course of preparation, it is known that many important truck subjects will be taken up.

These will include addresses on the subjects of the value and method of keeping motor truck costs; motor truck routing; the use of demountable bodies and other equipment for more efficient truck loading; the advantages of the giant pneumatic tire and trailers and the influence of good roads on future truck use. There will also be a discussion on the establishment of rural motor truck express lines and overland haulage.

F. G. Browning Dead

PHILADELPHIA, Oct. 5—Fred G. Browning, an active member of the Philadelphia Motor Truck Assn., died at his home in Woodburne, Bucks County. Mr. Browning for several years was chairman of the membership and entertainment committee of the truck association. At the time of his death, Mr. Browning was sales manager of the White Co., here.

Philadelphia May Check Smoking

PHILADELPHIA, Oct. 6—Regulation of trucks by city ordinance, or police rules, to prevent the escape of smoke is proposed by Dr. Wilmer Krusen, director of the Department of Public Health.

May License Buffalo Repairmen

To Weed Out Unfit Mechanics by Examination to Determine Their Ability

BUFFALO, N. Y., Oct. 9—A movement of municipal supervision and license of motor truck repair and service work in garages and service stations was outlined by F. G. Bagley, commissioner of public affairs for Buffalo, in his address before the Motor & Accessory Manufacturing Assn. here last month. The plan would license all repairmen after an examination to determine their fitness.

Trucks have become so much a necessity and so many persons are now engaged in earning a livelihood in their maintenance and repair that Bagley declares some sort of a safeguard is necessary for the fleet owners. Unfitted men are a needless burden on the fleet owner because their unfitness does not permit of their doing their work efficiently while their lack of precise knowledge requires them to spend an unduly large amount of time upon it. All this helps to increase the cost of truck operation and maintenance.

Commissioner Bagley pointed out that such a procedure would not be so radical a move as might at first be thought. Professional men of all kinds are licensed in most cities and states at present, he said, and even barbers must prove their fitness to practice their profession in most cities.

Atterbury Factory Increase

BUFFALO, N. Y., Oct. 5—Prospective purchasers who have experienced delays in deliveries will be interested to know that the Atterbury Motor Car Co. will practically double its manufacturing facilities in the near future in order to increase its production.

Fulton Raises Price

NEW YORK CITY, Oct. 1—Beginning today, the price of the Fulton Model C truck is increased from $2,150 to $2,350.

Trucks for Fruit Haulage

MEDFORD, ORE., Oct. 2—Motor trucks are proving an important factor in the haulage of pears and apples from the orchards to the shipping points in this section. It is estimated that fully 800 carloads of pears and a similar number of carloads of apples will leave from the Medford section this month. When it is figured that there are from 650 to 700 boxes to a car, the importance of motor trucks as a means of saving time to and from the orchards to the shipping points, is manifest. Some of the fruit is hauled as far as 25 miles, the average distance being 6 to 7 miles. Haulage of fruit from Medford to its nearest shipping point, 6 miles away, costs the farmer 3 cents per loaded box and 1 cent per empty. The trucks run day and night, planning to haul the empties in the day time and the full boxes at night when it is cool and not so hard on the fruit.

Introduce Coast Roads Bill

WASHINGTON, Oct. 2—A bill has been introduced in the House of Representatives authorizing the survey of roads in Washington, Oregon and California adapted to heavy truck transportation as a preliminary to the establishment and maintenance of a national system of truck defense and post roads along the Pacific Coast. In addition to being used as a national defense and post road system, the contemplated system is to be open to the use of the general public free of tolls and under state control except when used for national defense and military purposes. The bill would appropriate $250,000 to defray expenses.

This bill is not believed to interfere with any of the legislation now pending in Congress for the establishment of a Federal Roads Commission. It is merely a bill which would authorize special military defense highways for the protection of the Pacific Coast when under the direct supervision of the War Department.

Coming Events

1919

Oct. 13-16—Boston, Semi-Annual Convention of American Car Manufacturers' Assn.

Oct. 16-18—New York City Motor Truck Show, Motor Transport Corps, 9th Coast Artillery Regiment Armory, 14th St.

Oct. 20-25—Raleigh, N. C. State Fair.

Oct. 22-27—Shreveport, La. State Fair.

Oct. 27-Nov. 1—Detroit Meeting Factory Service Managers, direction of N. A. C. C.

Nov. 17-22—St. Louis, Mo. National Exposition of Mines and Mining, Old Southern Hotel.

1920

Jan. 3-10—New York City Motor Truck Show, 8th Coast Artillery Regiment Armory, 193d St. and Jerome Ave.

Jan. 24-31—Chicago, Ill. Motor Truck Show, International Amphitheater, Stock Yards.

Feb. 9-14—Louisville, Ky. American Good Roads Congress.

Mar. 13-20—Boston Motor Truck Show, Mechanics Bldg.

Kentucky Truck Line Helps Farmers

Freight Depot to Have Garage for Out-of-Town Customers —Daily Market Reports

LOUISVILLE, KY., Oct. 9—The Union Transportation Line, with a capital stock of $100,000, was organized recently by several local businessmen interested in providing reliable and convenient means of freight transportation from Louisville to Kentucky and Indiana points within a radius of 100 miles. H. A. Kampmueller, general manager of the company, states that the concern plans to erect a two-story truck line depot and several downtown sites are under consideration.

The new line has made an exhaustive study of the roadway conditions within the 100-mile radius of Louisville, taking in Lexington, Elizabethtown, Hogdensville, Lebanon, Harrodsburg, Lancaster, Nicholasville, Georgetown, Shelbyville, New Castle and all intermediate points in Kentucky and Corydon, Paoli, Bedford, Seymour and Madison, in Indiana. The company plans at this time to establish truck lines to cover this territory as rapidly as they can be put into operation.

The company's freight depot will centralize the concern's business and operation and will contain many features worked out and now practiced by successful truck lines. The depot will contain a restroom for women, provided with lockers.

There also will be a business room for men at which daily market reports will be on file, with telephone and other facilities. Garage space will be provided in the building for out-of-town customers and every assistance will be given them in the sale of their products and the purchase of supplies. The plans for the depot provide for sufficient wareroom spaces for the sixty-one independent truck operators now running in and out of Louisville and Louisville shippers may deliver their merchandise at the station, where it will be allotted its proper space to catch the first truck to its destination. No charge will be made the farmer for business room and restroom privileges, and it is the intention to make the Union Line depot a meeting place for the men and women of the rural districts to transact their business in Louisville.

The line will afford the farmer a prompt and efficient means for the transportation of farm products to Louisville and the immediate delivery of merchandise from the city. Many important objects are to be accomplished by the operation of a successful truck line out of Louisville, including national advantages considered from the standpoint of increased food production in this territory.

The COMMERCIAL VEHICLE
Read by Fleet Owners

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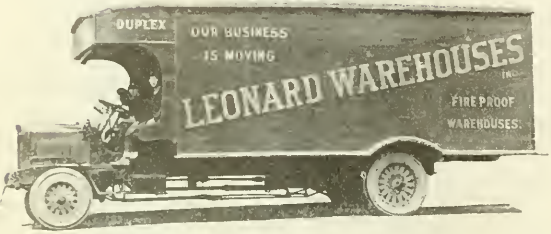
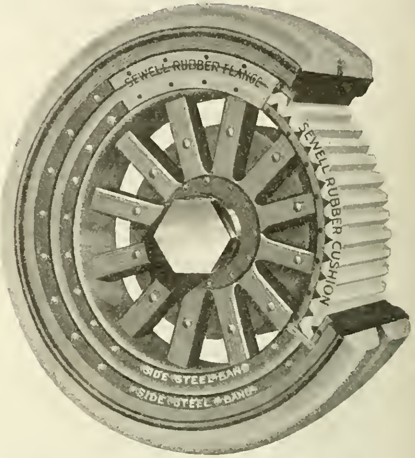
"The Crank Shaft Makers"
Worcester, Mass. Cleveland, Ohio

The Resiliency is Built in the Wheel





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The Record of This Set of

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This five-ton, duplex moving van was equipped with Sewell Cushion Wheels in June, 1913. It is more than a huge truck. It is a double-capacity Van, a house on wheels. It carries a crew of three men. For more than six years this Van has been used for interurban hauls. It has hauled all sorts of loads over all sorts of roads, broken pavements, frozen clay, summer and winter—between sixty and seventy thousand miles—during these six years.

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Sewell Wheel Book to Truck Owners on Request

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Nov. 1, 1919 No. 7

SUPERVISION *Is Big Problem*
In Operation of Truck Fleet for the National Distribution of Any Product

The Principles Outlined in This Article, While Applying to Gasoline and Oil Products, Are Also of Value to Any Truck Owner Using a Fleet in National Distribution

BY SINCLAIR GLUCK

MAKING the motor truck the main factor in the national distribution of a product would still appear a doubtful economic possibility to many business men. But it is not only an economic possibility. It is an accomplished fact. The problems to be faced in building up such a system—above all, the problem of adequate supervision—are not simple ones. But the Texas Co., serving thousands of towns and millions of consumers all over the United States, with retail gasoline, fuel oil and other oil products, has faced them and solved them successfully. How this oustanding problem of adequate supervision has been solved by the Texas Co. is outlined in this article, together with other general problems which the company faced in the control and maintenance of its fleet used in national distribution.

In the employment and maintenance of the immense fleet of trucks required to handle the business, it at once became evident to the Texas Co. that authority — supervision — must to a certain extent be centralized. This centralization was accomplished by concentrating the general supervision in the main offices of the company. But it was equally evident that supervision must to a much greater extent be decentralized or localized afterwards, so as to permit and insure a more direct supervision over the national activities of the fleet.

This decentralization was accomplished in four ways:

First, the division, subdivision and division again of the company so far as truck operation was concerned, into 1—Main territories; 2—Districts; 3—Smaller territories within each district, and 4—Distributing stations within each small territory, the distributing staton being the final unit.

Second, by a carefully linked up system of delegated authority and supervision of operation and maintenance which to a greater extent followed the lines of territorial division.

Third, by a system of records and reports from the ends of the nerves of the business as it were, which could be collected and analyzed in the brain or head office of the business.

Fourth, by a series of general rules which were carefully calculated and prepared at the head office for the guidance and control of the nerve ends, or ultimate distributing stations, all over the United States.

By means of this system, the general policy and control of fleet operation and maintenance in the large territories are in the hands of the central authority. Again, the general policy and control of the various districts are under the supervision of the main office of the territory which they comprise, while the district office directly supervises the sub-territories and distributing stations into which it is subdivided. Moreover, by means of the general rules and regulations for distributing stations, and the system of records and reports which these stations submit, the central authority is also in direct touch, to some extent, with the whole system individually.

The Territorial Subdivision

Taking these four methods in turn, the national activities of the company's fleet are divided into two main territories: the Northern, the Southern, there being as yet no Western territory. Taking one of these divisions for convenience, the Northern territory is subdivided into five districts: New York, Chicago, Boston, Philadelphia, and Norfolk, Va. Again, taking one of these subdivivisions, the New York District, with offices at 17 Battery Place, as an example for the others, is subdivided into three main terminal representatives: Albany for upper New York State, Pelham Manor for Connecticut, Long Island and Westchester County and Newark for New Jersey. Each of these sub-territories is again subdivided, so far as fleet operation and maintenance is concerned, into fifteen or so distributing stations in charge of operating agents. Thus the Albany territory is subdivided into about fifteen distributing stations in northern New York state. The Pelham Manor territory is subdivided into about fifteen distributing stations in Connecticut, Long Island and Westchester County; and the Newark territory is subdivided into about ten distributing stations throughout New Jersey. In addition there are four distributing stations which come under the direct supervision of the New York District Office. Two of these supply the Metropolitan district and are situated at Brooklyn and Long Island City. Of the other two, one is situated in Buffalo and the other in Youngstown, Ohio, and distribute respectively through western New York State and eastern Ohio.

The system of supervision of motor equipment closely follows the system of territorial subdivision. For the purpose of this article it will be sufficient to begin with the district office, though this office in its turn forwards its operation, maintenance and repair reports to the main territorial office concerned. In the district office, then, the superintendent in charge of the whole office delegates part of his authority to, and supervises the work of the assistant superintendent in charge of operation and maintenance. He in turn supervises the work of the supervisor of motor equipment. The latter is directly in charge of maintenance throughout the district and, jointly with the assistant superintendent, in charge of operation throughout the district. From the supervisor of motor equipment down, the responsibility for the operation and maintainance of the district fleet follows the territorial subdivision. Both operation and maintenance for the smaller territory are directly under the supervision of the territorial representative, but he is supplied in each case with a skilled mechanic directly in charge of maintenance, while he himself supervises routing and operation.

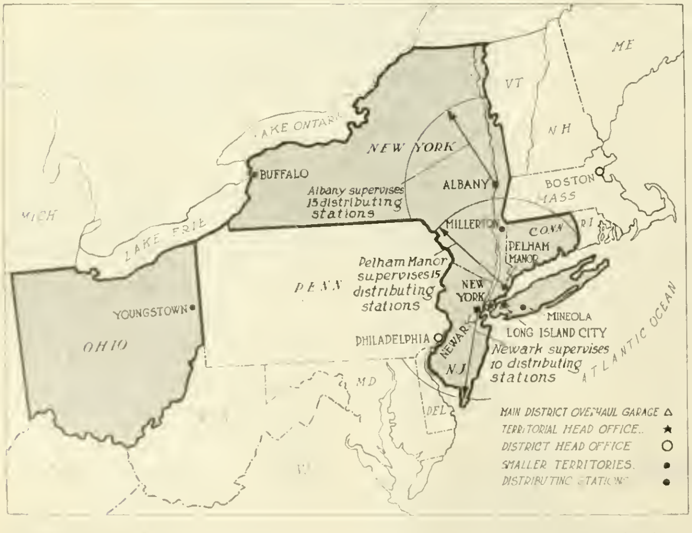
Records and Reports

The skilled mechanic of each smaller territorial office supervises the repair and maintenance of trucks in the fifteen or so distributing stations into which his territory is subdivded. These distributng stations air directly under the control of an operating agent in each case. In the case of the four distributing stations directly under the district office, the two which distribute in the Metropolitan district — Brooklyn and Long Island City — have one skilled mechanic between them (at Long Island City); at Buffalo and Youngstown, Ohio, all repairs are made at local garages and there are no mechanics assigned to these distributing stations. The chart on pafe 239 illustrates this method of delegating, throughout the district, authority for the control of the operation and maintenance of the fleet.

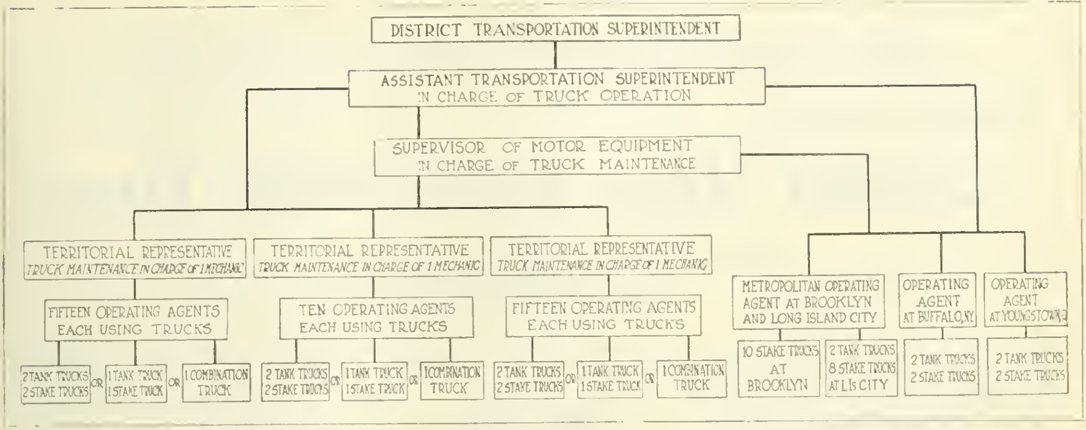
The third method employed—to link up the decentralization of authority—is the system of records and reports which flow in from the distributing stations all over the country, to be finally collected and charted in the central office. These reports and records are divided into three classes. First there is a monthly report from each distributing station, which is kept in the form of a separate sheet for each truck. This report is arranged by days and gives the milage covered, gasoline used, number of trips made, hours in service and the quantity of each product delivered in detail and in totals. This individual truck report also has spaces for remarks, such as change of tires, engine trouble or other trouble, or explanation as to why truck is not in service—accident, inspection repairs, and so forth.

Second, there is also an inspection report, showing need of repairs, repairs made, etc. This report is made up after the monthly inspection, which will be explained further on in this article.

Third, all invoices for work done go to the district office. These invoices show what material was



The shaded territory is the New York district. There are three territorial representatives at Albany, Pelham Manor and Newark, N. J., in addition to the main district offices in New York City, from all of which trucks are operated in the immediate territory in each case


DISTRICT TRANSPORTATION SUPERINTENDENT
ASSISTANT TRANSPORTATION SUPERINTENDENT IN CHARGE OF TRUCK OPERATION
SUPERVISOR OF MOTOR EQUIPMENT IN CHARGE OF TRUCK MAINTENANCE
TERRITORIAL REPRESENTATIVE TRUCK MAINTENANCE IN CHARGE OF 1 MECHANIC
TERRITORIAL REPRESENTATIVE TRUCK MAINTENANCE IN CHARGE OF 1 MECHANIC
TERRITORIAL REPRESENTATIVE TRUCK MAINTENANCE IN CHARGE OF 1 MECHANIC
FIFTEEN OPERATING AGENTS EACH USING TRUCKS
TEN OPERATING AGENTS EACH USING TRUCKS
FIFTEEN OPERATING AGENTS EACH USING TRUCKS
2 TANK TRUCKS 2 STAKE TRUCKS
OR
1 TANK TRUCK 1 STAKE TRUCK
OR
1 COMBINATION TRUCK
2 TANK TRUCKS 2 STAKE TRUCKS
OR
1 TANK TRUCK 1 STAKE TRUCK
OR
1 COMBINATION TRUCK
2 TANK TRUCKS 2 STAKE TRUCKS
OR
1 TANK TRUCK 1 STAKE TRUCK
OR
1 COMBINATION TRUCK
METROPOLITAN OPERATING AGENT AT BROOKLYN AND LONG ISLAND CITY
OPERATING AGENT AT BUFFALO, N.Y.
OPERATING AGENT AT YOUNGSTOWN
10 STAKE TRUCKS AT BROOKLYN
2 TANK TRUCKS 8 STAKE TRUCKS AT L.I. CITY
2 TANK TRUCKS 2 STAKE TRUCKS
2 TANK TRUCKS 2 STAKE TRUCKS

This chart shows how the authority for truck operation and maintenance is delegated in a typical district, that of New York, the area of which is shown in the map on the opposite page. The territorial truck organization is shown at the left and the district office force at the right

bought and the amount of labor required for the repair. They are forwarded to the supervisor in charge of motor equipment. From him they pass on to the accounting department in the district office, where they are collected and entered against the truck concerned, and forwarded to the main territorial office, and so on to the central office itself.

Rules for Stations

Fourth and last are the general rules which are applicable, regardless of situation, to each distributing station. In these stations, all routing and scheduling are left under the control of the operating agent in charge of the station. A territorial circle is drawn within the confines of which that particular distributing agent shall operate, however, and general rules of routing, scheduling and operation are laid down for his guidance in all cases. Also his routing and operation are carefully supervised for faulty system, such as unnecessarily long jumps in making deliveries, and he must operate so as to keep the delivery cost per gallon in his district down to a certain fixed figure. The Texas Co. would not state just what this cost was in terms of money but stated that the figure does not vary (except in extreme cases where it may pay to operate at a higher cost for some special reason) because where deliveries may be close together, other factors, such as bad roads, congested traffic or hilly country, even the balance.

The supervision of the fleet follows the lines indicated in the chart on this page. The direct supervision of the maintenance of trucks is in charge of the skilled mechanic who supervises the distributing station to which the trucks are assigned. The mechanic in charge inspects all the trucks under his charge and makes out his monthly report accordingly as already mentioned. In addition to the mechanic's inspection, the supervisor of motor equipment also inspects each station equipment (rolling stock) about once every 4 months and thereby checks up the mechanics' reports with the condition of the trucks themselves.

The supervision of operation is left somewhat to the operating agent in charge of each delivery station, provided his delivery cost per gallon is not in excess of the stipulated figure.

Repairs and Overhaul

The system of making repairs is briefly as follows: Very slight repairs are made by the driver of the truck himself. Minor repairs that the driver cannot handle are made in the field by the mechanic attached to the small territory of which the distributing station is a unit. In the case of the Buffalo and Youngstown distributing stations, minor repairs are made in local garages and there is no mechanic attached to these stations. Major repairs are also made in the same way at these stations.

In the ordinary distributing stations, major repairs are made at the repairshop which is maintained at the head office of the small territory concerned, the truck being driven to the repairshop. For example, a truck operating from a distributing station in upper New York State is sent to Albany for major repairs.

Finally every truck in the district is overhauled once a year in the district repair shop, situated, in the case of the New York district, at Long Island City. This main district repair station is not the same as the metropolitan distributing station, also located at Long Island City, and has no connection with it except to overhaul its trucks once a year.

Yearly Overhauls

In the case of overhaul also there are two exceptions to this rule, however. The trucks stationed at Buffalo and Youngstown distributing stations are overhauled once a year in the service stations maintained in these districts by the manufacturers of the trucks concerned. These exceptions are due to the distance the trucks would have to be transported from these stations in order to have them overhauled at the main overhaul station at Long Island City.

The fleet in the New York district consists at present of tank trucks; stake trucks; combination units (1-ton trucks, the bodies of which are of partly stake and partly tank construction); Ford light delivery units with 150 gal. tanks (these have convertible bodies, so that the tank can be removed and replaced by a box body); private cars for salesmen, representatives and officials of the company, and a number of horse wagons with either tank bodies or stake bodies.

The tank trucks consist of the 2- and 5-ton Pierce-Arrows, 1-ton Larrabee-Deyo trucks, and 3½- and 7½-ton Macks.

The Texas Co. has found this combination truck of great value, and its properties and advantages, together with the whole question of fleet distribution, will be dealt with more fully in later issues of The Commercial Vehicle.

This Article Is of Interest to Every Fleet Owner in the County

A Plan for Getting

25,000 Miles from Solid Tires

READ 1—The Plan
2—The Rules of the Contest
3—The Record Forms Used

PAYING its drivers cash prizes for tire mileage above the guaranteed number has enabled Wilson & Co., Chicago, to secure from 28,000 to 32,000 miles from solid tires guaranteed to run only 10,000 miles. According to E. W. Turley, manager of the motor truck service department of the Wilson company, the practice of patting the driver on the back and telling him that he is doing excellent work does not pay his grocery bill or put shoes on his children's feet. On the other hand, cash prizes do.

The Wilson company found that the average solid tire, such as used on its two- and five-ton motor trucks, are good for 10,000 miles without any particular attention on the part of the driver. By offering cash prizes under the plan described fully on these two pages, the company has been able to increase the mileage to approximately three times the guaranteed mileage and in some instances even more than three times, as in the case of tires which have given a total of 32,000 miles before being removed.

The plan is a psychological one in that it is based on the principle that if a man takes the same interest in the company's property as he does in his own personal effects, the care given the company's property will not suffer in comparison. The way in which the Wilson company accomplished this result was to offer its drivers 30 per cent of the gross saving on each tire run over the guaranteed mileage of 10,000. This plan thus makes it worth while for the driver to take care of his tires in that he gets a substantial share in the profits which his co-operation makes possible. As shown in the plan reproduced on this page and as published originally in the September Bulletin of the Motor Truck Owners' Association of Chicago, the drivers' prize on a set of two-ton truck tires costing $250 varies from $7.50 for a mileage of 11,000 to $112.50 for a mileage of 25,000. On five-ton trucks, with a set of tires costing $680, the driver's prize varies from $6.40 to $306.

The Plan

If you drive a 2-ton truck and the set of tires cost $250 you will receive the following cash prizes when you obtain the following mileage·

Mileage	Driver's Prize
11,000	$ 7.50
12,000	$ 15.00
13,000	$ 22.50
14,000	$ 30.00
15,000	$ 37.50
16,000	$ 45.00
17,000	$ 52.50
18,000	$ 60.00
19,000	$ 67.50
20,000	$ 75.00
25,000	$112.50

On 5-ton trucks tires costing $689 60

Mileage	Driver's Prize
11,000	$ 20.40
25,000	$306.00

Ask the man in charge of your local office to write to us for full details

Automobile Service Department
CHICAGO

All Drivers Eligible

All drivers are eligible for the cash prizes. In working out the plan all that the driver has to do is to fill out an entry blank with complete information as to the make, capacity and engine number of his truck and data on the size and serial number of his tires, together with the hub odometer reading at the time each tire is fitted. Other fleet owners desiring to make use of the same idea can readily do so by referring to a reproduction of the actual driver's blank as shown at the top of page 241.

After the blank has been filled out by the driver, it must be signed by the manager of the truck equipment at the branch where the driver is stationed. The blank is then sent to the main office of the truck service department where the office force at once calculates how much the Wilson company paid for the tires on the particular truck and how much the 30 per cent saving on each tire for every mile over 10,000 amounts to. This information is immediately sent back to the branch office and transmitted by it to the driver so that he may know in advance just how much to expect if the tires on his truck give more than the guaranteed mileage of 10,000. Immediately after a tire is changed on any truck, 30 per cent of the saving on every mile over the 10,000 is given to the driver. As the tires on the different trucks wear out at various times throughout the year, the awarding of the prizes is a continuous operation, not occurring at any stated time, such as is the case with many bonus systems that run for a month or a year.

The rules governing the winning of the cash prizes are simple and yet effective. They are shown in full in the box at the bottom of the opposite page. They provide that the driver must operate one truck continuously during the time he is a contestant for the tire prize. All reports made out on the blank shown on the opposite page must be forwarded to the main office of the truck service department after having been O.K.'d by the local office in the territory in which the driver operates. All reports are subject to check and confirmation by the company's traveling mechanic. Any incorrect hub odometer reading will at once eliminate the driver from winning a prize, and no credit will be given for mileage unless the mileage is recorded by the hub odometer. This makes it necessary that the driver inspect the hub odometer regularly, as well as take especially good care of his tires. The driver is further appealed to to play the game on the square and his enthusiasm is kept up by publishing his picture in the Wilson company's house organ whenever he wins a prize.

Thousands of Dollars in Cash Prizes

for the Drivers of

WILSON & CO. TRUCKS

ENTRY BLANK

Location

Name of Driver

Make of Truck

Capacity

Engine Number

Wilson & Co. Serial No. (appearing on Body)

Manager or Superintendent Signature

MAKE OF TIRES NOW ON TRUCK

	If Pneumatics Give Serial No.	SIZE	MAKE
Right Front			
Left Front			
Right Rear			
Left Rear			

Hubodometer Reading date

Make of Hubodometer

The winning of a prize is retroactive.

This blank is to be filled out by every driver wishing to try for a prize.

This blank must be signed by Manager or Superintendeot.

Full details of rulea governing tha winning of a prize will be forwarded to you upon receipt of your application correctly made out.

Upon receipt of this application correctly filled out we will tell you the amount of money you can win on each tire.

MAIL TO AUTOMOBILE SERVICE DEPARTMENT

When Tires Are Taken Off

One other important consideration in determining the mileage run by any tire is the point of wear at which the tire must be removed from the wheel. With solid tires, this point has been set at a depth of ¾ in. at the side of the steel base. This allows slightly more wear than other users of fleets allow. The general practice is to take off a tire as soon as it has worn within 1 in. of the side of the steel base. The determination to use the ¾ in. height or the 1 in. height may be made after a due consideration of the roads over which the trucks operate. If the roads are comparatively smooth, the ¾ in. height might seem desirable. When the roads are of cobblestone and rough it would seem that the 1 in. height might seem more advisable, since the added ¼ in. of rubber would prevent the steel base from coming into contact with the surface of the road at ruts or bumps.

While it might seem that the 30 per cent of the savings secured and awarded to the driver through the additional mileage obtained is small, it must be remembered that the Wilson company must take the clerical and operating expense of the plan out of its share of the savings effected.

While all of the operating details of the plan have now been told it does not end here, for the plan is of no avail and will not accomplish the results hoped for unless some educational work is done with the drivers to point out to them exactly how the additional mileage desired can be secured. The Wilson company assumes in the first place that its drivers are not experts in the care of tires. With this assumption as the starting point, it has secured from several of the large tire manufacturers copies of their pamphlets on how to take care of tires in order to secure the maximum mileage. These pamphlets are distributed among the drivers and are of great help to the men in that they state specifically just what abuses cause excessive tire wear.

Tires Biggest Expense

The value of this plan to help reduce truck operating costs may be realized when it is again brought to mind that with the possible exception of the wages of the driver, tires are the most expensive item in the Big 8 which enter into the cost of operation. These big eight items in truck operation were told in a series of articles appearing in THE COMMERCIAL VEHICLE beginning April 15, 1919, and ending August 15, 1919. The article on tires, pages 24 to 27, of THE COMMERCIAL VEHICLE for May 15, 1919, pointed out the most serious abuses which result in premature solid tire wear.

Rules Governing Winning of Cash Prizes for Tire Mileage

1—The same driver must drive the same truck continuously during the time the truck is operating.

2—Daily reports to be forwarded to the Truck Service Department after the local office has taken off such information as it wants.

3—Reports will be checked by traveling mechanics.

4—Any incorrect hubodometer reading will be eliminate the driver from winning a prize.

5—No tire to be run closer than ¾ of an inch to side of steel base.

6—No credit will be given for mileage unless recorded by hubodometer.

7—Play the gave on the square.

8—If you win a prize on one or more tires, send photograph of yourself with truck.

Read the Ten Principles In Installing Trucks in the Grocery Industry

GETTING RID OF HORSES

Handling Wholesale Groceries

Only Trucks Make Possible the Development of Chain Store Idea

NO. 4

This is the fourth in a series of articles on the principles to be considered in getting rid of horses in different industries. The first three articles in this series were published as follows:

No. 1 Coal	Aug. 15
No. 2 Paper	Sept. 1
No. 3 Lumber	Sept. 15

Article No. 5, on getting rid of horses in the express business will appear in the issue of Nov. 15, 1919.

GETTING rid of a fleet of horse wagons in the chain store grocery business, preparatory to the installation of a fleet of motor trucks, is a gradual process, for there are certain principles that must first be considered before this change can actually occur. These principles apply to any grocery business, no matter how varied the conditions may be. Application of these principles may mean a complete change in the functioning of the delivery system, but in the end, the trouble and expense necessitated will more than pay for itself. There are ten cardinal principles that must be considered by a grocery company in the chain store business before it installs a fleet of trucks. An example of the working out of these principles may be taken from the experience of the American Food Co., Newark, N. J., operating thirty-five stores throughout New Jersey.

That company bought its first truck, a 5-ton Pope-Hartford, 7 years ago. At that time, the company had fifteen stores, located in Newark and the suburban towns in the immediate vicinity. Deliveries were taken care of by the Pope-Hartford truck and three horse-drawn vehicles. Later, when the company decided to enlarge its territory, another Pope-Hartford of 3-ton capacity was installed. A rearrangement of its delivery schedule enabled the company to sell one of the horse wagons and still take care of the enlarged territory. In the early part of 1919, the two trucks were disposed of, as well as one more horse wagon. The two trucks were replaced by two Packards of 3- and 5-ton capacities. Since then, the delivery schedules have been so systematized that it has been found that the two trucks can take care of all haulage work without the help of the single horse wagon, and as a result, that vehicle will soon be disposed of.

These two trucks are not only taking care of all short hauls but long ones as well. One trip is made weekly to Long Branch, a distance of 103 miles, and to New Brunswick, a distance of 59 miles, both distances being in round trips. At the same time, three trips are made to New York City, 11 miles away. The territory extends to Caldwell, 11 miles away; Montclair, 7 miles distant, and South Orange, 5 miles away. Each truck is averaging about 700 miles a month. Taking care of the store deliveries, as well as those to New York City where food products are picked up from the warehouses, has necessitated the overloading of the trucks, and this, in the long run, will prove a detriment rather than an advantage. That company has realized this, and as a result, is planning to increase its fleet. At the same time, it is also planning to increase its territory, as well as build a new warehouse and garage to accommodate the increased fleet and to effect a functioning of its fleet of trucks in accordance with the ten cardinal principles.

Taking up these ten principles one by one, according to their sequence of importance, the first to be considered is the determination of the utility of motor trucks versus horse vehicles in hauling groceries.

1 The cost of delivery is the paramount issue to be decided upon before anything else is brought up. The American company has found that though the horse vehicles were reliable in the spring and fall months, they often caused a disarrangement of the delivery schedule in the hot summer because of the heat and in the winter because of the snow and slippery pavements. Another point to be considered is the fact that in the grocery field, the use of horse wagons is limited to the local territory only and cannot in any way meet any expansion of territory outside of the city limits. As the chain store business is one that is founded on these territorial expansion possibilities, it is apparent that the horse wagons cannot fit in with its scope. Though they may be used for short hauls in the city, it is doubtful whether they are practical even then. The logical answer to this question is in the determination of the time saved in delivery and the number of such small deliveries per day. A motor truck can take care of all of the short hauls necessary each day and still be useful for the long hauls, thus being busy all of the time. Though another point to be considered in the utility of the truck is its size, it is not difficult to make a decision in regard thereto, as it is apparent that conditions are such in the grocery field as to require a large sized truck to effect an economy in its operation. On account of the daily turnover of the food products at the chain stores, it is much more economical to take care of their demands with a large truck than with a smaller one that would necessitate more trips being made, with a consequent loss of time and money.

2 Grocery concerns contemplating the installation of motor trucks in place of horse vehicles must next determine the area of delivery territory. This goes hand-in-hand with the previous principle, for it determines for a large part the utility of the truck in long and short hauls. Grocery concerns that have been using horses for the short hauls to stores throughout the city, as in the case of the American Food Co., which has some twenty stores in Newark and the immediate vicinity, must consider motor trucks from the viewpoint of quickness and efficiency of service. A 7 mile trip of its horse wagon out to Montclair with a load of 2 tons usually results in it being out one whole day for that delivery. With the 5-ton truck, on the other hand, the delivery is made in Montclair in 2 hrs.

3 The third principle that must be considered by a grocery concern that contemplates the installation of a fleet of trucks is the tonnage to be delivered. Though this point has been partially covered in the first principle, still it does not take into consideration that in the grocery field, when horse vehicles are used, the railroad must be relied upon for short hauls from warehouses located in nearby cities. This has resulted in delays from three days to a week, causing many delivery complications. With the advent of motor truck haulage in the grocery business, as in the case of the American Food Co., these hauls have been handled entirely by the trucks. Thus, insurance has been given that the necessary stock will always be on hand to take care of the turnover at the stores. As in the case of the delivery to the chain stores, a large truck is needed for this warehouse delivery so as to cut down the number of trips. The 5-ton Packard used by the American Food Co. makes three trips weekly from Newark to New York City and frequently returns with from 7 to 8 tons of freight. It is therefore apparent that a small truck would not be adequate.

Average Size of Load

4 The average size of load, the fourth principle to be considered, though covered in the first and third principles, does not include the haulage of bread. The American Food Co. has no bakery of its own and therefore makes no deliveries of bread. However, there are several grocery concerns that have their own bakeries, one of these being the Atlantic & Pacific Tea Co., Jersey City, the operation of whose trucks was outlined in the August 15, 1919, issue of THE COMMERCIAL VEHICLE. That company first determined the

T. B. Bubb, Traffic Manager of the American Food Co., Newark, N. J.

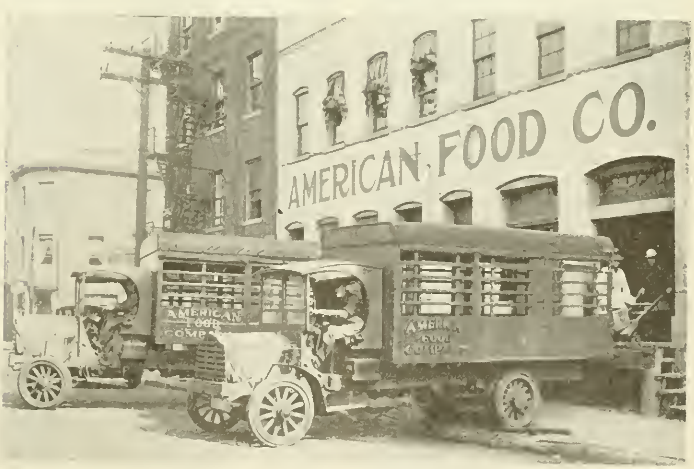
average number of loaves of bread that could be delivered on each of its routes and then selected the size of truck most suitable for the load. It uses twenty-six 5-ton Pierce-Arrows for this work. Each truck carries over 5000 loaves to take care of forty or fifty stores. This size of truck, however, is not always suitable, because, as stated before, it is necessary to first determine the average load. Another point that must be considered is that bread delivery must be made at night. That means that the delivery of the bread must be entirely separate from the grocery end of the business, for it would be inefficient to try to run a truck continuously both night and day.

Loading Conditions

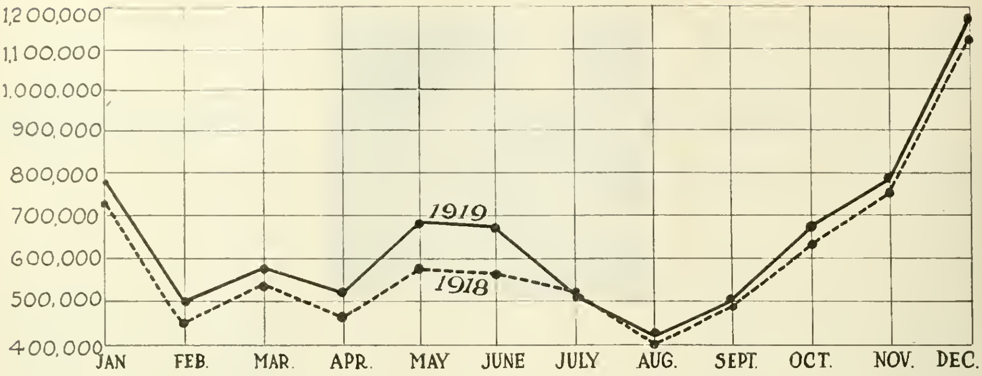
5 The fifth principle takes into consideration the loading of the trucks. A grocer whose business dates back long before the advent of motor trucks will find that his loading facilities are not adequate to harmonize with the efficiency of motor truck use. The platform will probably not be high enough to accommodate the higher bodies of the trucks, nor be large enough to meet with any expansion in the fleet. In the case of the American Food Co., its platform can accommodate only three trucks at one time, and in view of the fact that that company is contemplating an increase of its fleet, many changes will have to be made. Loading conditions must be such as to allow the loading of all of the trucks at one time, especially in the morning rush. As the loading of a truck takes from ½ to 1 hr.'s time, it is apparent that were several trucks forced to wait on account of insufficient loading space, that much valuable time would be lost. Loading of groceries is also dependent on the efficient layout of the warehouse. Elevators must be placed so that grouping of loads for the trucks may be expedited. The trucks must be kept moving in order to get any kind of efficiency. This cannot be accomplished if the trucks are kept waiting for any undue length of time during the allocation of the loads.

Where platform conditions are not satisfactory, efficient loading may be contingent upon the use of demountable bodies, four-wheeled or semi-trailers, according to conditions. Loading of a grocery truck takes 1 to 2 hrs. on account of the large number of packages. With a demountable body, four-wheeled or

(Continued on page 302)



The two Packard trucks being loaded with groceries at the American Food Co.'s warehouse. Note that the floor of the truck is not level with the platform and that the goods are loaded piecemeal by an ordinary handtruck. Loading is extremely slow, taking about 1½ hours.



COMPARING YEARLY PACKAGE DELIVERIES BY SIMPLE CHART.

YEARLY CHARTS

Help to Anticipate Peak Loads

in Department Store Deliveries

The Chart Shown Above Indicates How to Do It

COMPLETE and reliable records of past performances form one of the most important factors in the efficiency and success of a department store delivery system. There are certain outstanding problems of fleet organization, staff supervision and distribution, and loading, which face the delivery superintendent of every large department store in the United States as the peak load period—November to January—draws nearer. In a general way these problems are common to all department stores, but in certain features of their application, and in their relative importance one to another in different cases, delivery problems vary widely for different stores, according to the position of the store, the kind of goods handled, the average bulk of the goods handled, the class of customers for whom the store caters and the store's system of payments—that is, whether the majority of parcels are C. O. D., paid or charged, or on approval. Any one or all of the above may modify the usual problems which present themselves to the delivery superintendent.

As has been previously pointed out in THE COMMERCIAL VEHICLE, there are three general expedients which help to handle peak loads in the department store industry:

1—The entire fleet must be at the highest point of efficiency at this time.

2—There must be an adequate force of drivers and helpers to handle all trucks.

3—Each truck must work to its full capacity.

But the interrelation of these three methods and their mode of application depend to a large degree upon individual cases.

Systematizing Experience

Under these circumstances, every delivery superintendent must solve his own particular problems for himself, and there is only one field of research for the solution of individual human problems, whether these are psychological or purely business—the field of experience.

Every delivery store superintendent should have at his elbow, in the most convenient form for reference, a complete record of all past performances by his department, both in the summer months and in the peak load period. With this record available and in the most convenient form, he can try out various methods of handling his peak load deliveries and the record will tell at a glance the comparative efficiency of each and the cost of each. He can hire extra drivers one year and promote helpers to serve as extra drivers the next year. He can take a single route and split it up into three with a truck assigned to each part one year; he can assign three trucks generally to the whole route the next year, and he can assign two trucks to the same route with an extra helper to each truck the year after that, and the records will show him at a glance the number of parcels handled, the time taken and the cost in each case. By judicious experiment and carefully kept records, each year should show some new feature of the whole system decided upon and permanently installed, in the light of past experience, as the best possible solution of the particular question involved.

Of what these records should consist, and how complete they may be made, is well shown by the system in operation at Gimbel Bros., one of the largest department stores in New York.

Individual Truck Records

The first record which is kept on the delivery fleet consists of a large, loose-leaf book in which each truck in the fleet is assigned a page. On each page is entered the make, the number assigned to it in the fleet, its weight capacity, a description of the body, its tire equipment, its cost without tires, cost including tires, the date when it was purchased and its final disposal if no longer in service. These leaves are kept in numerical order according to the number of trucks in the fleet. Such a record is not only useful when tires or replaced parts are needed, but it enables the superintendent to keep careful track of the life of the tires or the age of the car in service before major repairs are necessary, and so check up the efficiency of the driver when away from the garage.

Daily Delivery Record

The second record kept is a daily record showing the number of deliveries made each day by each truck during the preceding year. Immediately under this figure is placed the number of packages delivered by the same truck on the same day during the current year. This enables a check to be kept on the work done by any individual truck during the summer months and in the peak load period. These records are separated according to the garage to which the trucks belong—whether main store or sub-station—and the daily deliveries for that garage are totalled. The value of this record is at once apparent when an actual example taken from it is given: On a certain day in 1918, thirteen trucks covering a certain territory delivered 1123 parcels. On the same day in 1919, twelve of the same trucks in same territory delivered 1360 parcels.

This example is taken from Gimbel's records and shows that the thirteen trucks which were operating in this territory on this date in 1918 were working considerably under capacity, and that by eliminating one truck both gasoline and wear and tear on the thirteenth truck have been saved, with an increase rather than a decrease in the number of parcels delivered. It also raises the question whether the fleet assigned to that particular territory cannot be still further cut down without decreasing the number of deliveries. This experiment can then be made at about the same time of year during 1920, with the probable result of a still further saving in gasoline and wear and tear. Such a record is of immense advantage to a delivery superintendent in preparing for the peak load period now approaching, because it shows him exactly the volume of deliveries for which he must prepare, and also just how many trucks it takes to handle this volume in any particular territory.

Various Applications

How this record shows an advantage to be gained in another direction is also shown from a further example taken from the firm's records.

In 1918, a certain territory was covered by three trucks with a helper assigned to each. In 1919, one truck was added to this territory and the helpers were dropped from all four trucks. The results showed increased efficiency and more packages delivered. Also comparison of the salaries of the three original helpers with the cost of the upkeep and gasoline for the fourth truck showed a decrease in cost for the new method, neglecting the initial cost of the fourth truck but not its operating expenses.

Two Years' Work Compared

The third record kept is easily made up from the preceding one and consists of a chart of the total daily deliveries made by the entire fleet throughout the year. This chart bears one line in black showing the rise and fall of deliveries during 1918 and a red line showing the rise and fall of deliveries during 1919. For the most part these lines parallel each other or coincide, but there is naturally a slight variance from year to year dependent upon special sales arranged by the store or general economic conditions all over the country. Moreover, there should be a regular increase from year to year and throughout the year for a healthy business. A study of this chart, taken in conjunction with any special program contemplated by the store, enables the delivery superintendent to approximate still more closely the volume of business with which he will have to deal during the approaching peak load period, and to estimate and arrange for the number of trucks necessary to handle this volume of deliveries.

This chart may also prove of great benefit in another way, which is intimately connected with peak load problems. One of the general rules by which a delivery superintendent may be guided in preparing for peak loads (No. 1, quoted above) is: "The entire fleet must be at the highest point of efficiency at this time" (the peak load period). In order to bring the fleet to this highest efficiency just at the peak load period, it is necessary that each unit of the fleet should receive its overhaul and any repairs that may be necessary as nearly as possible just before the peak load period. For example, a truck may be overhauled and repaired in March and come out in first-class condition. But if it is put back into service and employed steadily up to November of the same year it can hardly be expected to be at its highest point of efficiency when the peak load rush begins. On the other hand, it is obvious that a delivery superintendent cannot, for example, lay off all or nearly all of his fleet for repairs during September or October. For if he did so, the store deliveries would be at a standstill, and the probabilities are that before very long the store would have a new delivery superintendent.

But a careful study of his delivery chart will show him just how many trucks he can lay off and just when he can lay them off, not only at the main store garage but at each of the sub-stations. The second record system mentioned above gives him the daily deliveries from each garage for any time of the year, as well as the daily totals for the entire fleet. In this way, the delivery superintendent can figure out just how many trucks he can have overhauled and repaired, for example, during August, during September, and during October.

Arranging For Repairs

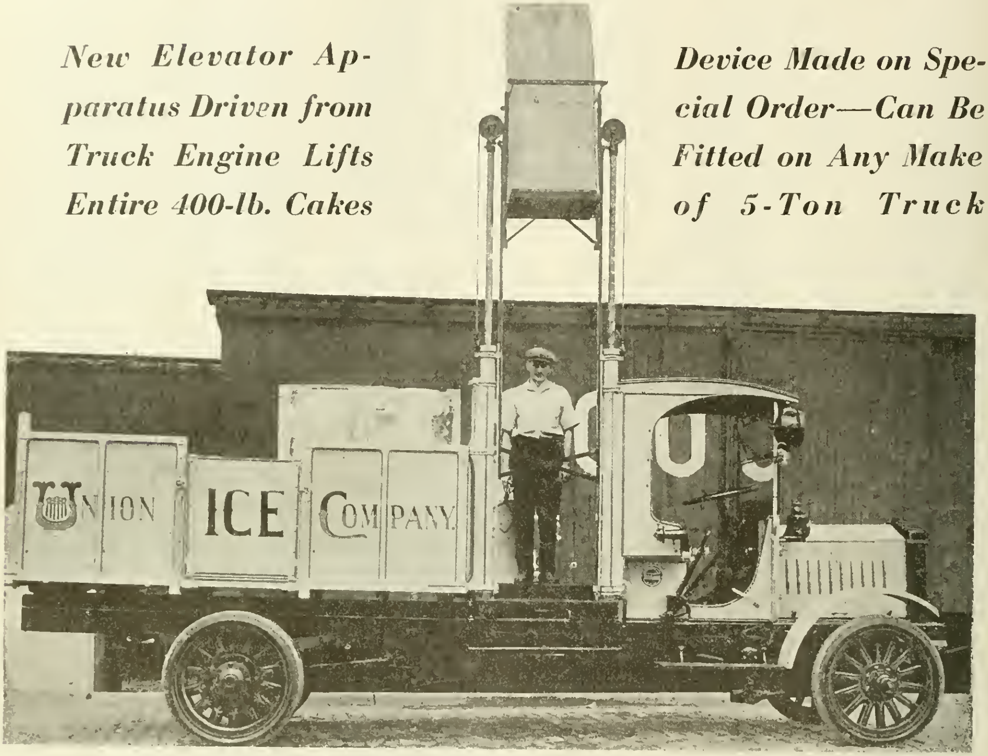
Moreover, by putting a little additional pressure on garages and routes where the chart shows him his equipment can handle the increased traffic he can usually manage to repair or overhaul the entire fleet during these three months. Even if he cannot do this, the chart, in conjunction with other records, will show him just how many trucks will have to be overhauled in advance during July.

The sample chart at the head of this article shows how the total daily delivery record for the preceding and current year may be kept by months for convenience.

Saving Truck Time Icing Freight Cars

New Elevator Apparatus Driven from Truck Engine Lifts Entire 400-lb. Cakes

Device Made on Special Order—Can Be Fitted on Any Make of 5-Ton Truck



This new elevator apparatus is capable of lifting two cakes of ice, each weighing 400 lbs., or 800 lbs. in all, from the truck body to the top of the freight car in 30 seconds

FLEET owners in the ice industry whose trucks are used to haul ice for refrigerator freight cars, can save much time in such work by the use of the new apparatus shown on this page. How to eliminate the truck time wasted during this work has become a serious problem to fleet owners. Their trucks have not been able to compete favorably with horse drawn vehicles on account of the time and effort necessary to lift the ice off the trucks onto the loading platforms and from there into the refrigerator cars. On account of the size of the cakes of ice, it has been necessary to cut the ice into sizes that could be handled and thrown from the platform or from the truck to the roof of the car. As a result of these conditions, the trucks have been unduly delayed.

The new device has been designed to eliminate all of this labor by lifting the ice to the roof of the car without the necessity of breaking the cakes into smaller pieces. Though it is shown in the accompanying illustration fitted on a Riker truck, it may also be mounted on any make of truck. J. H. Stubbe, manager of the Locomobile company's branch in Pittsburgh, Pa., designed the body and hoist shown on the Riker, which is owned by the Union Ice Co., Pittsburgh. This body is designed so that it will carry a capacity load of about 9,000 lbs. When 300-lb. cakes are carried the ice completely fills the body. This insures against breakage of cakes in transit.

The device is a hydraulic oil elevator, controlled from the truck and operated by the engine. It is mounted on a structural steel base crosswise of the truck frame, the tubes and rams being made of tubing combining strength and lightness. The oil reservoir contains a little less than the full capacity of the tubes, so that the tank is exhausted before there is any danger of injury to the rams by overruning their stroke. The lifting cable passes under the cage and over two half pulleys to differentiate in case one ram should go up a little faster than the other. The complete weight of the elevator is 380 lbs.

The elevator is flush with the right side of the truck, thus permitting moving room below for the operator who is filling the elevator, the other operator dragging off the ice cakes on top of the car with tongs. The device will raise two 400-lb. cakes of ice to the car roof in one trip. The entire 4-ton load of the truck shown in the illustration can be transferred to the interior of the refrigerator car in a few minutes with ten to fifteen round trips.

The device is made on special order by the Locomobile Company of America, Bridgeport, Conn.

FEW CHANGES IN 1920 MOTOR TRUCKS

1—Average Price Increase on All Models Only 4.3 Per Cent
2—Four-Speed Gearboxes on 2-, 2½-, 3½- and 5-Tonners
3—Pneumatic Tires Show Increase as Standard Equipment
4—Electric Starters and Lights Show Small Increase
5—Hot-Spot Engine Manifolds Are More Numerous

CHANGES in the design and construction of motor trucks during 1919 have been few. The year has been one of readjustment from war to peace conditions rather than one of great engineering development. The satisfactory service which our motor trucks performed in the war and the greatly increased production built up as a result of the enlarged employment of trucks in war work have caused the truck manufacturers to give more concern to keeping up production rather than making changes in design. Some steps have been taken toward the redesigning of truck engines for heavier grades of fuel; toward the increased use of pneumatic tires; toward the increased use of self-starters and toward the development of an improved method of controlling the temperature of the engine cooling water to give a maximum operating efficiency in all kinds of weather. A more detailed discussion of these tendencies in design will be given in the latter part of this article.

No Ford of Truckdom

The Ford of truckdom, or the truck which will occupy the same position in the commercial vehicle field as that of the Ford in the passenger car field, has not yet been developed. In this connection, the two biggest developments are the greatly increased production of Ford 1-ton trucks and Reo ¾-tonners. Judging by the production of these two vehicles, they have met with greater favor than anticipated for all kinds of light delivery work. While the Reo ¾-tonner has always been mounted on pneumatic tires all around, the Ford worm-driven 1-tonner has had solid tires on the rear. There is a possibility that the solid tires on the rear axle of the Ford truck will be replaced and pneumatics substituted.

There has been a certain readjustment in the sizes of the trucks offered. This readjustment is shown for each different model in the table at the bottom of page 248.

1920 Truck Design

1—The new 1920 trucks show very few mechanical changes as compared with those of 1919.

2—Perhaps the biggest change is the employment of four-speed gearsets on the average trucks of 2-, 2½-, 3½- and 5-ton capacities. In 1919, the average 2-, 2½- and 3½-ton trucks had three-speed gearboxes. The 3½-ton average truck for 1920 has the gearset mounted amidships instead of in a unit powerplant as for 1919.

3—Prices have increased only to a small extent, averaging 4.3 per cent on all models. The largest price increase is 12.4 per cent on trucks of 3-ton capacity.

4—The 1½-ton truck is the most popular for 1920 as ninety different models of this make are offered. Following in order come the 2-tonner with seventy-three models; the 3½-ton truck with sixty-seven models, and the 2½-tonner with sixty-two models.

5—In the type of final drive employed, there has been little change, either when the calculation is based on the number of models offered or upon the number of trucks produced. The different forms of inclosed drive have increased at the expense of chain drive. By models, 65 per cent of the 1920 trucks are worm driven and by production 53 per cent are worm driven.

6—Hot-spot manifolds for truck engines have increased. This is a development of the Class B war truck design. Gasoline producers and engine designers have got together for new designs to meet future fuels.

7—Electric equipment on trucks of all sizes has increased slightly.

8—Pneumatic tires as standard equipment are offered on eight 1-ton trucks; on six 1½-ton trucks; one 2-tonner; one 2½-tonner, and one 3½- tonner.

1½-Tonner Most Popular

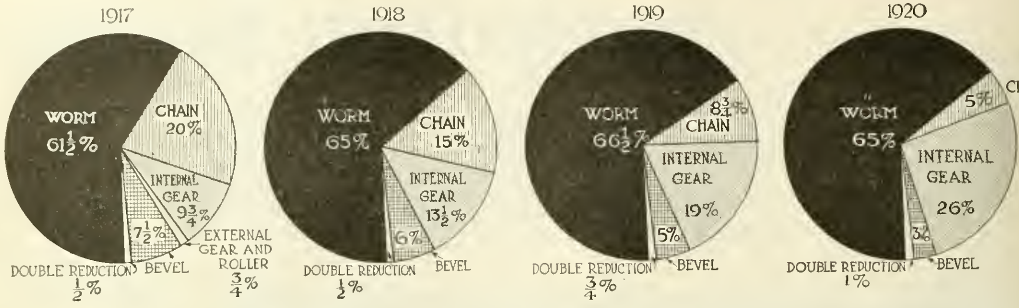
The most popular truck as judged by the number of models of that size offered on the market for 1920, is the 1½-tonner with ninety different models. Following in order come the 2-tonner with seventy-three models; the 3½-ton truck with sixty-seven models, the 2½-tonner with sixty-two models.

Small Price Increase

While the labor situation in the truck factories has been one of the most important factors helping to retard production on account of strikes and increase the price on account of the decreased production due to the strikes, price increases have been remarkably low as compared with price raises in other commodities. On the average, 1920 truck prices are only 4.3 per cent higher than in 1919. The complete range of price readjustment for all sizes of trucks is shown in the table on the bottom of page 249. Exclusive of the reduction in price on trucks of under ½-ton capacity and the decrease of 0.9 per cent on 1½-ton trucks, both of which may be neglected, the first because only one truck is listed under ½-ton capacity and the second because it is so small, the largest price increase is 12.4 per cent on trucks of 3-ton capacity. Tractors have increased 22.6 per cent in price, although this increase must be taken with reservation on account of the wide range in the tractor capacity.

In the average truck of ½-, ¾-, 1, 1½-, 2-, 2½-, 3½- and 5-ton capacities, as given on pages 250 and 251, it is seen that there is very little change in the 1920 trucks as compared with those of 1919. The average ½-ton truck is still bevel driven; the average ¾-tonner, still internal-

Percentage of Final Drive by Models Offered



The final drive averages shown above are calculated on the number of models offered in each particular year and as included in the specifications of those trucks published in THE COMMERCIAL VEHICLE for that year. The averages must not be confused with those on the same subject based on the production of trucks. The latter averages are given on the opposite page, so that the true situation in regard to types of final drive may be had both from the basis of number of models offered and of number of trucks produced. The above percentages indicate the decline in the chain drive for some form of inclosed drive

gear driven and the others, worm driven. Pneumatic tires have not yet become standard on 1-ton trucks. The majority of 3½-ton trucks now take the driving propulsion through the springs instead of by radius rods as was the case in 1919.

Four-Speed Gearboxes Gain

Perhaps the biggest mechanical change in the 1920 trucks as compared with those of 1919, is the adoption of four-speed gearsets as the average equipment on trucks of 2-, 2½-, 3½-, and 5-ton capacities. In the 1919 trucks, the 2-, 2½-, and 3½-tonners were fitted with three-speed gearboxes. This change has undoubtedly been brought about by the mounting of a four-speed gearbox on the Class B war truck where it was fitted in order to give an especially large low gear reduction so as to provide greater pulling power at low speeds.

Some progress has been made toward the production of truck engines capable of running on the lower grades of fuel. Here again the hot-spot manifold as used on the Class B truck engine has been copied to a certain extent in engines for even smaller sizes of trucks. This development will probably show more tangible results during the coming year in view of the fact that the engine designers and fuel producers have met together during 1919 to work out some of their common problems.

There has been no important change in the case of final drive for motor trucks, either when based upon the number of models offered or upon the number of trucks produced. In each case, the inclosed form of drive has gained slightly. Based on production, worm drive, bevel drive, and double-reduction drive have increased slightly, while internal-gear drive and chain drive have lost ever so slightly.

Electric Systems Gain

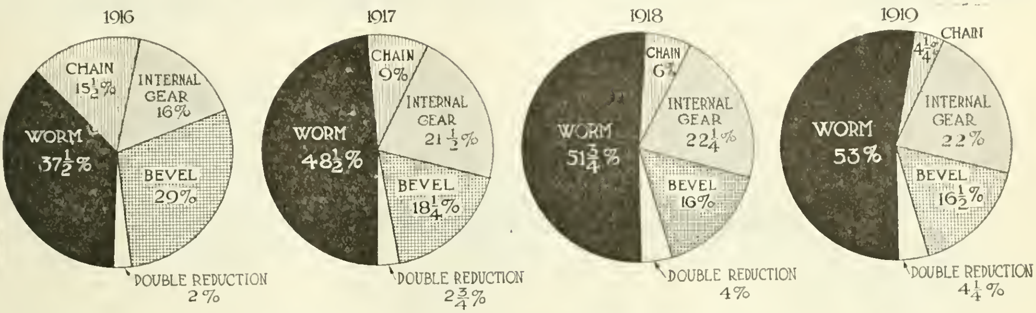
In the way of electrical equipment, electric lights are furnished on all six ½-ton trucks offered for 1920. Four of these are furnished with separate lighting systems, three of them being furnished as standard equipment and the others at an extra cost. Two models have combination starting, lighting and ignition as standard equipment. In the ¾-ton classification, five of the twelve models offered for next year have start-

The Trend in Load Capacity

Tons	NUMBER OF CHASSIS								1920 GAIN-LOSS		7 YEARS' GAIN-LOSS	
	1913	1914	1915	1916	1917	1918	1919	1920	*Number*	*Per Cent*	Number	Per Cent
Less than ½...	13	15	19	8	3	4	1	1	*± 0*	*± 0*	−12	− 92.4
½	19	28	31	28	19	13	14	6	*− 8*	*−57.2*	−13	− 68.5
¾	47	48	44	40	23	26	18	12	*− 6*	*−33.3*	−35	− 74.5
1	59	72	68	65	54	64	68	47	*−21*	*−30.9*	−12	− 20.7
1½	46	50	66	54	45	51	75	90	*+15*	*+20.0*	+44	+ 95.6
2	62	62	76	93	70	87	89	73	*−16*	*−18.1*	+11	+ 17.8
2½	5	10	19	17	29	34	41	62	*+21*	*+51.2*	+57	+1140.0
3	55	48	43	33	20	21	17	12	*− 5*	*−29.4*	−43	− 78.2
3½	14	14	28	38	48	64	62	67	*+ 5*	*+ 8.1*	+53	+ 378.0
4	19	17	16	14	12	11	11	10	*− 1*	*− 9.1*	− 9	− 47.4
5 and 5½.....	49	44	45	43	42	52	59	60	*+ 1*	*+ 1.7*	+11	+ 22.5
6 and 6½....	9	16	18	14	9	10	8	6	*− 2*	*−25.0*	− 3	− 33.3
7 and over...	6	8	12	10	7	9	6	4	*− 2*	*−33.3*	− 2	− 33.3
Tractors.....			.	12	8	16	18	9	*− 9*	*−50.0*	....	....
Total...	403	432	485	469	389	452	487	459	......	......	....	....

Based on specifications published in THE COMMERCIAL VEHICLE for 8 years, irrespective of the number of trucks of given model sold

Percentage of Final Drive By Truck Production



The above averages are calculated separately on each year's production. The 1916 production was 98,000 trucks; 190,000 in 1917 and 250,000 in 1918. Thus, while the percentage of bevel-driven trucks decreased 2¼ per cent in 1918, there were actually more bevel-driven trucks made in 1918 than in 1917. While the subject of production will be treated of more fully in our issue of January 1, 1920, the estimated 1919 production at this time is 307,000. The approximate number of trucks with each particular type of final drive may be determined for any one of the 4 years by multiplying the production of the year by the different percentages for that year, as shown above

ing, lighting and ignition units as standard equipment. In the 1-ton size, two of ten models which are furnished with electric lighting have it specified as standard equipment with the other eight models at an extra cost varying from $35 to $125. On eleven other 1-tonners which may be had with electric starting and lighting, only one model has it as standard equipment, the others being furnished only at extra charge. In the 1½-ton size, fifteen of the ninety models offered are furnished with electric lighting. Of these, four models have it as standard equipment and the other eleven as extra equipment at an additional cost. Twenty-five other models of 1½-ton capacity may be had with starting and lighting, of which seven models have it as standard equipment. In the 2-ton classification, ten models are furnished with electric lights, of which three models have them as standard equipment. Sixteen other models may be had with starting and lighting. Of these, four have the equipment as standard. Fifteen 2½-ton trucks have electric lights, with three models as standard equipment. Thirteen other models have starters and lighting combined with three models as standard equipment. Seventeen 3½-ton models have electric lights, with three as standard and fifteen other models having combination starting and lighting systems, of which three are again furnished as standard with no extra charge. Nineteen models of 5-tonners may be had with electric lights. Of these, two models are furnished with lights as standard. Ten other models have combination starting and lighting outfits, all furnished at extra cost.

Pneumatic tires are of course standard on the ½- and ¾-ton trucks. For 1920, however, three 1-ton models are furnished with pneumatics in front and eight other models with pneumatics all around as standard equipment out of forty-seven models offered in all. Of the ninety models offered in the 1½-ton size, two models are offered with pneumatics in the front and solids in the rear and six models with pneumatics all around. In the 2-ton classification one model has pneumatics all around as standard equipment; in the 2½-ton size, one model, and in the 3½-ton size, one model.

Automatic engine temperature control has not developed during 1919 as rapidly as expected. One of the most prominent examples of trucks using a thermostatic engine temperature control is the Packard line. Undoubtedly more improvement along these lines will be carried out during 1920.

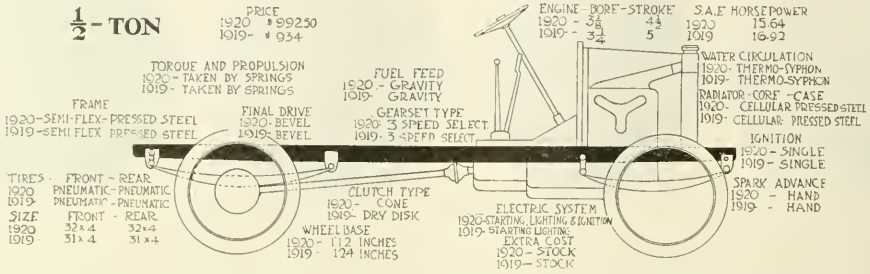
The Trend in List Prices

Tons	AVERAGE PRICES								*1920 GAIN-LOSS*		7 YEARS' GAIN-LOSS	
	1913	1914	1915	1916	1917	1918	1919	1920	*Amount*	*Per Cent*	Amount	Per Cent
Less than ½	.....	.....	$ 439.50	$ 429.17	$ 503.33	$ 612.50	$ 835.00	$ 320.00	*−$515.00*	*−61.7*	.....	.....
½	$1,527.77	$1,002.00	862.77	766.43	760.59	836.82	934.16	992.50	*+ 58.34*	*+ 6.3*	−$535.27	−35.0
¾	1,358.33	1,453.16	1,328.99	1,234.00	1,217.73	1,227.71	1,390.93	1,453.63	*+ 62.70*	*+ 4.5*	+ 95.30	+ 7.0
1	1,759.39	1,690.55	1,660.98	1,642.17	1,521.50	1,611.80	1,815.08	1,799.49	*− 15.59*	*− 0.9*	+ 40.10	+ 2.3
1½	2,345.53	2,034.33	2,057.54	2,004.32	1,950.34	2,137.19	2,224.60	2,226.21	*+ 41.61*	*+ 1.8*	− 79.32	− 3.4
2	2,635.36	2,565.48	2,433.27	2,287.93	2,302.91	2,504.42	2,758.33	2,809.21	*+ 50.88*	*+ 1.9*	+ 173.85	+ 6.6
2½	2,950.00	2,957.14	2,740.00	2,481.21	2,526.60	2,724.68	2,950.40	3,020.00	*+ 69.60*	*+ 2.4*	+ 70.00	+ 2.4
3	3,095.88	3,323.33	3,271.32	3,147.73	3,356.21	3,368.75	3,688.84	4,147.73	*+ 458.89*	*+12.4*	+1051.85	+34.0
3½	3,837.50	3,437.50	3,489.77	3,276.43	3,258.33	3,480.00	3,904.82	3,999.40	*+ 94.58*	*+ 2.4*	+ 161.90	+ 4.2
4	3,841.66	3,877.77	3,337.50	3,417.50	3,488.63	3,856.82	4,177.77	4,453.89	*+ 276.12*	*+ 6.6*	+ 612.23	+15.9
5 and 5½	4,366.66	4,350.00	4,312.90	4,311.36	4,181.08	4,506.52	4,848.72	4,962.85	*+ 114.13*	*+ 2.4*	+ 596.19	+13.7
6 and 6½	4,970.00	4,743.75	4,915.38	4,555.55	4,725.00	4,925.00	5,237.50	5,360.00	*+ 122.50*	*+ 2.1*	+ 390.00	+ 7.9
7 and over	5,600.00	4,420.00	4,394.44	4,687.50	4,825.00	5,056.25	5,600.00	6,000.00	*+ 400.00*	*+ 7.1*	+ 400.00	+ 7.2
Tractors	.....	.....	.....	3,825.00	3,862.50	3,526.66	3,560.00	4,365.63	*+ 805.63*	*+22.6*	.....	.....

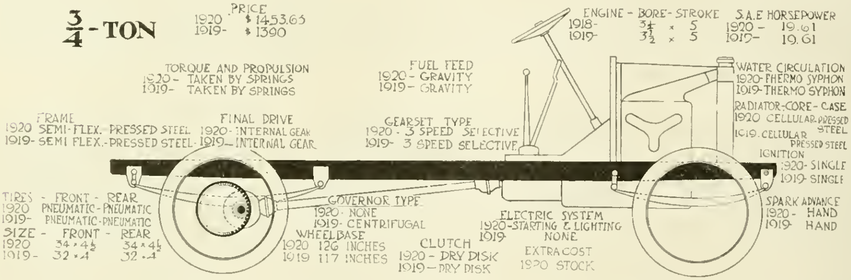
Based on specifications published in THE COMMERCIAL VEHICLE for 8 years, irrespective of the number of trucks of given model sold

Average 1919 and 1920 Trucks Compared

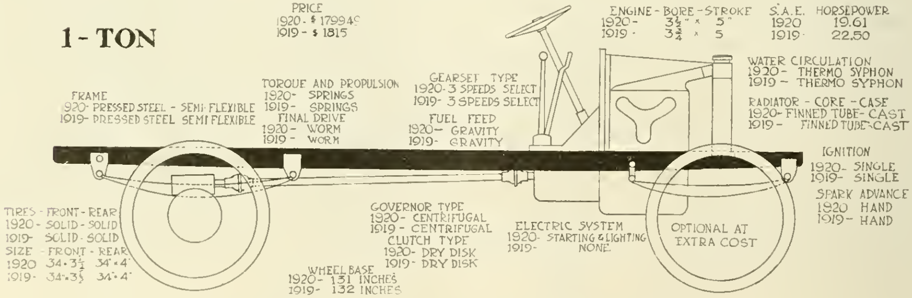
½-TON



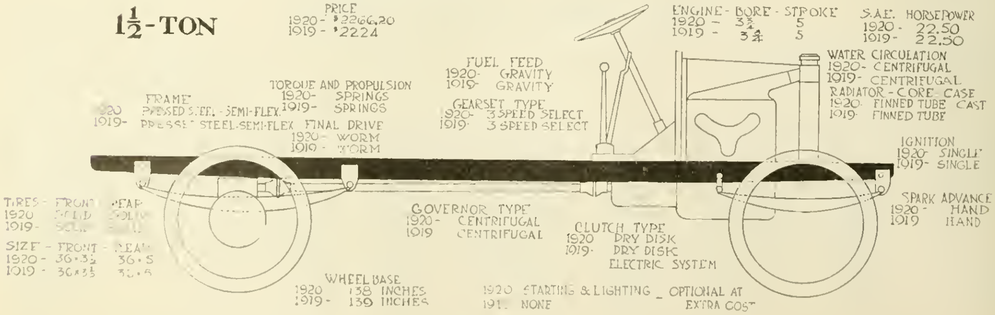
¾-TON



1-TON

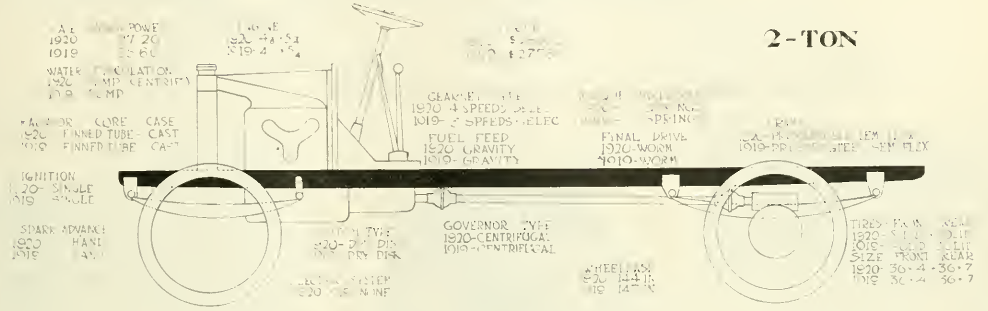


1½-TON

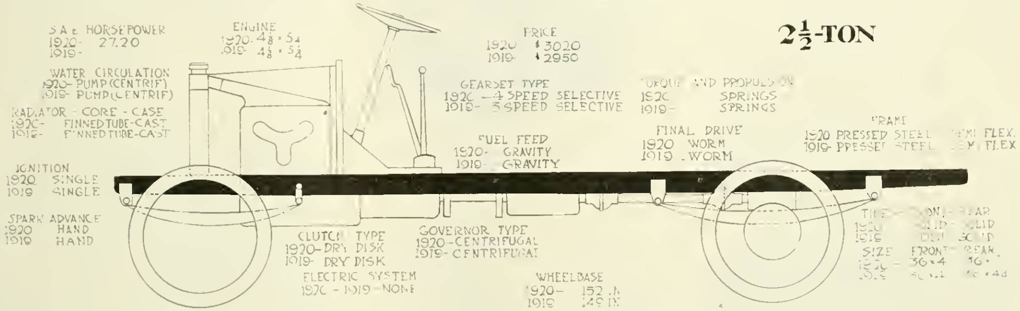


Pictorial Comparison of Important Sizes

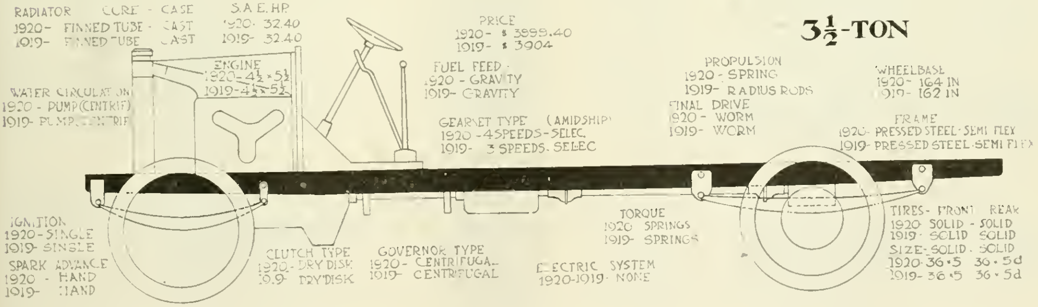
2-TON



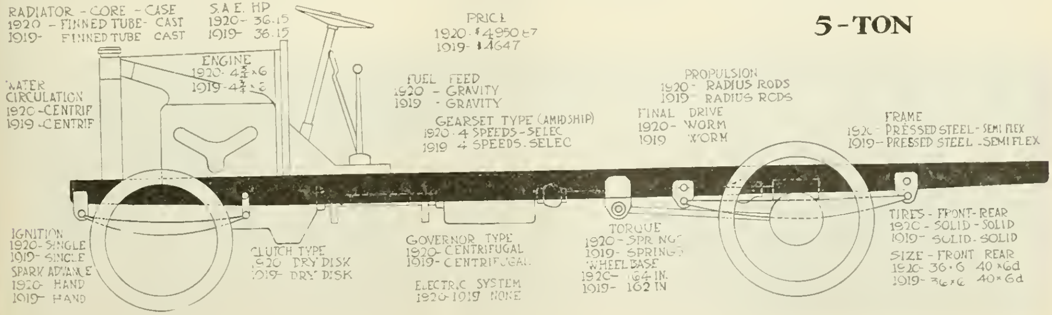
2½-TON



3½-TON



5-TON



How Fleet Owners Can Make Use of Ship-by-Truck Bureaus

Firestone Company Now Has Bureau in Sixty-two Cities — Fleet Owners Should Make Use of Them to Obtain Their Return Loads

At the signing of the Armistice, the Return Loads Bureaus instituted by the State Councils of National Defense in various states, and supervised by the Highways Transport Committee in Washington, ceased functioning. All of these bureaus were built up on the patriotic appeal and once that appeal was removed, they did no further real work. The main reason for these bureaus closing up their doors at the end of the war was that they were not self-supporting. It cost money to operate them and yet they had no income because they charged nothing for the services which they rendered to the motor truck operator seeking goods to haul, or the shipper seeking trucks to haul them.

The Firestone Tire & Rubber Co took up the work where the National Government and State agencies left off and has today established what are known as Ship-by-Truck bureaus in sixty-two of the principal cities throughout the United States, as shown in the accompanying list.

The Firestone Ship-by-Truck bureaus are essentially the same as the previous war time Return Loads Bureaus. Both are non-supporting. While the Return Loads Bureaus were financed from Government and State funds and by contributions from public-spirited citizens, the Ship by-Truck Bureaus are financed by funds of the Firestone company. Harvey S. Firestone, president of the company bearing his name, has made the project a national one with the purpose of selling to shippers and businessmen the country over the Ship-by-Truck idea.

The Ship-by-Truck Insignia

62 Ship-by-Truck Bureaus

Akron, Ohio
Albany, N. Y.
Atlanta Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Brooklyn, N. Y.
Buffalo, N. Y.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Tex.
Davenport, Ia.
Des Moines, Ia.
Detroit, Mich.
El Paso, Tex.
Erie, Pa.
Fargo, N .D.
Grand Rapids, Mich.
Great Falls, Mont.
Harrisburg, Pa.
Hartford, Conn .
Houston, Tex.
Indianapolis, Ind.
Jacksonville, Fla.
Kansas City, Mo.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Minot, N. D.
Nashville, Tenn.
Newark, N. J.
New Orleans, La.
New York, N. Y.
Oakland, Cal.
Oklahoma City, Okla.
Omaha, Nebr.
Philadelphia, Pa.
Phoenix, Ariz.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
Sacramento, Cal.
St. Louis, Mo.
Salt Lake iCty, Utah
San Antonio, Tex.
San Francisco, Cal.
Scranton, Pa.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Wichita, Kan.
Youngstown, Ohio

While the life of the Ship-by-Truck bureaus is indefinite because of the fact that they are non-supporting, they have nevertheless already been of great service to motor truck fleet owners engaged in intercity and overland truck haulage work. Requests made for trucks to haul goods over different routes are referred by the Ship-by-Truck Bureau in any city to local truckmen who have thus been able to get into contact with shippers.

The Ship-by-Truck Bureaus assume no responsibility in the handling of goods but simply act as go-between for the men with goods to ship and the truckmen with trucks to move those goods.

The Ship-by-Truck Bureaus are controlled from a central bureau in Akron. Each bureau has two kinds of information. The first is a list of shippers with goods to move and the second a list of truckmen running over certain routes in each locality. When a shipper calls his local bureau on the telephone, the latter gives information as to what motor truck lines are already operating trucks over the route on which the goods must be moved.

While the Ship-by-Truck Bureaus make no charge for their services, they play no favorites and any fleet owner operating trucks in intercity or overland haulage work who is desirous of obtaining outgoing loads or return loads should make use of such bureaus to his own advantage.

A Ship-by-Truck train which recently ran between San Francisco and Los Angeles, a distance of 482 miles

1920 Directory of Motor Truck Makers

208 Manufacturers of American Commercial Vehicles—194 Gasoline, Five Steam and Nine Electrics—Number and Capacity of Models Made

MODELS IN TONS CAPACITY
Figures refer to capacity, not number of models

Gasoline Trucks

Name	Manufacturer	Address	Under ½	½	¾	1	½1	2	2½	3	3½	4	5	5½	6	6½	7 and over
A & B	American & British Mfg. Co.	Providence, R. I.								3			5				
Acason	Acason Motor Truck Co.	Detroit, Mich.				1	1½		2½		3½		5				
Ace	American Motor Truck Co.	Newark, Ohio					1½		2½								
Acme	Acme Motor Truck Co.	Cadillac, Mich.				1		2			3½	5					
Admiral	Admiral Motor Car Co.	St. Louis, Mich.															
Air-O-Flex	Air-O-Flex Motor Corp	Detroit, Mich.					1½										
Alamo	Alamo Truck Co.	Iola, Kans.															
All-American	All-American Truck Co.	Chicago, Ill.				1											
All-Power	All-Power Truck Co	Detroit, Mich.									3½						
Apex	Hamilton Motors Co.	Grand Haven, Mich.				1	1½		2½								
Armleder	O. Armleder Co.	Cincinnati, Ohio						2			3½						
Atco	American Truck & Trailer Corp.	Kankakee, Ill						2									
Atlas	Martin Truck & Body Co	York, Pa.			¾												
Atterbury	Atterbury Motor Car Co	Buffalo, N. Y							2½		3½		5				
Autocar	Autocar Co.	Ardmore, Pa.						2									
Autohorse	One-Wheel Truck Co	St. Louis, Mo.											T				
Available	Available Truck Co.	Chicago, Ill.						2	2½		3½		5				
Beck	Beck-Hawkeye Motor Truck Works	Cedar Rapids, Ia.				1	1½	2									
Bell	Bell Motor Car Co.	York, Pa.		3/5													
Bell	Iowa Motor Truck Co., Inc.	Ottumwa, Ia.					1½		2½								
Belmont	Belmont Motor Corp.	Lewiston, Pa			¾		1½		2½		3½						
Bessemer	Bessemer Motor Truck Co.	Grove City, Pa.				1	1½		2½			4					
Bethlehem	Bethlehem Motors Corp.	Allentown, Pa.					1½		2½		3½						
Betz	Betz Motor Truck Co.	Hammond, Ind							2½								
Bollstrom	Bollstrom Motors, Inc.	St. Louis, Mich.											5				
Brinton	Brinton Motor Truck Co.	Philadelphia, Pa.							2½								
Briscoe	Briscoe Motor Co.	Jackson, Mich				1											
Brockway	Brockway Motor Truck Co.	Cortland, N. Y.					1½		2½		3½		5				
Champion	Direct Drive Motor Co	Pottstown, Pa		3/5													
Chevrolet	Chevrolet Motor Co.	Flint, Mich.				1											
Clydesdale	Clydesdale Motor Truck Co.	Clyde, Ohio				1	1½	2			3½		5				
Collier	Collier Motor Truck Co.	Bellevue, Ohio			1	1½	2										
Columbia	Columbia Motor Truck & Trailer Co.	Pontiac, Mich.				1			2½								
Comet	Comet Automobile Co.	Decatur, Ill.				1											
Commerce	Commerce Motor Car Co.	Detroit, Mich.				1	1½										
Concord	Abbott-Downing Truck & Body Co.	Concord, N. H.					1½		2½								
Conestoga	Conestoga Motor Truck Co.	Lancaster, Pa.			¾	1		2									
Corbitt	Corbitt Motor Truck Co.	Henderson, N. C.				1	1½	2	2½		3½		5				
Corliss	Corliss Motor Truck Co.	Corliss, Wis.		½													
Couple-Gear	Couple-Gear Freight Wheel Co.	Grand Rapids, Mich.									3½		5				
Croce	Croce Automobile Co.	Asbury Park, N. J.		½													
Dart	Dart Truck & Tractor Corp.	Waterloo, Ia.				1		2			3½						
Day-Elder	Day-Elder Motors Co.	Newark, N. J.				1	1½	2	2½		3½		5				
Dearborn	Dearborn Motor Truck Co.	Chicago, Ill.					1½	2									
Defiance	Turnbull Motor Truck & Wagon Co.	Defiance, Ohio					1½	2									
DeKalb	DeKalb Wagon Co.	DeKalb, Ill.						2	2½								
Denby	Denby Motor Truck Co.	Detroit, Mich.				1		2		3			5				
Dependable	Dependable Truck & Tractor Co.	Galesburg, Ill															
Diamond-T	Diamond-T Motor Car Co.	Chicago, Ill.					1½	2			3½		5				
Diehl	Diehl Motor Truck Works	Philadelphia, Pa.															
Dispatch	Dispatch Motor Car Co.	Minneapolis, Minn			¾												
Doane	Doane Motor Truck Co.	San Francisco, Calif.													6		
Dodge Bros	Dodge Bros.	Detroit, Mich.		½													
Dorris	Dorris Motor Car Co.	St. Louis, Mo.							2½		3½						
Douglas	Douglas Motors Corp.	Omaha, Neb.				1			2½								
Duplex	Duplex Truck Co.	Lansing, Mich.									3½						
Economy	Olds Motor Works.	Lansing, Mich.			¾												
Elmira	Elmira Commercial Motor Car Co., Inc	Elmira, N. Y.		½													
Erie	Erie Motor Truck Mfg. Co.	Erie, Pa.					1½	2	2½		3½						
Fageol	Fageol Motors Co.	Oakland, Calif.							2½		3½		5				
Famous	Famous Trucks, Inc.	St. Joseph, Mich				1											
Fargo	Fargo Motor Car Co.	Chicago, Ill.						2									
Federal	Federal Motor Truck Co.	Detroit, Mich.				1	1½	2			3½		5	T			
Ford	Ford Motor Co.	Detroit, Mich.				1											
Forschler	Forschler Motor Truck Mfg. Co., Inc.	New Orleans, La.					1½	2		3							
F. W. D.	Four Wheel Drive Auto Co.	Clintonville, Wis.								3							
Four Wheel Drive	Four Wheel Drive Truck Co.	Webberville, Mich.															
Fulton	Fulton Motor Truck Co.	Farmingdale, L. I.				1	1½										

Heavy type represents those vehicles whose specifications are given in this issue

1920 Directory of 220 Manufacturers of Gasoline,

Name	Manufacturer	Address	MODELS IN TONS CAPACITY Figures refer to capacity, not number of models Under ½	½	¾	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
Gabriel	Gabriel Auto Co	Cleveland, Ohio				1		2				4					
Garford	Garford Motor Truck Co.	Lima, Ohio.					1¼	2					5		6		
Gary	Gary Motor Truck Co.	Gary, Ind				1	1½		2½		3½		5				
G. M. C.	General Motors Truck Co.	Pontiac, Mich.			¾		1½	2			3½		5				
Gersix	Gerlinger Motor Car Co.	Portland. Ore.							2¼								
Giant	Giant Truck Corp	Chicago, Ill.				1	1½	2			3½						
Globe	Globe Motor Truck	E. St. Louis, Ill.				1	1½	2									
Gramm-Bernstein	Gramm-Bernstein Co.	Lima, Ohio.					1½	2	2½		3½		5				
Grant	Grant Motor Car Corp.	Cleveland, Ohio.					1½	2									
Hahn	Hahn Motor Truck Co.	Hamburg, Pa				1	1¼		2½								
Hal-Fur	S. W. Hal-Fur Motor Truck Co	Cleveland, Ohio.				1			2½								
Hall	Lewis-Hall Iron Works	Detroit, Mich.						2			3½		5				7
Harvey	Harvey Motor Truck Co.	Harvey, Ill.					1½		2½		3½		5				
Hawkeye	Hawkeye Truck Co.	Sioux City, Ia.					1½		2½								
Hendrickson	Hendrickson Motor Truck Co.	Chicago, Ill.						2			3½						
Highway-Knight	Highway Motors Co.	Chicago, Ill.										4	5				
Higrade	Higrade Motors Co.	Harbor Springs, Mich			¾	1											
Huffman	Huffman Bros. Motor Co.	Elkhart, Ind.					1½										
Hurlburt	Hurlburt Motor Truck Co.	New York City					1½		2½		3½		5				
Independent	Independent Motor Truck Co.	Davenport, Ia					1½	2									
Independent	Independent Motor Co.	Youngstown, Ohio.				1		2									
Indiana	Indiana Truck Co.	Marion, Ind					1¼	2	2½		3½		5				
Inland	Inland Motor Co.	Evansville, Ind.					1½	2									
I. H. C	International Harvester Co	Chicago, Ill.				1	1½	2			3½						
Jackson	Jackson Automobile Co	Jackson, Mich.									3½						
Jumbo	Nelson Motor Truck Co.	Saginaw, Mich							2½								
Kalamazoo	Kalamazoo Motors Corp.	Kalamazoo, Mich					1½		2½		3½						
Kearns	Kearns Motor Car Co.	Beavertown, Pa			¾		1½										
Keldon	House Cold Tire Setter Co	St. Louis, Mo.						2									
Kelly-Springfield	Kelly-Springfield Motor Truck Co.	Springfield, Ohio.					1½		2½		3½	4	5		6		
Keystone	Commercial Car Unit Co.	Philadelphia, Pa.						2									
Kimball	Kimball Motor Truck Co.	Los Angeles, Calif.						2	2½	3		4	5				
Kissel	Kissel Motor Car Co.	Hartford, Wis.			¾		1½	2			3½						
Kleiber	Kleiber Co., Inc.	San Francisco, Calif				1	1½	2	2½		3½		5				
Knox	Knox Motors Co.	Springfield, Mass.											T				
Koehler	H. J. Koehler Motors Corp.	Newark, N. J					1¼		2½								
Landshaft	Wm. Landshaft & Son	Chicago, Ill.				1		2									
Lambert	Buckeye Mfg. Co.	Anderson, Ind.				1											
Lange	Lange Motor Truck Co.	Pittsburgh, Pa.						2									
Larrabee	Larrabee-Deyo Motor Truck Co.	Binghamton, N. Y.					1½		2½		3½		5				
L. M. C.	Louisiana Motor Car Co	Shreveport, La.							2½								
Loyal	Loyal Motor Truck Co.	Lancaster, Ohio.		½	¾	1											
Maccar	Maccar Truck Co	Scranton, Pa.					1½		2½		3½		5				
Mack	International Motor Co.	New York City.					1½	2			3½		5	5½			T
Maibohm	Maibohm Motors Co.	Sandusky, Ohio.															
Manly	O'Connel Motor Truck Co.	Waukegan, Ill.					1½	2	2½								T
Master	Master Trucks, Inc.	Chicago, Ill.					1½	2			3½		5		6		
Maxwell	Maxwell Motor Co.	Detroit, Mich.					1½										
Moreland	Moreland Motor Truck Co.	Los Angeles. Calif				1	1½		2½			4	5				
Muskegon	Muskegon Engine Co.	Muskegon, Mich						2									
Mutual	Mutual Truck Co	Sullivan, Ind.						2	2½		3½		5				
Napoleon	Napoleon Motors Co.	Traverse City, Mich				1	1½										
Nash	Nash Motors Co.	Kenosha, Wis.				1	1½	2									
Nelson & Le Moon	Nelson & Le Moon	Chicago, Ill.					1½	2			3½		5				
Netco	New England Truck Co.	Fitchburg, Mass.						2	2½								
New York	Tegetmeier & Riepe	New York City					1½	2									
Niles	Niles Motor Truck Co	Pittsburgh, Pa.						2									
Noble	Noble Motor Truck Co.	Kendallville, Ind.				1	1½	2	2½		3½						
Northway	Northway Motors Corp.	Natick, Mass.						2			3½						
O. K.	Oklahoma Auto Mfg. Co	Muskogee, Okla.					1½			3							
Old Hickory	Kentucky Wagon Mfg. Co.	Louisville, Ky.			¾	1											
Old Reliable	Old Reliable Motor Truck Co	Chicago, Ill.					1½		2½		3½		5				7½
Oneida	Oneida Motor Truck Co	Green Bay, Wis				1	1½	2			3½		5				
Oshkosh	Oshkosh Motor Truck Mfg. Co	Oshkosh, Wis.						2									
Packard	Packard Motor Car Co.	Detroit, Mich.					1½	2		3		4	5		6		
Packet	Packet Motor Truck Co.	Minneapolis, Minn	¼														
Paige	Paige-Detroit Motor Car Co.	Detroit, Mich.							2½		3½						
Parker	Parker Motor Truck Co.	Milwaukee, Wis.						2			3½		5				
Patriot	Hebb Motors Co.	Lincoln, Neb.					1½		2½								
Pierce-Arrow	Pierce-Arrow Motor Car Co	Buffalo, N. Y.						2					5				
Pioneer All Steel	All Steel Truck Co	St. Louis, Mo						2									
Pony	Minnesota Machine & Foundry Co	Minneapolis, Minn	¼														
Power	Power Truck & Tractor Co	Detroit, Mich.						2									
Rainier	Rainier Motor Corp	New York City.			¾	1	1½	2									
Reliance	Reliance Motor Truck Co	Appleton, Wis.					1½		2½								
Reo	Reo Motor Car Co	Lansing, Mich.			¾												
Republic	Republic Motor Truck Co.	Alma, Mich.				1	1½		2½		3½						
Riker	Locomobile Co	Bridgeport, Conn								3		4					
[illegible]	Golden West Motors Co	Sacramento, Calif.						2									
Rock Falls	Rock Falls Mfg. Co	Sterling, Ill					1¼										
Rowe	Rowe Motor Truck Co.	Lancaster, Pa						2	2½	3			5				
Sandow	Sandow Motor Truck Co	Chicago, Ill.				1	1½		2½		3½		5				
Sanford	Sanford Motor Truck Co	Syracuse, N. Y.							2½		3½		5				
Schacht	G. A. Schacht Motor Truck Co	Cincinnati, Ohio.						2	2½		3½		5				
Schwartz	Schwartz Motor Truck Co	Reading, Pa.					1½		2½				5				
Selden	Selden Truck Corp	Rochester, N. Y.					1½		2½		3½		5				

Heavy type represents vehicles whose specifications are given in this issue

Steam, Electric and Electric Industrial Trucks—Con.

Name	Manufacturer	Address	MODELS IN TONS CAPACITY Figures refer to capacity, not number of models														
			Under ½	½	¾	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
Seneca	Seneca Motor Truck Co.	Fostoria, Ohio		½													
Service	Service Motor Truck Co.	Wabash, Ind.				1	1½		2½		3½		5				
Shaw	W. W. Shaw Corp.	Chicago, Ill.						2									
Signal	Signal Motor Truck Co.	Detroit, Mich.				1	1½	2			3½		5				
Southern	Southern Truck & Car Corp.	Greensboro, N. C.				1	1½										
Standard	Standard Motor Truck Co.	Detroit, Mich.				1		2			3½		5				
Sterling	Sterling Motor Truck Co.	Milwaukee, Wis.					1½		2½		3½		5				7½
Stewart	Stewart Motor Corp	Buffalo, N. Y.			¾	1	1½	2			3½						
Sullivan	Sullivan Motor Car Co.	Rochester, N. Y.					1½	2			3½						
Superior	Superior Motor Truck Co.	Atlanta, Ga.				1		2									
Three Point	Three Point Truck Corp	New York City															
Tiffin	Tiffin Wagon Co.	Tiffin, Ohio					1½		2½		3½		5		6		
Titan	Titan Motor Truck Co.	Milwaukee, Wis.									3½		5				
Tower	Tower Motor Truck Co.	Greenville, Mich.						2									
Traffic	Traffic Motor Truck Corp	St. Louis, Mo.						2									
Transport	Transport Truck Co	Mt. Pleasant, Mich.				1	1½	2									
Triangle	Triangle Motor Truck Co.	St. Johns, Mich.					1½		2½								
Union	Union Motor Truck Co	Bay City, Mich							2½			4					
United	United Motors Co.	Grand Rapids, Mich.					1½		2½		3½		5				
United Four Wheel Drive	United Four Wheel Drive Co.	Chicago, Ill.								3							
U. S.	United States Motor Truck Co.	Covington, Ky.				1½		2½		3½		5					
Universal	Universal Service Co.	Detroit, Mich.					1½	2		3							
Velie	Velie Motors Corp.	Moline, Ill.					1½	2			3½						
Victor	Victor Motor Truck & Trailer Co.	Chicago, Ill.					1½	2									
Vim	Vim Motor Truck Co	Philadelphia, Pa		½		1		2		3							
Walker-Johnson	Walker-Johnson Truck Co.	East Woburn, Mass.							2½								
Walter	Milwaukee Locomotive Mfg. Co.	Milwaukee, Wis.															T
Walter	Walter Motor Truck Co.	New York City											5				
Ward-La France	Ward LaFrance Motor Truck Co.	Elmira, N. Y.							2½		3½			5½			
Ware	Ware Twin Engine Truck Co.	Minneapolis, Minn.					1½				3½						
Watson	Watson Products Corp.	Canastota, N. Y.			¾						3½						
White	White Co.	Cleveland, Ohio			¾			2		3			5				
White Hickory	White Hickory Wagon Mfg. Co.	Atlanta, Ga.					1½										
Wichita	Wichita Falls Motor Co.	Wichita Falls, Texas					1½	2	2½		3½			6			
Wilcox	H. E. Wilcox Motor Co.	Minneapolis, Minn.				1	1½		2½		3½		5				
Wilson	J. C. Wilson Co	Detroit, Mich.					1½		2½		3½		5				
Winther-Marwin	Winther Motor Truck Co	Kenosha, Wis.					1½		2½		3½						
Winther	Winther Motor Truck Co	Kenosha, Wis.					1½	2		3	3½	4	5		6		7
Witt-Will	Witt-Will Co	Washington D. C				1	1½		2½								
Wolverine	American Commercial Car Co.	Detroit, Mich.					1½										

Electric Trucks

Name	Manufacturer	Address	Under ½	½	¾	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
Atlantic	Atlantic Vehicle Co	Newark, N. J.				1		2			3½		5			6½	
C. T.	Commercial Truck Co	Philadelphia, Pa		½		1		2			3½		5				
Couple-Gear	Couple-Gear Freight Wheel Co.	Grand Rapids, Mich									3½		5				7
Fritchlie	Fritchlie Automobile & Battery Co.	Denver, Colo.															
Lansden	Lansden Co., Ltd	Brooklyn, N. Y.				1		2			3½		5				
Lansing	Lansing Co., Inc	Lansing, Mich.							2½						6		
Oneida	Oneida Motor Truck Co.	Green Bay, Wis.				1		2			3½		5				
Walker	Walker Vehicle Co.	Chicago, Ill.		½		1		2			3½		5				
Ward	Ward Motor Vehicle Corp	Mt. Vernon, N. Y.	3/8	½		1		2			3½		5				

Electric Industrial Trucks

Name	Manufacturer	Address	Under ½	½	¾	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
Automatic	Automatic Transportation Co.	Buffalo, N. Y.				1		2									T
Baker R. & L.	Baker R. & L. Co.	Cleveland, Ohio						2									
Buda	Buda Co.	Chicago, Ill.						2									T
Clark Tructractor	Clark Tructractor Co.	Chicago, Ill.					1½										T
Crescent	Crescent Truck Co.	Elizabeth, N. J.						2									T
Electromobile	Koppel-Industrial Car & Equipment Co.	Koppel, Pa					1½	2									T
Elwell-Parker	Elwell-Parker Electric Co.	Cleveland, Ohio	1/5				1¾	2									
Hoagland-Thayer	Hoagland-Thayer, Inc.	Newark, N. J.															
Hunt	C. W. Hunt Co.	West New Brighton, N. Y					1½	2									T
I. T. C.	Cowan Truck Co.	Holyoke, Mass.				1		2									T
Karry-Lode	Karry-Lode Industrial Truck Co.	Long Island City, L. I.						2									T
Lansden	Lansden Co., Ltd	Brooklyn, N. Y.															
Lansing	Lansing Co., Inc.	Lansing, Mich						2	2½				5				
Mercury	Mercury Mfg. Co	Chicago, Ill.															T

Steam Trucks

Name	Manufacturer	Address	Under ½	½	¾	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
American	American Machine Co.	Newark, Del.															
Doble	Doble Laboratory	San Francisco, Cal				1											
Steamotor	Amalgamated Machinery Corp.	Chicago, Ill.						2									
Steam-O-Truck	Steam Automotive Works	Denver, Colo.											5				
Winslow	Winslow Boiler & Engineering Co.	Chicago, Ill.											5				

Heavy type represents those vehicles whose specifications given in this issue

Buyers' Guide to 1920 Gasoline Trucks

Classified According to Load Capacity and Combined With Salient Features of Chassis Design

TRUCKS OF UNDER ½-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C Horse-power	Elec-tric System	Gear-set Type	Final Drive
Pony	$320	90	pneu	12.0	none	fric	chain

TRUCKS OF ½-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C Horse-power	Elec-tric System	Gear-set Type	Final Drive
Champion	$1,000	114	pneu	16.9	lighting	selec	bevel
Elmira C	500	104	pneu	15.6	lighting	prog	bevel
Loyal	950	110	pneu	15.6	s,l&i-2	selec	int-gear
Seneca F-2	1,060	108	pneu	15.6	s,l&i	selec	bevel
Vim 21	1,095	108	pneu	14.4	lighting	selec	bevel
Vim 26 Special	1,350	127	pneu	14.4	lighting	selec	bevel

TRUCKS OF ¾-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C Horse-power	Elec-tric System	Gear-set Type	Final Drive
Belmont AA	$1,150	114	pneu	19.6	s,l&i-2	selec	int-gear
Conestoga 12	......	124	pneu	19.6	s&l	selec	int-gear
Economy T-LHD	1,250	128	pneu	21.0	s,l&i	selec	int-gear
G. M. C. 16	1,495	132	pneu	32.5	s,l&i-2	selec	bevel
Kearns H	1,350	118	pneu	16.9	s&l-2	selec	int-gear
Kissel Gen. Delivery	1,875	135	pneu	21.0	none	selec	bevel
Loyal Special	1,245	120	pneu	16.9	s,l&i-2	selec	int-gear
Old Hickory M	995	112	pneu	16.9	s,l&i	selec	bevel
Rainier R4-11	1,750	125	pneu	19.6	opt	selec	worm
Reo F	1,285	128	pneu	27.2	s,l&i-2	selec	bevel
Stewart 11	1,195	110	pneu	15.6	s,l&i-2	selec	int-gear
White 15	2,400	133½	pneu	22.5		selec	bevel

TRUCKS OF 1-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Elec-tric System	Gear-set Type	Final Drive
Acason 1		142	solid*	22.5		selec	worm
Acme B	$1,950	130	solid	22.5	lighting	ind-c	worm
All-American A	1,295	130	p&s	16.9	s&l	selec	int-gear
Apex C	1,395	130	p&s	19.6	s*,l&i	selec	int-gear

TRUCKS OF 1-TON CAPACITY—Con.

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Elec-tric System	Gear-set Type	Final Drive
Beck A	1,500	124	solid	19.6	lighting	selec	int-gear
Bessemer G	1,600	134	solid*	19.5	opt	selec	int-gear
Briscoe T-34	1,485	121	pneu	18.2	s,l&i-2	selec	int-gear
Clydesdale 32	....	144	solid	22.5	......	selec	worm
Collier 18	......	140	solid	19.6	....	......	worm
Columbia F	1,750	126	solid	22.5	none	selec	int-gear
Commerce E	1,590	126	solid*	22.5	s&l	selec	int-gear
Conestoga 20	2,100	128	solid	19.6	....	selec	worm
Corbitt E	2,150	130	solid	22.5	none	selec	worm
Dart E	......	130	solid	22.5	s&l*	selec	worm
Day-Elder A	1,775	128	solid	19.6	s&l	selec	worm
Denby 12	1,950	124	solid	19.6	....	......	int-gear
Douglas C	1,700	122	pneu	19.6	....	selec	int-gear
Famous B-10	1,690	120	solid*	19.6	lighting	selec	int-gear
Federal SD	2,300	132	pneu	22.5	lighting*	selec	worm
Ford TT	550	124	p&s	22.5	lighting	plan	worm
Fulton A	......	130	pneu	19.6	s&l	......	int-gear
Gabriel C	2,000	136	pneu	29.0	s&l-2	selec	worm
Gary F	1,900	130	solid	16.9	......	selec	worm
Giant 15	1,950	138	solid*	22.5	lighting	selec	worm
Hal-Fur C	2,000	136	pneu	25.6	s,l&i	selec	worm
Independent F	1,685	128	solid*	19.6	lighting	selec	worm
I. H. C. F	1,850	128¾	solid	19.6	s&l*	selec	int-gear
Kleiber AA	2,400	130	opt	22.5	none	selec	worm
Loyal	1,500	130	pneu	16.9	s,l&i-2	selec	int-gear
Moreland 19-M	....	126	pneu	22.5	lighting	selec	worm
Napoleon 9	1,385	132	pneu*	19.6	lighting	selec	int-gear
Nash 2018	1,650	130	solid*	22.5	s&l-2	selec	int-gear
Noble A-20	....	144	solid*	22.5	s&l-2	selec	worm
Old Hickory W	2,175	135	solid*	22.5	none	selec	worm
Oneida A	2,290	144	solid	22.5	starter*	......	worm
Rainier R-9	1,875	125	solid	19.6	opt	selec	worm
Republic 10	1,555	124	solid*	22.5	s&l-2	selec	int-gear
Sandow C	1,795	120	solid*	19.6	lighting	selec	worm
Service 220	2,100	137	solid	19.6	s&l*	selec	worm
Signal F	2,400	146	solid	27.2	lighting-2	selec	worm
Southern A	1,495	.	solid*	19.6	......	.....	....
Standard 56	1,900	134	solid	22.5	......	selec	worm
Stewart 8	1,650	130	solid	19.6	lighting-2	selec	int-gear
Transport 20	1,650	130	....	22.5	......	.....	int-gear
Vim 25	2,195	125	solid*	22.5	none	selec	worm
Wilcox A-1	.....	130	pneu*	22.5	lighting	selec	worm
Witt Will M	2,000	120	solid	22.5	none	selec	worm

ABBREVIATIONS—Types of construction

*—with other options
dbl-red—double reduction drive
4—driving on all four wheels

fric—friction
ind-c—individual clutch, constant mesh
int-gear—internal gear

plan—planetary
pneu—pneumatic
p&s—pneumatic and solid
prog—progressive

selec—selective sliding gearset
s, l & i—starting, lighting and ignition

s, l & i-2—2-unit starting, lighting and ignition system
s & l-2—2-unit starting and lighting system

TRUCKS OF 1½-TON CAPACITY

Name and Model	Chassis Price	Wheelbase, Inches	Tires	N.A.C.C. Horsepower	Electric System	Gearset Type	Final Drive
Aceson RB	...	142	solid*	22.5		selec	worm
Ace	...	144	solid	22.5	s,l&i-2	selec	worm
Air-O-Flex C		160	solid	22.5	s,l&i-2	selec	int-gear
Apex D	$1,595	130	solid	19.6	s&l	selec	int-gear
Beck B	1,900	144	solid*	22.5	lighting-2	selec	int-gear
Belmont BB	1,950	144	p&s	22.5	lighting	selec	int-gear
Bessemer H-2	2,085	144	solid*	22.5	opt.	selec	int-gear
Bethlehem D	1,955	136	solid	22.5	s&l-2	selec	int-gear
Brockway S	2,100	140	solid	32.5	s,l&i-2	selec	worm
Clydesdale 42	...	146	solid*	22.5		selec	worm
Collier 19	...	144	solid	22.5			worm
Commerce EP	1,965	134	pneu	22.5	s&l	selec	int-gear
Concord A	2,350	140	solid	22.5		selec	worm
Corbitt D	2,400	130	solid	22.5	none	selec	worm
Day-Elder B	2,075	144	solid	22.5	s&l	selec	worm
Dearborn F	1,980	126	solid*	19.6		selec	worm
Defiance D	...	140	pneu	22.5	s&l-2	selec	int-gear
Diamond-T T	2,220	144	solid	22.5		selec	worm
Diamond-T FS	2,445	144	solid	22.5		selec.	worm
Diemond-T J-4	2,755	154	solid	22.5		selec	worm
Erie	...	144	solid	27.2		opt.	worm
Federal TE	2,500	144	solid	27.2	...	selec	worm
Forschler AX	2,375	120	opt.	19.6		selec	worm
Fulton C	2,350	137	solid	16.9	none.	selec	int-gear
Garford 25	1,890	135	solid	22.5	s,l&i	selec	worm
Gary CT	2,250	142	solid	25.6		selec	worm
G. M. C. 31	2,395	130	solid	22.5	lighting-2	selec	worm
Giant 14	...	144	solid*	22.5	lighting	selec.	worm
Gramm-Bernstein 15	...	138	solid*	22.5	...		int-gear
Gremm-Bernstein W-15	...	...	solid*	22.5			worm
Grant 10	1,885	124	pneu*	22.5	s,l&i-2	selec	int-gear
Grant 11	1,935	140	pneu*	22.5	s,l&i-2	selec	int-gear
Harvey WEA	2,350	128	solid	27.2		selec.	worm
Hawkeye K	1,995	148	solid*	22.5	...	selec	int-gear
Huffmen B	...	140	solid*	16.9	...	selec.	worm
Huffman C	...	140	solid*	16.9	...	selec	int-gear
Hurlburt	2,850	148	solid.	25.6	...	selec.	worm
Independent E	1,890	135	solid*	22.5	none.	selec	int-gear
Indiana 12	2,150	135	solid*	18.2	s&l*	selec	worm
Inland C	1,950	136	p&s	22.5	s&l-2	selec.	int-gear
I. H. C. K	2,200	129	solid	19.6	s&l*	selec	int-gear
Kearns M	2,000	136	solid	19.6	...	selec.	int-gear
Kelly-Springfield K	2,750	144	solid	22.5	s,l&i-2*	selec.	chain
Kelly-Springfield KS-32	2,750	144	solid	22.5	s,l&i-2*	selec	worm
Kissel (Gen. Utility	2,275	152	solid	24.2	none	selec	worm
Kleiber A	2,800	143	solid	27.2	none	selec.	worm
Koehler C	1,765	131	solid	19.6	s&l-2	selec	int-gear
Larrabee V	2,150	138	solid	22.5	lighting	selec	worm
Maccar L	2,750	150	solid	27.2	opt.	selec	worm
Mack AB	3,000	144	solid*	25.6	light.-2*	selec	worm
Mack AB	3,000	144	solid*	25.6	light.-2*	selec	worm
Master JW	2,290	142	solid	27.2	s&l*	selec	worm
Master JI	2,190	142	solid	27.2	s&l*	selec	int-gear
Maxwell	1,185	124	solid*	21.1	lighting	selec	worm
Moreland 19B	2,930	126	solid	27.2	lighting	selec.	worm
Napoleon 11	1,660	132	pneu*	19.6	lighting	selec.	int-gear
Nash 3016	2,250	144	solid*	22.5	s&l-2	selec.	int-gear
Nelson & LeMoon F	...	opt	solid*	27.2	s&l-2*	selec	worm
Noble B-30	...	144	solid*	22.5	s&l-2	selec	worm
Old Reliable A	2,350	138	solid	25.6	lighting	selec.	worm
Oneida B	2,650	144	solid	27.2	starting*	...	worm
Packard E	3,200	144	solid	25.6	s&l-2	selec.	worm
Rainier R6	1,975	133	solid	19.6	opt.	selec	worm
Republic 11	1,885	144	solid*	22.5	s&l-2	selec.	int-gear
Rock Falls 9	3,500	150	pneu	29.5	s&l-2	prog.	bevel
Sandow CG	2,090	135	solid*	22.5	...	selec	worm
Sandow J	...	150	solid*	22.5	...	selec.	int-gear
Schwartz D	2,175	140	solid*	22.5	none.	selec.	int-gear
Selden B	2,185	137½	solid*	22.5	s&l-2*	selec.	worm
Service 31	2,500	150	solid	25.6	s&l*	selec.	worm
Service 36	2,930	150	pneu	29.0	s&l-2*	selec.	worm
Signal R	2,700	146	solid	27.2	lighting-2	selec.	worm
Southern B	1,795	...	solid*	22.5	...	...	...
Sterling	2,480	142	opt.	25.6	s&l	ind-c.	worm
Stewart 9	1,975	140	solid	22.5	light.-2*	selec.	int-gear
Sullivan F	2,350	130	solid	22.5	...	selec.	worm
Tiffin GW	2,300	135	solid	27.2	s,l&i	selec.	worm
Transport 30	1,950	140	...	22.5	...	...	int-gear
Triangle A	2,185	144	solid*	22.5	none.	selec.	int-gear
United 1	...	145	solid	22.5	lighting	selec	int-gear
U. S. N	2,150	144	solid*	22.5	s&l-2*	prog.	int-gear
Velie 46	1,925	133	solid	22.5	none	selec.	int-gear
Victor A	1,950	140	solid*	22.5	lighting	prog.	worm
Wichita L	2,350	144	solid	19.6	...	...	worm
Wilcox B	...	144	solid	29.0	lighting	selec.	worm
Wilson	2,450	140	solid	22.5	lighting	selec	worm
Winther-Marwin 430-A	...	132	solid*	22.5	s&l-2*	selec.	int-gear
Winther 39	...	140	solid	22.5	s&l*	selec.	int-gear
Witt Will U Special	2,150	120	solid	22.5	none	selec.	worm
Wolverine C	...	140	solid*	22.5	s,l&i-2	selec.	int-gear

TRUCKS OF 2-TON CAPACITY

Name and Model	Chassis Price	Wheelbase, Inches	Tires	N.A.C.C. Horsepower	Electric System	Gearset Type	Final Drive
Acme A	$2,750	148	solid	22.7	lighting	ind-c.	worm
Armleder LW	2,900	156	solid	27.2	none	selec	worm
Acto W-25	2,875	150	solid*	29.0	none	selec	worm
Autocar 21-UF	2,300	97	solid*	18.1	none	prog.	dbl-red
Autocar 21-UG	2,400	120	solid*	18.1	none	prog.	dbl-red
Available H-2	2,950	148	solid	27.2	none	selec	worm
Beck C	2,350	144	solid*	27.2	lighting-2	selec	int-gear
Clydesdale 65	...	163	solid*	27.2	...	selec	worm
Collier 20		152	solid	27.2			worm
Conestoga 30	2,700	138	solid	22.5		selec	worm
Corbitt C	3,000	148	solid	27.2	none	selec	worm
Dart CC4		150	solid	29.0	s&l*	selec	worm
Day-Elder D	2,450	141	solid	27.2	s&l	selec	worm
Dearborn BW	2,250	133	solid	22.5		selec	worm
Denby 134	2,450	133	solid	22.5			int-gear
Defiance E	...	140	pneu	22.5	s&l-2	selec	int-gear
DeKalb E-2	2,250	134	solid*	27.2	none.	selec	worm
Diamond-T J-3	3,185	154	solid	27.2		selec	worm
Erie	...	144	solid	27.2	...	...	worm
Federal UE	2,800	156	solid	27.2	...	selec	worm
Forschler B	2,750	144	opt.	27.2	...	selec	worm
Gabriel E	3,250	156	solid*	29.0	s&l-2	selec	worm
Garford 70-B	3,300	142	solid*	29.0	s&l	selec	worm
G. M. C. 41	2,725	144	solid	27.2	lighting-2	selec	worm
Giant 16	2,850*	144*	solid*	27.2	none	selec	worm
Gramm-Bernstein 20	...		solid*	27.2	...	...	worm
Grant 15	2,150	124	pneu*	22.5	s,l&i-2	selec	int-gear
Grant 16	2,250	140	pneu*	22.5	s,l&i-2	selec	int-gear
Independent F	2,290	146	solid*	27.2	none.	selec	int-gear
Independent G	2,300	144	solid*	27.2	lighting	selec	worm
Indiana 20	2,750	150	solid*	27.2	s&l*	selec	worm
Inland D	2,850	132	...	25.6	none		int-gear
I. H. C. G	2,600	138¼	solid	29.0	s&l*	selec	int-gear
Keldon 19	2,885	144	solid	...	none	selec	int-gear
Keystone 40	1,795	144	p&s*	25.6	none	selec	int-gear
Kimball AB	3,675	144	opt.	25.6	lighting	selec	worm
Kissel Freighter	2,975	168	solid*	29.0	none	selec.	worm
Kleiber BB	3,200	153	solid	27.2	none	selec.	worm
Lange B	2,950	126	solid	27.2	none	ind-c.	chain
Mack AB	3,300	144	solid*	25.6	s&l-2*	selec	chain
Mack AB	3,300	144	solid*	25.6	light.-2*	selec	worm
Master M	2,590	144	solid	29.0	light.-2*	selec	int-gear
Master W	2,890	144	solid	29.0	s&l*	selec.	worm
Muskegon 20	2,325	144	solid	27.2	none.	selec	int-gear
Mutual	3,375	150	solid*	25.6	s&l	selec.	worm
Nash 4017	3,250	124	solid*	29.0	none.	selec	int-gear
Nelson & LeMoon F2	...	opt	solid	27.2	s&l-2*	selec	worm
Netco D	3,200	144	solid*	27.2	none	selec	worm
Niles E	2,800	140	solid	27.2	none	selec	worm
Noble C-40	...	148	solid*	25.6	s&l-2	selec	worm
Northway B-2	3,250	146	solid	25.6	s,l&i-2	selec.	worm
Oneida C	3,000	144	solid	27.2	starting*	...	worm
Packard 2-E	3,600	144	solid	25.6	s&l-2	selec.	worm
Parker F-9C	3,325	150	solid	29.5	s&l-2	selec.	worm
Parker F-9W	3,325	150	solid	25.6	s&l-2	selec.	worm
Pierce-Arrow X-4	4,300	150	solid*	25.6	s,l&i-2	selec.	worm
Pioneer All Steel F	2,790	144	solid	27.2	none.	...	worm
Power B	2,950	150	solid	27.2	none	selec	worm
Rainier R-8	2,400	147	solid	22.5	none	selec	worm
Rowe CDW	3,000	...	solid	25.6	none	selec.	worm
Schacht	3,350	144	solid	29.0	none	selec	worm
Signal J	3,100	150	solid	27.2	lighting-2	selec	worm
Standard 76	2,800	140	solid	27.2	...	selec	worm
Stewart 7	2,575	156	solid	27.2	lighting-2	selec.	int-gear
Sullivan E	2,975	150	solid	27.2	...	selec	worm

ABBREVIATIONS—Types of Construction

*—with other options
dbl-red—double reduction drive
4—driving on all four wheels
fric—friction
ind-c—individual clutch, constant mesh
int-gear—internal gear
plan—planetary
pneu—pneumatic
p&s—pneumatic and solid
prog—progressive
selec—selective sliding gearset
s, l & i—starting, lighting and ignition
s, l & i-2—2-unit starting, lighting and ignition system
s & l-2—2-unit starting and lighting system

TRUCKS OF 2-TON CAPACITY—Con.

Name and Model		Chassis Price	Wheelbase, Inches	Tires	N.A.C.C. Horsepower	Electric System	Gearset Type	Final Drive
Traffic	C	$1,395	132	solid	22.5	.....	selec	int-gear
Transport	50	2,585	150	...	27 2	...	.....	int-gear
Velie	25-B	2,950	152	solid	27.2	none	selec	worm
Victor	B	2,225	140	solid	22.5	lighting	prog	worm*
Vim	22	3,150	142	solid	22.5	none	selec	worm
White	30	3,300	157½	solid*	22.5	....	selec	dbl-red
Wichita	M	2,750	144	solid	22.5	......	......	worm
Winther	49-A	...	147	solid	25.6	s&l-2*	selec	int-gear

TRUCKS OF 2½-TON CAPACITY

Acason	H		150	solid	29.0	.....	ind-c	worm
Ace	Series A		156	solid*	29.0	s,l&i-2	selec	worm
Apex	E	$2,450	150	solid	29.0	s&l	selec	int-gear
Atterbury	7-CX		153½	solid	27.2	lighting	selec	worm
Available	H	3,250	148	solid	27.2	none	selec	worm
Belmont	CC	2,550	154	solid	27.2	lighting	selec	int-gear
Bessemer	J-2	2,785	158	solid*	27.2	opt	selec	int-gear
Bethlehem	E	2,365	144	solid	25.6	s&l-2	selec	int-gear
Betz		2,700	150	solid	29.0	none	selec	worm
Brinton	F	3,000	150	solid	27.2	none	selec	worm
Brockway	K-4	2,950	152	solid	27.2	s,l&i-2	selec	worm
Columbia	G	2,650	144	solid	25.6	s&l-2	selec	int-gear
Concord	B	2,850	150	solid	29.0	....	selec	worm
Corbitt	B	3,200	148	solid	27.2	none	selec	worm
Day-Elder	C	2,750	150	solid	32.4	lighting	selec	worm
DeKalb	E	2,600	136	solid*	27 2	none	selec	worm
Dorris	K-4	3,285	144	solid*	29 0	s&l-2	selec	worm
Douglas	E	2,525	130	solid	29.0	....	selec	int-gear
Erie			160	solid	.....	.	.	worm
Fageol		3,400	144	solid	29.0		prog	worm
Gary	J	2,750	148	solid	29.0		selec	worm
Gramm-Bernstein	25	.	. .	solid*	29.0	. .	...	worm
Hal-Fur	B	2,750	168	solid*	29.0	none	selec	worm
Harvey	WFA	3,300	150	solid	29.0	......	selec	worm
Hawkeye	M	2,650	148	solid*	29.0	lighting	selec	int-gear
Hurlburt		3,750	170	solid	29.0	...	selec	worm
Indiana	25	2,950	156	solid*	27.2	s&l*	selec	worm
Kelly-Springfield	K-35	3,250	144	solid	22.5	s,l&i-2	selec	chain
Kelly-Springfield	KS-36	3,250	144	solid	22.5	s,l&i-2	selec	worm
Kimball	AC	3,975	159	opt	29.0	lighting	selec	worm
Kleiber	B	3,800	160	solid	32.4	none	selec	worm
Koehler	M	2,965	162	solid	25.6	s&l-2	selec	worm
LaFrance	2-A	3,350	166	opt	36.2	s&l*	selec	worm
Larrabee	C	3,000	157	solid	27.2	lighting	selec	worm
L. M. C.	2-20	2,950	164	solid	27.2	s,l&i-2	selec	int-gear
Maccar	H	2,500	162	solid	32.4	opt	selec	worm
Moreland	19-C	3,775	144	solid	32.4	lighting	selec	worm
Mutual	A		153	pneu	25.6	s&l		worm
Netco	H	3,400	168	solid*	32.4	none	selec	worm
Noble	D-50		162	solid	29.0	lighting	selec	worm
Old Reliable	D	3,250	160	solid	29.0	lighting	selec	worm
Paige	50-18	2,950	150	solid*	27.2	none	selec	worm
Republic	19	2,395	144	solid*	27 2	s&l-2	selec	int-gear
Rowe	CDW	3,250		solid	25.6	none	selec	worm
Sandow	J	2,975	165	solid*	27 2	. .	selec	worm
Sanford	25	3,000	156	solid	27.2	lighting	selec	worm
Schacht		3,650	156	solid	29 0	none	selec	worm
Schwartz	C	2,675	146	solid	27 2	none	selec	int-gear
Selden	A		145	solid	27 2	s&l-2*	selec	worm
Service	51	3,000	160	solid	29.0	s&l*	selec	worm
Sterling		3,475	156	opt	30 7	s&l	selec	worm
Tiffin	MW	3,050	148	solid	27 2	s,l&i	selec	worm
Triangle	B	2,850	151	solid*	27.2	none	selec	int-gear
Union	F	2,675	152	solid*	25.6	lighting	selec	int-gear
United			151	solid	29.0	lighting	selec	int-gear
U. S.	H	3,250	144	solid*	27 2	lighting*	prog	worm
Walker-Johnson	B	2,850	150	solid*	29.0	none	selec	worm
Wichita	R	2,950	144	solid	22 5			worm
Wilcox	C		150	solid	29 0	lighting	selec	worm
Wilson		3,150	152	solid	27 2	lighting	selec	worm
Winther-Marwin	459		152	solid	35 6	s&l-2*	selec	int-gear
Witt Will	P	2,650	144	solid	27 2	none	selec	worm

TRUCKS OF 3-TON CAPACITY

Name and Model		Chassis Price	Wheelbase, Inches	Tires	N.A.C.C. Horsepower	Electric System	Gearset Type	Final Drive
A & B	3-T	$4,500	144	solid	42.8	none	selec	int-gear
Denby	25	3,250	150	solid	27 2	. .	.	int-gear
Forschler	BX	3,450	144	opt	27.2	. . .	selec	worm
F. W. D.	B	4,500	124	solid*	36.2	s&l	ind-c	bevel
Kimball	AK	4,475	159	opt	32 4	lighting	selec	worm
Packard	E	4,300	156	solid	32.4	s&l-2	selec	worm
Riker	B	4,600	150	solid	29 0	s&l-2	selec	worm
Rowe	DEW	3,800	. ..	solid	25.6	none	selec	worm
Rowe	GW	4,500	170	pneu	33.8	s,l&i	selec	worm
Vim	23	3,950	150	solid	29.0	none	selec	worm
White	40	4,300	174	solid	22.5	..	selec	int-gear
Winther	69		150	solid	25 6	s&l-2*	selec	int-gear

TRUCKS OF 3½-TON CAPACITY

Acason	L	.....	172	solid	29.0	.....	ind-c	worm
Acme	C	$3,750	168	solid	32.4	lighting	ind-c	worm
All-Power	SV-4	4,800	166	solid	32.4	s,l&i*	ind-c	worm
Armleder	KW	3,850	186	solid	32.4	none	selec	worm
Atterbury	7-D	.....	167½	solid	32.4	lighting	selec	worm
Available	H-3½	4,200	156	solid	32.4	none	selec	worm
Belmont	DD	3,550	160	solid	32.4	lighting	selec	int-gear
Bethlehem	F	3,465	162	solid	30.7	s&l-2	selec	int-gear
Brockway	R-2	3,900	164	solid	32.4	s,l&i-2	selec	worm
Clydesdale	90	.	180	solid	32.4	.	selec	worm
Corbitt	A	4,000	178	solid	32.4	none	selec	worm
Dart	L	. .	160	solid	32.4	s&l*	selec	worm
Day-Elder	F	3,350	165	solid	32.4	lighting	selec	worm
Diamond-T	LB	4,390	170	solid	32.4	......	selec	worm
Dorris	K-7	4,200	154	solid*	29.0	s&l-2	selec	worm
Duplex	E	4,000	130	solid	29.0	opt	selec	int-gear
Erie		..	168	solid	32.4	.....	....	worm
Fageol		4,500	172	solid	..	....	selec	worm
Federal	WD	3,650	156	solid	32.4	.....	selec	worm
Gary	KT	3,850	162	solid	32 4	.	selec	worm
G. M. C.	71	3,750	163	solid	32.4	lighting-2	selec	worm
Giant	17	3,850	176	solid	32 4		selec	worm
Gramm-Bernstein	35	.	.	solid*	32 4		.....	worm
Harvey	WHA	3,900	160	solid	32.4	....	selec	worm
Hurlburt		4,400	156	solid	32 4	. .	selec	worm
Indiana	35	3,600	160	solid*	30.7	s&l*	selec	worm
I. H. C.	L	...	160	solid	29.0	s&l*	selec	int-gear
Jackson	C-1920	4,250	150	solid	32.4	s,l&i-2	selec	bevel
Kelly-Springfield	K-40	4,250	150	solid	32 4	s,l&i-2*	selec	chain
Kissel	Heavy Duty	3,975	168	solid*	29.0	none	selec	worm
Kleiber	C	4,400	163	solid	32.4	none	selec	worm
LaFrance	4-A	.	158	opt	32.4	s&l*	selec	worm
Larrabee	B	3,950	154	solid	32.4	lighting	selec	worm
Maccar	M	4,300	174	solid	33.4	opt	selec	worm
Mack	AC	4,950	168	solid*	40.0	lighting*	selec	chain
Master	A	3,990	168	solid	32.4	s&l*	selec	worm
Mutual	A		. ...	solid	32.4	s&l	. ..	worm
Nelson & LeMoon	F	.	opt	solid	32.4	s&l-2*	selec	worm
Noble	E-70	.	182	solid	32.4	lighting	selec	worm
Northway	D-3½	4,250	160	solid	25.6	s,l&i-2	selec	worm
Old Reliable	C	4,000	160	solid	29.0	lighting	selec	worm
Oneida	D	3,700	160	solid	32.4	...	.	worm
Paige	51-18	3,950	160	solid*	32.4	none	selec	worm
Parker	J-9	4,150	160	solid	32.4	s&l-2	selec	worm
Republic	20	3,595	165	solid*	32.4	none	selec	int-gear
Sandow	M	3,975	175	solid	32.4	. .	selec	worm
Sanford	35	3,975	174	solid	32.4	lighting	selec	worm
Schacht		4,150	168	solid	29.0	none	selec	worm
Selden	A	3,850	162	solid	32.4	s&l-2*	selec	worm
Service	76	4,200	171	solid	32.4	s&l-2*	selec	worm
Signal	M	4,100	168	solid	32.4	lighting-2	selec	worm
Standard	66	3,675	160	solid	32.4	. .	selec	worm
Sterling		4,550	162	.....	32.4	s&l	ind-c	worm
Stewart	10	3,500	165	solid	32.4	lighting-2	selec	int-gear
Sullivan	11	...	160	solid	32.4	..	selec	worm
Tiffin	PW	3,980	160	solid	32.4	s,l&i	selec	worm
Titan	Transport	4,300	162	solid*	32.4	lighting	ind-c	int-gear

ABBREVIATIONS—Types of Construction

*—with other options	fric—friction	plan—planetary	selec—selective sliding gearset	s, l & i-2—2-unit starting, lighting and ignition system
dbl-red—double reduction drive	ind-c—individual clutch, constant mesh	pneu—pneumatic	s, l & i—starting, lighting and ignition	s & l-2—2-unit starting and lighting system
4—driving on all four wheels	int-gear—internal gear	p&s—pneumatic and solid		
		prog—progressive		

TRUCKS OF 3½-TON CAPACITY—Con.

Name and Model		Chassis Price	Wheelbase, Inches	Tires	N.A.C.C Horsepower	Electric System	Gearset Type	Final Drive
United			157	solid	29.0	lighting	selec	int-gear
U. S.	J	$3,950	162	solid	32.4	lighting	prog	worm
Velie	26-B	3,900	174	solid	32.4	none	selec	worm
Ware	A	3,500	140	solid*	19.6	none	selec	bevel
Watson			168	solid	32.4	none	selec	worm
Wichita	O	3,750	165	solid	32.4		...	worm
Wilcox	D		154	solid	29.0	lighting	selec	worm
Wilson		3,950	160	solid	32.4	lighting	selec	worm
Winther-Marwin	479		158	solid	29.0	s&l-2*	selec	int-gear
Winther	979		168	pneu	32.4	s&l-2*	selec	int-gear

TRUCKS OF 4-TON CAPACITY

Bessemer	K-2	$3,985	175	solid	32.4	opt.	selec	int-gear
Gabriel	F	4,300	160	solid	32.4	s&l-2	selec	worm
Highway-Knight	A	4,800	159	solid*	25.6	s,l&i-2	selec	worm
Kelly-Springfield	K-45	4,400	150	solid	32.4	s,l&i-2*	selec	chain
Kimball	AE	4,975	170	solid	36.2	lighting	selec	worm
Moreland	19-G	4,875	162	solid	36.2	lighting	selec	worm
Packard	4-E	4,550	156	solid	32.4	s&l-2	selec	worm
Riker	BB	4,700	150	solid	29.0	s&l-2	selec	worm
Union	H	3,500	171	solid	32.4	lighting	selec	int-gear
Winther	89	...	156	solid	29.0	s&l*	selec.	int-gear

TRUCKS OF 5-TON CAPACITY

A & B	T	...	144	solid	42.8	none	elec	int-gear
Acason	M		172	solid	36.2		iod-c	worm
Acme	E	$4,850	180	solid	36.2	lighting	ind-c	worm
Atterbury	8-E	...	167½	solid	36.2	s&l	selec	worm
Autohorse	10	2,100	43	solid	32.5	none	selec	int-gear
Available	H-5	4,900	168	solid	36.2	none	selec	worm
Bollstrom	A		144	solid*	29.0		ind-c	int-gear
Brockway	T	5,000	172	solid	36.2	none	selec	worm
Clydesdale	120-B		176	solid	36.2		selec.	worm
Corbitt	AA	5,000	178	solid	36.2	none	selec.	worm
Day-Elder	E	4,500	150	solid	32.4	lighting	selec.	worm
Denby	210	4,900	170	solid	32.4	...	...	int-gear
Diamond-T	R	5,190	170	solid	32.4	...	selec	worm
Diamond-T	S	5,660	180	solid	36.2	...	selec	worm
Fageol		5,300	172	solid	32.4	...	selec	worm
Federal	XC	4,500	156	solid	32.4	...	selec	worm
Garford	68	5,000	128	solid	36.2	lighting	selec	chain
Gary	M	4,850	170	solid	40.0		selec	worm
G. M. C.	101	4,350	163	solid	32.4	lighting-2	selec	worm
Gramm-Bernstein	50	...	...	solid*	36.2		...	worm
Harvey	WKA	5,000	160	solid	32.4		selec	worm
Highway-Knight	B	5,600	159	solid	25.6	s&l-2	selec	worm
Hurlburt		5,250	156	solid	32.4	...	selec	worm
Indiana	50	4,600	170	solid*	36.2	s&l*	selec	worm
Kelly-Springfield	K-50	4,900	150	solid	32.4	s,l&i-2*	selec	chain
Kimball	AF	5,975	170	solid	40.0	ligbtiog	selec	worm
Kleiber	D	5,300	180	solid	44.2	none	selec	worm
Larrabee	T	4,750	178	solid	32.4	none	selec	worm
Maccar	G	5,250	186	solid	36.2	opt	selec	worm
Master	B	4,990	170	solid	36.2	lightiog*	selec	worm
Moreland	19-V	5,350	192	solid	36.2	lighting	selec	worm
Mutual	A	...	...	solid	40.0	s&l	...	worm
Nelson & LeMoon	FC-5	...	opt	solid	36.2	s&l-2*	selec.	worm
Old Reliable	D	5,000	166	solid	41.0	lighting	selec	worm
Oneida	E	4,750	180	solid	44.1	starting*	...	worm
Packard	E	5,450	156	solid	40.0	s&l-2	selec.	worm
Parker	M-9	5,225	160	solid	36.2	s&l-2	selec	worm
Pierce-Arrow	R-9	5,500	168	solid	38.3	s,l&i	selec	worm
Rowe	FW	4,900	...	solid	36.2		selec.	worm

TRUCKS OF 5-TON CAPACITY—Con.

Name and Model		Chassis Price	Wheelbase, Inches	Tires	N.A.C.C. Horsepower	Electric System	Gearset Type	Final Drive
Sandow	L	$4,750	175	solid	32.4		selec	worm
Sanford	50	4,750	174	solid	32.4	lighting	selec	worm
Schacht		4,950	168	solid	32.4		selec	worm
Schwartz	D	4,500	170	solid	32.4	lighting	selec	int-gear
Selden	DL	4,950	170	solid	32.4	s&l-2*	selec	worm
Service	101	5,000	171½	solid	32.4	s&l*	selec	worm
Signal	R	5,100	180	solid	36.2	lighting	selec	worm
Standard	86	4,650	160	solid	32.4	none	selec.	worm
Sterling	W	5,350	168	solid	40.0	s&l	ind-c	worm
Sterling	CH	5,600	174	solid	40.0	s&l	selec.	chain
Tiffin	TW	5,000	168	solid	36.2	s,l&i	selec.	worm
Titan		5,150	156	solid*	32.4	lighting	ind-c	int-gear
United		...	160	solid	32.4	lighting	selec	int-gear
U. S.	K	4,850	168	solid	36.2	lighting	ind-c	worm
Walter	S	...	168	solid	32.4	s&l-2	selec	dbl-red
White	45	5,000	174	solid	29.0	...	selec	int-gear
Wilcox	W	...	162	solid	36.2	lighting	selec.	worm
Wilson		4,800	160	solid	32.4	lighting	selec	worm
Winther	109	...	162	solid	36.2	lighting	selec	int-gear

TRUCKS OF 5½-TON CAPACITY

LaFrance	5-A		162	solid*	40.0	s&l*	selec.	worm
Mack	AC	$5,500	168	solid	40.0	light.-2*	selec	chain

TRUCKS OF 6-TON CAPACITY

Garford	69	$5,300	128	solid	44.1	lighting	selec	worm
Kelly-Springfield	K-60	5,200	150	solid	32.4	s,l&i-2*	selec.	chain
Packard	6-E	5,700	156	solid	40.0	s&l-2	selec	worm
Tiffin	UW	5,200	168	solid	36.2	s,l&i	selec	worm
Wichita	S	5,400	165	solid	32.4		..	dbl-red
Winther	129		162	solid	42.2	lighting	selec	int-gear

TRUCKS OF 7-TON CAPAITY

Winther	148		162	solid	42.2	lighting	selec	int-gear

TRUCKS OF 7½-TON CAPACITY

Mack	AC	$6,000	168	solid	40.0	light.-2*	selec	chain
Old Reliable	K	6,000	136	solid	36.2	none	selec	chain
Sterling		6,000	174	solid	40.0	s&l	ind-c	chain

TRACTORS

Federal		$2,950	120	solid	27.2	none	selec.	worm
Federal		3,775	114½	solid	32.4	nooc	selec.	worm
Knox	35	5,500	108½	solid	40.0	s&l-2	selec	chain
Mack	AB	3,400	120	solid*	25.6	light.-2*	selec.	chain
Mack	AC	4,950	119	solid	40.0	light.-2*	selec	chain
Mack	AC	5,500	119	solid	40.0	light.-2*	selec	chain
Mack	AC	6,000	119	solid	40.0	light.-2*	selec.	chaio
Master	T	2,850	110	solid	29.0	...	selec.	iot-gear
Walter	MO-35	...	108	solid	30.7	none	selec	ext-gear

ABBREVIATIONS—Types of Construction

*—with other options
dbl-red—double reduction drive
4—driving on all four wheels
fric—friction
ind-c—individual clutch, constant mesh
int-gear—internal gear
plan—planetary
pneu—pneumatic
p&s—pneumatic and solid
prog—progressive
selec—selective sliding gearset
s, l & l—starting, lighting and ignition
s, l & i-2—2-unit starting, lighting and ignition system
s & l-2—2-unit starting and lighting system

Detailed Technical Specifications

Details of 459 Gasoline, 22 Electric and One Steam Motor Truck
ticulars in Types and Makes of Principal Truck Parts, Including
ernors and Also Electric

Name and Model		Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE													
									Size in Ins.								COOLING				IGNITION			ELEC. SYSTEM		
																	Radiator									
																	CASE		CORE							
					Make	Material	Type	Kind	Front	Rear	Make	Type	Make	No. Cyl Bore and Stroke—N.A.C.C. Hp.	Cy'inders Cast	Water Circ.	Make	Type	Make	Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
A. & B.	3T	3	$4,500	144	own	rol-c	s-flex	sol	48x3½d	48x3½d	Arch	wd	own	4-5⅛x4¾-42.8	2	g-p	Bush	sht		fin	dual	Bosch	hand	none	none	none
A. & B.	5T	5		144	own	rol-c	s-flex	sol	48x3½d	48x5d	Arch	wd	own	4-5⅛x3¾-42 8	2	g-p	Bush	sht		fin	dual	Bosch	hand	none	none	none
Acason	I	1		142		p-stl		sol*	36x3½	36x5		wd		4-5¾x5¼-22.5	4	cent						Eismn				
Acason	RB	1½		142		p-stl		sol*	36x3½	36x6		wd		4-3¾x5¼-22.5	4	cent						Eismn				
Acason	H	2½		150		p-stl		sol	36x4	36x7*		wd		4-4¼x5¾-29.0	2	cent						Eismn				
Acason	L	3½		172		p-stl		sol	36x5	36x5d		wd		4-4¼x6¾-29.0	2	cent						Eismn				
Acason	M	5		172		p-stl		sol	36x6	40x6d	Sth	mt		4-4¾x6¾-36.2	2	cent						Eismn				
Ace	A	1½		144	P&B	p-stl	flex	sol	34x3½	34x5	Sch	wd	Buda	4-3¾x5⅛-22.5	4	ther	Mod	cst	Mod		sing	West	hand	sl&i	West	none
Ace	A	2½		156	P&B	p-stl	flex	sol*	36x4	36x7	Day	mt	Buda	4-4¼x5½-29.0	4	cent	Mod	cst	Mod		sing	West	hand	sl&i-2	West	none
Acme	B	1	1,950	130	Smith	p-stl	a-flex	sol	34x3½	34x5	Bim	wd	Con	4-3¾x5-22.50	4	ther	G&O	prs	G&O	fin	sing	Eismn	hand	lghtg	G&D	35
Acme	A	2	2,750	148	Smith	p-stl	s-flex	sol	36x4	36x7*	Bim	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	G&O	fin	sing	Eismn	hand	lghtg	G&D	35
Acme	C	3½	3,750	168	Smith	p-stl	s-flex	sol	36x5	40x10*	Bim	wd	Con	4-4½x5½-32.4	2	cent	own	cst	G&O	6n	sing	Eismn	hand	lghtg	G&D	35
Acme	E	5	4,850	180	Smith	p-stl	s-flex	sol	36x6	40x12*	Sth	mt	Con	4-4¾x6-36.2	2	cent	own	cst	G&O	fin	sing	Eismn	hand	lghtg	G&D	35
Air-O-Flex	C	1½		160	P&B	p-stl	s-flex	sol	36x3½	36x5		wd	Buda	4-3¾x5¼-22.5	4	pist	Mod	cst	Mod	pln	dual	Wag	hand	sl&i-2	Wag	none
All-American	A	1	1,295	130	Drt	p-stl	flex	p&s	33x4	32x4		wd	H-S	4-3¼x5-16.9	4	ther	own	cst	Stan	cel	sing	Simms*	hand	s&l	West	
All-Power	SV4	3½	4,500	166	Prsh	p-stl	a-flex	sol	36x6	36x10	Clrk*	mt	Con	4-4½x5½-32.4	2	cent	McC	cst	McC	fin	dual	Eismn	hand	sl&i*	West	none
Apex	C	1	1,395	130	own	rol-c	rigid	p&s	33x4	32x3½	Bim	wd	Buda	4-3½x5½-19.6	4	ther	Can	cst	Can	cel	sing	Aut-L	hand	s*l&i	Aut-L*	
Apex	D	1½	1,595	130	own	rol-c	rigid	sol	32x3½	32x4	Bim	wd	Buda	4-3½x5⅛-19.6	4	ther	Can	cst	Can	cel	sing	Aut-L	hand	s&l	Aut-L	75
Apex	E	2½	2,450	150	own	rol-c	rigid	sol	36x4	36x6	Prud	wd	Buda	4-4¼x4½-29.0	4	cent	Con	cst	Can	cel	sing	Eismn	hand	s&l	Eismn	
Armleder	HW	2	2,900	156	Smh	p-stl	s-flex	sol	36x4	36x4d	Crn	wd	Con	4-4⅛x5¼-27.2	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	none	none	none
Armleder	KW	3½	3,850	186	own	rol-i	flex	sol	36x5	36x5d	Crn	wd	Con	4-4½x5½-32 4	2	cent	own	cst	own	fin	sing	Eismn	hand	none	none	none
Atco	W25	2	2,875	150	P&B	p-stl	rigid	sol*	36x4*	36x7*	Sth	mt	Buda	4-4¼x5½-29.0	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Atterbury	7CX	2½		153½	Savg	p-stl	flex	sol	36x4	36x4d	Arch	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Lng	fin	sing	Eismn	fixed	lghtg	Vesta	
Atterbury	7D	3½		167½	Savg	p-stl	flex	sol	36x5	40x5d	Arch	wd	Con	4-4½x5½-32.4	2	cent	own	cst	Lng	fin	sing	Eismn	hand	lghtg	Vesta	
Atterbury	8E	5		167½	Savg	p-stl	flex	sol	36x5	40x6d	Day	mt	Con	4-4¾x6-36.2	2	cent	own	cst	Lng	fin	sing	Eismn	hand	s&l	Delco	none
Autocar	21UF	2	2,300	97	own	rol-c	s-flex	sol*	34x4	34x5		wd	own	2-4¾x4½-18.1	1	cent	own	sht	own	fin	sing	Bosch*	fixed	none	none	none
Autocar	UC21	2	2,400	120	own	rol-c	s-flex	sol*	34x4	34x5		wd	own	2-4¾x4½-18.1	1	cent	own	sht	own	fin	sing	Bosch*	fixed	none	none	none
Autohorse	10	5	2,100	43	own	rol-c	rigid	sol	34x10		Bim	wd	Con	4-3¾x5-22.5	4	cent	Eurk	sht	Eurk	cel	sing	Eismn	hand	none	none	none
Available	H2	2	2,950	148	own	rol-c	rigid	sol	36x4	36x7	Sch	wd	Con	4-4⅛x5¼-27.2	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Available	H2½	2½	3,250	148	own	rol-c	rigid	sol	36x4	36x8	Sch	wd	Con	4-4⅛x5¼-27.2	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Available	H3	3½	4,200	156	own	rol-c	rigid	sol	36x5	40x10*	Sch	wd	Con	4-4½x5½-32.4	2	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Available	H5	5	4,900	168	own	rol-c	rigid	sol	36x6	40x6d*	Sch	wd	Con	4-4¾x6-36.2	2	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Beck	A	1	1,500	124	P&B	p-stl	rigid	sol*	34x3*	34x4*	Bim	wd	Con	4-3½x5-19.6	4	ther	Idl	cst	Idl	cel	sing	Bosch	fixed	lghtg-2	Vesta	75
Beck	B	1½	1,900	144	P&B	p-stl	rigid	sol*	34x3½*	34x5*	Bim	wd	Con	4-3¾x5-22 5	4	ther	Idl	cst	Idl	cel	sing	Bosch	fixed	lghtg-2	Vesta	75
Beck	C	2	2,350	144	P&B	p-stl	rigid	sol*	36x3½*	36x6*	Bim	wd	Con	4-4⅛x5¼-27.2	4	g-p	Idl	cst	Idl	cel	sing	Bosch	fixed	lghtg-2	Vesta	75
Belmont	AA	¾	1,150	114	Savg	p-stl	s-flex	pnu	31x4	31x4	E&O	wd	Con	4-3½x5-19.6	4	ther	Chgo	cst	Chgo	fin	dual	Conn	hand	sl&i-2	Dneto	none
Belmont	BB	1½	1,950	144	own	rol-c	s-flex	sol*	34x4½	36x5	E&O	wd	Con	4-3¾x5¼-22.5	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	lghtg	Dneto	none
Belmont	CC	2½	2,550	154	own	rol-c	s-flex	sol	36x4	36x7	clrk	mt	Con	4-4⅛x5¼-27.2	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	lghtg	Dneto	none
Belmont	DD	3½	3,550	160	own	rol-c	s-flex	sol	36x5	40x5d	clrk	mt	Con	4-4½x5½-32.4	2	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	lghtg	Dneto	none
Bessemer	G	1	1,600	124	Savg	p-stl	s-flex	sol*	34x3	34x4	Sch	wd	Con	4-3½x5-19.6	4	ther	Idl	sht	Idl	cel	sing	Bosch	hand	opt	opt	
Bessemer	H-2	1½	2,085	144	P&B	p-stl	s-flex	sol*	36x3½	36x5	Sch	wd	Con	4-3¾x5-22.5	4	ther	own	cst	Idl*	cel	sing	Bosch	hand	opt	opt	
Bessemer	J-2	2½	2,785	158	P&B	p-stl	s-flex	sol*	36x4	36x4	Sch	wd*	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Idl*	cel	sing	Bosch	hand	opt	opt	
Bessemer	K-2	4	3,985	175	P&B	p-stl	s-flex	sol	36x6	36x10	Sth	mt	Con	4-4½x5½-32.4	2	ther	own	cst	Stan	cel	sing	Bosch	hand	opt	opt	
Bethlehem	D	1½	1,965	136	Drt	p-stl	s-flex	sol	34x3½	34x5	Way	wd	own	4-3¾x4½-22.5	2	cent	Fed	cst	Fed	cel	dual	A-Knt	hand	s&l-2	G&D	none
Bethlehem	E	2½	2,365	144	Drt	p-stl	s-flex	sol	34x4	34x6	Way	wd	own	4-4x4½-25.6	2	cent	Fed	cat	Fed	cel	dual	A-Knt	hand	s&l-2	G&D	none
Bethlehem	F	3½	3,465	162	Drt	p-stl	s-flex	sol	34x4	34x5d	Way	wd	own	4-4⅜x6-30.7	2	ther	Fed	cst	Fed	cel	dual	A-Knt	hand	s&l-2	G&D	none
Betz		2½	2,700	150	P&B	p-stl	s-flex	sol	36x4	36x7	Day	mt	Buda	4-4¼x5½-29.0	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	fixed	none	none	none
Bollstrom	A	5		144	own	rol-c	flex	sol*	36x6	36x6	clrk	mt	own	4-4¼x5½-29.0	1	cent	own	cst	own		sing	Bosch	hand			
Brinton	F	2½	3,000	150	own	rol-c	s-flex	sol	36x4	36x6	Sch	wd	Con	4-4⅛x5¼-27.2	4	cent	M-R	cst	M-R	fin	sing	Bosch	hand	none	none	none
Briscoe	T-34	1	1,485	121	Prsh	p-stl	rigid	p&s	33x4	34x3½	Hay	wd	own	4-3⅜x5-18.2	4	ther	Pfx	cst	Pfx	zz-t	sing	Conn	hand	sl&i-2	Aut-L	none
Brockway	S	1½	2,100	140	Prsh	p-stl	s-flex	sol	36x3½	36x5	H&D	wd	Con	4-3¾x5-22.5	4	ther	Bush	cst	Bush	fin	sing	Eismn	fixed	sl&i-2	Dneto	200
Brockway	K-4	2½	2,950	152	Prsh	p-stl	s-flex	sol	36x4	36x7	H&D	wd	Con	4-4⅛x5½-27.2	4	cent	Bush	cst	Bush	fin	sing	Eismn	hand	sl&i-2	Dneto	200
Brockway	R-2	3½	3,900	164	Prsh	p-stl	s-flex	sol	36x5	36x5d	Sth	mt	Con	4-4½x5½-32 4	2	cent	Bush	cst	Bush	fin	sing	Eismn	hand	sl&i-2	Dneto	200
Brockway	T-5	5	5,000	172	Prsh	p-stl	s-flex	sol	36x6	40x6d	Sth	mt	Con	4-4¾x6-36.2	2	cent	Lng	cst	Lng	fin	sing	Eismn	hand	none	none	
Champion	1200	3/5	1 000	114		p-stl	s-flex	pnu	32x4	32x4		wd	Lght	4-3¼x4½-16 9	4	ther		prs		zx-t	sing	A-Knt	hand	lghg-2		none
Clydesdale	32	1		144	P&B	p-stl	s-flex	sol*	34x3½*	34x5*	Sch	wd	Con	4-3¾x5-22.5	4	ther	own	cst	own	pln	sing	Bosch	hand			

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in [illegible]
cylinders cast, 1 singly
cyl-ends—[illegible]
d—dual
d-d—dry disk
d-p—dry plate
dplx—from both motor & drive-shaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—[illegible] gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-1—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square-tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

# of Gasoline Motor Trucks for 1920

Chassis as Produced by 208 American Manufacturers—Full Par-
Engines, Clutches, Gearsets, Rear Axles, Steering Gears, Gov-
and Fuel Systems

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
none	none				Schblr	grv	none	none	elec	none	amid	2	int-g-f	own		r-rd	r-rd	S-P	ext-r-w	ext-f-w	r	Gem	r	mtl	Franck	A & B 3T
none	none				Schblr	grv	none	none	elec	none	amid	2	int-g-f	own		r-rd	r-rd	S-P	ext-r-w	ext-f-w	r	Gem	r	mtl	Franck	A. & B. 5T
cent		motor			Schlbr		d-d		selec	Fuller		3	worm	Timkn					int-r-w	int-r-w						Acason 1
cent		motor			Schblr		d-d		selec	Fuller		3	worm	Timkn					int-r-w	int-r-w						Acason RB
cent		motor			Schblr		d-d		ind-c	Cotta		3	worm	Timkn					int-r-w	int-r-w	r	Ross	ctr			Acason H
cent		motor			Schblr		d-d		ind-c	Cotta		3	worm	Timkn					int-r-w	int-r-w		Ross	ctr			Acason L
cent		motor			Schblr		d-p	B-Beck	ind-c	Cotta		3	worm	Timkn					int-r-w	int-r-w		Ross	ctr			Acason M
cent	Pierce	motor	1200	17	Schblr	grv	d-d	M & E	selec	Cotta	amid	3	worm	Timkn	7.00	sprgs	sprgs	Mth	int-r-w	int-r-w	l	Ross	ctr	mtl	Spicer	Ace A
cent	Pierce	motor	1000	14	Schblr	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	7.75	sprgs	sprgs	Mth	int-r-w	int-r-w	l	Ross	ctr	mtl	Spicer	Ace A
cent	Dplx	gearst	1700	22	Rayfld	vac	d-p	B-Beck	ind-c	Cotta	motr	3	worm	Timkn	7.75	sprgs	sprgs	Dtr	int-r-w	int-r-w	l	Ross	ctr	mtl	Blood	Acme B
cent	Dplx	gearst	1500	17	Rayfld	vac	d-p	B-Beck	ind-c	Cotta	motr	3	worm	Timkn	8.50	sprgs	sprgs	Dtr	int-r-w	int-r-w	l	Ross	ctr	mtl	Blood	Acme A
cent	Dplx	gearst	1200	13	Rayfld	vac	d-p	B-Beck	ind-c	Cotta	amid	3	worm	Timkn	12.00	r-rd	sprgs	Dtr	int-r-w	int-r-w	l	Ross	ctr	mtl	Blood	Acme C
l-b	Con	motor	1250	13	Rayfld	vac	d-p	B-Beck	ind-c	Cotta	amid	3	worm	Timkn	11.67	r-rd	sprgs	Dtr	int-r-w	int-r-w	l	Ross	ctr	mtl	Blood	Acme E
suct	Phro	motor	1800	28	Stmbg	grv	d-p	B-Beck	selec	B-Lipe	amid	4	int-g	Russl	5.46	r-rd	r-rd		int-r-w	ext-r-w	l	Ross	ctr	fab	Therm	Air-O-Flex C
			2500	25	Stmbg	grv	d-p	B-Beck	selec	G-Lees	motr	3	int-g	Torbn	6.50	sprgs	sprgs	Dtr	ext-r-w	int-r-w	l	Ross	ctr	mtl	Univl	All-American A
suct	Phro	motor	1500	23	Zenith	grv	d-d	Detlaf	ind-c	Cotta	motr	3	worm	Timkn		sprgs	sprgs	Tutb	ext-r-w	int-r-w	l	Ross	ctr	mtl	Unvsl	All-Power SV4
none	none			35	Stmbg	vac	d-d	Fuller	selec	Fuller	motr	3	int-g	Torbn	6.50	sprgs	sprgs	Dtr	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Apes C
none	none				Stmbg	vac	d-d	Fuller	selec	Fuller	motr	3	int-g	Torbn	8.00	sprgs	sprgs	Dtr	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Apes D
cent	Dplx	motor	1177	14	Stmbg	vac	d-d	Fuller	selec	Fuller	motr	3	int-g	Torbn	9.00	sprgs	sprgs	Dtr	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Apes E
cent	Pierce	motor	1100	16	Schblr	grv	d-d	B-Lipe	selec	B-Lipe	motr	3	worm	Timkn	8.75	r-rd	sprgs	Mtb	int-r-w	int-r-w	l	Ross	ctr	mtl	Spicer*	Armleder HW
cent	Pierce	motor	1100	14	Schblr	grv	d-d	B-Lipe	selec	B-Lipe	motr	3	worm	Timkn	8.75	r-rd	sprgs	Mtb	int-d-s	int-r-w	l	Ross	ctr	mtl	Spicer*	Armleder KW
cent	Pierce	motor	1150	16	Stmbg	vac	d-d	Fuller	selec	Fuller	amid	4	worm	Wis*	7.75	sprgs	sprgs	Shel	int-r-w	int-r-w	l	Ross	ctr	mtl	Hart	Atco W25
suct	Mnsch	motor	1300	15	Zenith	grv	d-d	B-Lipe	selec	B-Lipe	motr	4	worm	Timkn	9.25	sprgs	sprgs	Sp-P	int-r-w	int-r-w	r	Gem	r	mtl	Spicer	Atterbury 7CX
suct	Mnsch	motor	1200	13	Zenith	grv	d-d	B-Lipe	selec	B-Lipe	motr	4	worm	Timkn	10.33	sprgs		Sp-P	int-r-w	int-r-w	r	Gem	r	mtl	Spicer	Atterbury 7D
cent	Con	motor	1150	11	Zenith	vac	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	11.60	r-rd		Sp-P	int	int	l	Gem	ctr	mtl	Spicer	Atterbury 8E
none	none	none		20	Stmbg	grv	d-p	own	prog	own	amid	3	d-rd	own	8.30	sprgs	sprgs		ext-r-w	int-r-w	r	own	r	mtl		Autocar 21UF
none	none	none		20	Stmbg	grv	d-p	own	prog	own	amid	3	d-rd	own	8.30	sprgs	sprgs		ext-r-w	int-r-w	r	own	r	mtl		Autocar 21UG
none	none	none	1200	15	Stmbg	grv	d-p	B-Beck	selec	Detrt	amid	3	int-g	own	11.41	tor-a	tor-a	Chmp	ext-d-s	int- -w	c	own	r			Autohorse 10
none	none	none	940	13	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Wis*	7.75	r-rd	sprgs	Tuth	int-r-w	int-r-w	l	Ross*	ctr	mtl*	Spicer*	Available H-2
cent	Pierce	motor	1051	13	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Wis*	8.66	r-rd	sprgs	Tuth	int-r-w	int-r-w	l	Ross*	ctr	mtl*	Spicer*	Available H-2½
cent	Pierce	motor	924	9	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Wis*	10.66	r-rd	sprgs	Tutb	int-r-w	int-r-w	l	Ross*	ctr	mtl*	Spicer*	Available H-3½
cent	Con	motor	881	9	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	11.66	r-rd	sprgs	Tutb	int-r-w	int-r-w	l	Ross	ctr	mtl*	Spicer*	Available H-5
cent	Pierce	motor			Stmbg	grv	d-d	Fuller	selec		motr	3	int-g	Clrk	6.50	sprgs	sprgs	Hig	ext-r-w	int-r-w	l	Lavn	ctr	fab	Blood	Beck A
cent	Pierce	motor			Stmbg	grv	d-d	Fuller	selec		motr	3	int-g	Clrk	8.00	sprgs	sprgs	Hig	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Blood	Beck B
cent	Pierce	d-s			Stmbg	grv	d-d	Fuller	selec		motr	3	int-g	Clrk	9.00	sprgs	sprgs	Hig	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Blood	Beck C
cent	Pierce	motor	1050	18	Zenith	grv	W-P	G-Lees	selec	G-Lees	motr	3	int-g	Clrk	5.25	sprgs	sprgs	Mtb	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Sterl	Belmont AA
cent	Pierce	motor	1050	16	Zenith	vac	W-P	G-Lees	selec	G-Lees	motr	3	int-g	Clrk	7.00	sprgs	sprgs	Mth	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Sterl	Belmont BB
cent	Pierce	motor	1050	12	Zenith	vac	d-d	Fuller	selec	Fuller	motr	3	int-g	Clrk	8.00	sprgs	sprgs	Mth	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Sterl	Belmont CC
cent	Pierce	motor	1050	10	Zenith	vac	d-d	Fuller	selec	Fuller	motr	4	int-g	Clrk	10.00	sprgs	sprgs	Mth	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Sterl	Belmont DD
none	none	none	1450	20	Zenith	grv	d-d	Fuller	selec	Fuller	motr	3	int-g	Torbn	7.00	sprgs	sprgs	S-P	ext-r-w	int-r-w	l	Ross	ctr	mtl	Arvac	Bessemer G
cent	Pierce	motor	1400	17	Zenith	grv	d-p	B-Beck	selec		amid	3	int-g	Torbn	8.00	r-rd	sprgs	S-P	ext-r-w	int-r-w	l	Ross	ctr	mtl	Arvac	Bessemer H2
cent	Pierce	motor	1400	14	Zenith	grv	d-p	B-Beck	selec	B-Lipe	amid	4	int-g	Torbn	8.00	r-rd	sprgs	S-P	ext-r-w	int-r-w	l	Ross	ctr	mtl	Arvac	Bessemer J2
cent	Pierce	motor	1250	12	Zenith	grv	d-p	B-Beck	selec	B-Lipe	amid	4	int-g	Torbn	10.25	r-rd	sprgs	S-P	int-r-w	ext-d-s	l	Ross	ctr	mtl	Spicer	Bessemer K2
suct	Mnrch	motor	1358	18	Schblr	grv	d-p	B-Beck	selec	Detrt	motr	3	int-g	Russel	8.20	sprgs	sprgs	Shel	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Bethlehem D
suct	Mnrch	motor	1303	15	Schblr	grv	d-p	B-Beck	selec	Detrt	motr	3	int-g	Russel	8.80	sprgs	sprgs	Shel	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Bethlehem E
suct	Mnrch	motor	1113	12	Schblr	grv	d-p	B-Beck	selec	Detrt	motr	3	int-g	Russel	9.40	sprgs	sprgs	Shel	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Univl	Bethlehem F
cent	Pierce	motor	1100	15	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	motr	4	worm	Timkn	8.50	sprgs	sprgs	Tutb	int-r-w	int-r-w	l	Ross	ctr	mtl	Unvsl	Betz 2½-Ton
cent		motor	1000	12	Stmbg	grv	d-d		ind-c	own	amid	4	int-g	own		sprgs	sprgs		ext-d-a	ext-w4	l	Gem	ctr	mtl	own	Bollstrom A
cent	Pierce	motor	1000	18	Stmbg	grv	d-d	B-Lipe	selec	B-Lipe	motr	3	worm	Timkn		r-rd	t-arm	Phila	int-r-w	int-r-w	l	Ross	l&c	mtl	Spicer	Brinton F
none	none	none	2400	25	Buick	grv	cone	own	selec	own	motr	3	int-g	Russel	8.20	sprgs	sprgs	Aloy	ext-r-w	int-r-w	l	Lavn	ctr	mtl	Unvsl	Briscoe T-34
none	none		1300	18	Schblr	vac	d-d	B-Lipe	selec	B-Lipe	motr	3	worm	Shel	7.80	r-rd	sprgs	Merl	int-r-w	int-r-w	l	Gem	ctr	mtl	Spicer	Brockway S
none	none		1200	15	Schblr	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	8.50	r-rd	sprgs	Merl	int-r-w	int-r-w	l	Gem	ctr	mtl	Spicer	Brockway K-4
none	none		1200	12	Schblr	grv	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	10.33	r-rd	sprgs	Merl	int-r-w	int-r-w	l	Gem	ctr	mtl	Spicer	Brockway R-2
l-b	Con	motor	1200	12	Schblr	vac	d-d	B-Lipe	selec	B-Lipe	amid	4	worm	Timkn	11.66	r-rd	sprgs	Merl	int-r-w	int-r-w	l	Gem	ctr	mtl	Spicer	Brockway T
none	none					grv	d-p		selec		motr	3	bevel		5.25	sprgs	sprgs		ext-r-w	int-r-w	l		ctr	mtl		Champion 1200
cent	own	motor	1200	17	Zenith	grv	d-d	B-Lipe	selec	B-Lipe	motr	3	worm	Timkn	7.20	r-rd	sprgs	S-P	int-r-w	int-r-w	l	Ross	ctr	mtl	Spicer	Clydesdale 32

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A, Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model		Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE			COOLING					IGNITION			ELEC. SYSTEM		
					Make	Material	Type	Kind	Size in Ins. Front	Size in Ins. Rear	Make	Type	Make	No. Cyl Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	Water Circ.	Radiator CASE Make	Radiator CASE Type	Radiator CORE Make	Radiator CORE Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
Clydesdale	42	1½		146	P&B.	p-stl.	s-flex.	sol*	36x3½*	36x6*	Sch.	wd.	Con.	4-3¾x5-22.5	4	ther.	own.	cst.	own.	pln.	sing.	Bosch.	hand.			
Clydesdale	65	2		163	P&B.	p-stl.	s-flex.	sol*	36x4*	36x4d*	Sch.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	own.	cst.	own.	pln.	sing.	Bosch.	hand.			
Clydesdale	90	3½		180	P&B.	p-stl.	s-flex.	sol.	36x5	40x5d	Sch.	wd.	Con.	4-4½x5½-32.4	2	cent.	own.	cst.	own.	pln.	sing.	Bosch.	hand.			
Clydesdale	120B	5		176	P&B.	p-stl.	-flex.	sol.	36x6	40x6d	Sth.	mt.	Con.	4 4¾x6-36.2	2	cent.	own.	cst.	own.	pln.	sing.	Eismn.	hand.			
Collier	18	1		140		p-stl.		sol.	34x4	34x5*			Con.	4-3½x5-19.6	4	cent.	Lng.					Eismn.				
Collier	19	1½		144				sol.	36x4	36x6*			Con.	4-3¾x5-22.5	4	cent.						Eismn.				
Collier	20	2		152		rol-c.		sol.	36x4	36x7			Con.	4-4⅛x5¼-27.2	4	cent.						Eismn.				
Columbia	F	1	1,750	126	own.	rol-c.	flex.	sol.	34x3½	34x4	Crn.	wd.	Con.	4-3¾x5-22.5	4	cent.	Lng.	cst.	Lng.	fin.	sing.	Bosch.	hand.	none.	none.	none
Columbia	G	2½	2,650	144	own.	rol-c.	s-flex.	sol.	36x4	36x7	Crn.	wd.	Hink.	4-4x5¼-25.6	4	cent.	Lng.	cst.	Lng.	fin.	sing.	Bosch.	hand.	s&l-2.	Remy.	125
Commerce	F	1	1,590	126	Drt.	p-stl.	flex.	sol*	34x3*	34x4*	Bim.	wd.	Con.	4-3¾x5-22.5	4	ther.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	fixed.	s&l.	Bijur.	none
Commerce	EP	1½	1,965	134	Drt.	p-stl.	flex.	pnu.	36x6	36x6	Bim.	wd.	Con.	4-3¾x5-22.5	4	ther.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	fixed.	s&l.	Bijur.	none
Concord	A	1½	2,350	140	P&B.	p-stl.	s-flex.	sol.	36x3½	36x5	Crn.	wd.	Buda.	4-3¾x5¼-22.5	4	cent.	Bush.	cst.	Bush.	fin.	sing.	Eismn.	hand.			
Concord	B	2½	2,850	150	P&B.	p-stl.	s-flex.	sol.	36x4	36x4d	Crn.	wd.	Buda.	4-4¼x5½-29.0	4	cent.	Bush.	cst.	Bush.	fin.	sing.	Eismn.	hand.			
Conestoga	12	¾		124	Savg.	p-stl.		pnu.	32x4½	32x4½	E&O.	wd.	Con.	4-3½x5-19.6	4	ther.				cel.	sing.	Simms	hand.	s&l.		none
Conestoga	20	1	2,100	128	own.	rol-c.		sol*	34x3½*	34x5*	E&O.	wd.	Con.	4-3½x5-19.6	4	ther.	own.	cst.	E&M.	fin.	sing.	Simms	hand.			
Conestoga	30	2	2,700	138	own.	rol-c.	rigid.	sol.	36x4	36x4d	E&O.	wd.	Con.	4-3¾x5-22.5	4	ther.	own.	cst.	E&M.	fin.	sing.	Simms	hand.			
Corbitt	E	1	2,150	130	own.	rol-c.	flex.	sol.	34x3½	34x4	Bim.	wd.	Con.	4-3¾x5-22.5	4	ther.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none	
Corbitt	D	1½	2,400	130	own.	rol-c.	flex.	sol.	36x3½	36x5	Bim.	wd.	Con.	4-3¾x5-22.5	4	ther.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none	
Corbitt	C	2	3,000	148	own.	rol-c.		sol.	36x3½	36x7	Bim.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none.	
Corbitt	B	2½	3,200	148	own.	rol-c.	s-flex.	sol.	36x4	36x7	Bim.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none.	
Corbitt	A	3½	4,000	178	own.	rol-c.	s-flex.	sol.	36x5	36x10	Sth.	mt.	Con.	4-4½x5½-32.4	2	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none.	
Corbitt	AA	5	5,000	178	own.	rol-c.	s-flex.	sol.	36x6	40x12	Sth.	mt.	Con.	4-4¾x6-36.2	2	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none.	none	
Dart	E	1		130	Savg.	p-stl.	s-flex.	sol.	34x3½	34x5	Bim.	wd.	Buda.	4-3¾x5¼-22.5	4	ther.	own.	cst.	S-J.	cel.	sing.	Eismn.	hand.	s&l*	Bijur*	200
Dart	CC4	2		150	Savg.	p-stl.	s-flex.	sol.	36x4	36x7	Bim.	wd.	Buda.	4-4¼x5½-29.0	4	cent.	own.	cst.	S-J.	cel.	sing.	Eismn.	hand.	s&l*	Bijur*	200
Dart	L	3½		160	Savg.	p-stl.	s-flex.	sol.	36x5	36x10	Bim.	wd.	Buda.	4-4½x6-32.4	4	cent.	own.	cst.	S-J.	cel.	sing.	Eismn.	hand.	s&l*	Bijur*	200
Day-Elder	A	1	1,775	128	Savg.	p-stl.	s-flex.	sol.	34x3	34x4	Jns.	wd.	Con.	4-3½x5-19.6	4	ther.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	s&l.	Eismn.	150
Day-Elder	B	1½	2,075	144	Savg.	p-stl.	s-flex.	sol.	34x3½	34x5	Jns.	wd.	Con.	4-3¾x5-22.5	4	ther.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	s&l.	Eismn.	150
Day-Elder	D	2	2,450	144	Savg.	p-stl.	s-flex.	sol.	36x4	36x6	Jns.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	s&l.	Eismn.	150
Day-Elder	C	2½	2,750	150	Savg.	p-stl.	s-flex.	sol.	36x4	36x7	Jns.	wd.	Buda.	4-4½x5¼-32.4	4	cent.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	lghtg.	Eismn.	90
Day-Elder	F	3½	3,350	165	Savg.	p-stl.	s-flex.	sol.	36x5	36x5d	Jns.	wd.	Con.	4-4½x5½-32.4	2	cent.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	lghtg.	Eismn.	90
Day-Elder	E	5	4,500	150	Savg.	p-stl.	s-flex.	sol.	36x5	40x6d	Jns.	wd.	Buda.	4-4½x6-32.4	2	cent.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	fixed.	lghtg.	Eismn.	90
Dearborn	F	1½	1,980	126	own.	rol-c.	s-flex.	sol*	34x4*	34x5*		wd.	Con.	4-3½x5-19.6	4	ther.		cst.		fin.	sing.	Bosch.	hand.			
Dearborn	BW	2	2,250	133	own.	rol-c.	s-flex.	sol.	34x4	34x5		wd.	Buda.	4-3¾x5¼-22.5	4	ther.	Chgo.	cst.	Chgo.	fin.	sing.	Bosch.	hand.			
Defiance	D	1½		140	Drt.	p-stl.	s-flex.	pnu.	35x5	36x6	Crn.	wd.	Con.	4-3¾x5-22.5	4	cent.	Pfx.	cst.	Pfx	cel.	sing.		hand.	s&l-2.		none
Defiance	E	2		140	Drt.	p-stl.	s-flex.	pnu.	35x5	38x7	Crn.	wd.	Con.	4-3¾x5-22.5	4	cent.	Pfx.	cst.	Pfx.	cel.	sing.		hand.	s&l-2.		none
DeKalb	E2	2	2,250	134	Prsh	p-stl.	flex.	sol*	34x3½*	36x5*	Sch.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Jck.	sht.	Jck.	pln.	sing.	Eismn.	hand.	none.	none.	
DeKalb	E2½	2½	2,600	136	Prsh	p-stl.	flex.	sol*	36x4*	36x6*	Sch.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Jck.	sht.	Jck.	pln.	sing.	Eismn.	hand.	none.	none.	
Denby	12	1	1,950	124				sol.	36x3	36x4			Con.	4-3½x5-19.6		ther.	Lng.		Lng.			Eismn.				
Denby	124	2	2,450	133				sol.	36x3½	36x6			Con.	4-3¾x5-22.5		ther.	Lng.		Lng.			Eismn.				
Denby	25	3	3,250	150				sol.	36x4	36x7			Con.	4-4⅛x5¼-27.2		cent.	Lng.		Lng.			Eismn.				
Denby	210	5	4,900	170				sol.	36x6	40x12			Con.	4-4½x5½-32.4		cent.	Lng.		Lng.			Eismn.				
Diamond-T	T	1½	2,220	144	Smh.	p-stl.		sol.	36x3½	36x5		wd.		4-3¾x5¼-22.5	4	cent.		cst.	G&O.	fin.	sing.	Bosch.	fixed.			
Diamond-T	FS	1½	2,445	144	Smh.	p-stl.		sol.	36x3½	36x5		wd.		4-3¾x5¼-22.5	4	cent.		cst.	G&O.	fin.	sing.	Bosch.	fixed.			
Diamond-T	J4	1½	2,755	154	Smh.	p-stl.		sol.	36x3½	36x5		wd.	Con.	4-3¾x5-22.5	4	ther.		cst.	G&O.	fin.	sing.	Bosch.	fixed.			
Diamond-T	J3	2	3,185	154	Smh.	p-stl.		sol.	36x4	36x7		wd.	Con.	4-4⅛x5¼-27.2	4	cent.		cst.	G&O.	fin.	sing.	Bosch.	fixed.			
Diamond-T	LB	3½	4,390	170	Smh.	p-stl.		sol.	36x5	36x5d		wd.	Con.	4-4½x5½-32.4	2	cent.		cst.	G&O.	fin.	sing.	Bosch.	hand.			
Diamond-T	R	5	5,190	170	Smh.	p-stl.		sol.	36x6	40x6d		wd.	Con.	4-4½x5½-32.4	2	cent.		cst.	G&O.	fin.	sing.	Bosch.	hand.			
Diamond-T	S	5	5,660	180	Smh	p-stl.		sol.	36x6	40x6d		wd.	own	4-4¾x6-36.2	2	cent.		cst.	G&O.	fin.	sing.	Bosch.	hand.			
Dorris	K-4	2½	3,285	144	Smh.	p-stl	s-flex.	sol*	36x4*	36x8*	Sth	mt.	own.	4-4¼x5½-29.0	4	cent.	own.	cst.	McC.	fin.	sing.	Bosch	hand.	s&l-2.	West.	175
Dorris	K-7	3½	4,200	154	Smh.	p-stl.	s-flex.	sol*	36x5*	36x10*	Sth.	mt.	own.	4-4¼x5½-29.0	4	cent.	own.	cst.	McC.	fin.	sing.	Bosch.	hand.	s&l-2.	West.	175
Douglas	C	1	1,700	122	own.	rol-c.		sol.	34x4½	35x5	own.	wd.	Buda.	4-3½x5¼-19.6	4	cent.	own.	cst.		fin.	sing.	Eismn.	hand.			
Douglas	E	2½	2,525	130	own.	rol-c.		sol.	34x4	36x7	own.	wd.	Buda.	4-4¼x5½-29.0	4	cent.	own.	cst.		fin.	sing.	Eismn.	hand.			
Duplex	E	3½	4,000	130	P&B.	p-stl.	rigid	sol.	36x6	36x6	Prud.	wd.	Buda.	4-4¼x5½-29.0	4	cent.	Lng.	prs.	Lng.	fin.	sing.	Eismn.	hand.	opt.	opt.	
Economy	T-LHD	¾	1,250	128		p-stl	s-flex.	pnu.	35x5	35x5	Auto.	wd.	own.	4-3¹¹⁄₁₆x5¼-21.2	4	cent.	own.	prs.	own.	cel.	dual.	Aut-L.	hand.	sl&i.	Aut-L.	none
Elmira	C	½	500	104	own.	rol-c.	s-flex.	pnu.	28x3	28x3	Mot	wr.	Perk.	4-3⅛x4-15.6	4	ther.	Bush.	prs.	Bush.	cel.	sing.	A-Knt	hand.	lghtg.	Carl.	65
Erie		1½		144		p-stl		sol.	34x3½	36x5				4-4⅛x5¼-27.2	1					fin.		Bosch.		opt.		150
Erie		2		144		p-stl.		sol.	34x3½	36x5				4-4⅛x5¼-27.2	1					fin.		Bosch.				
Erie		2½		160		p-stl.		sol.	34x4	36x5			Con.	4-4⅛x5¼-27.2	1					fin.		Bosch.				
Erie		3½		168		p-stl		sol.	36x5	40x5d			Con.	4-4½x5½-32.4	2					fin.		Bosch.				
Fageol	2½	2½	3,400	144	own.	rol-c.		sol.	34x4	36x7	Prud.	wd.	Wau.	4-4¼x5¾-29.0	2	cent.	own.	cst.	Mod.	zz-t.	sing.	Spltf.	hand.			
Fageol	3½	3½	4,500	172	own.	p-stl	flex	sol.	36x5	36x5d	Prud*.	wd*.	Wau.	4-	2	cent.	own.	cst.	Mod.	zz-t.	sing.	Spltf.	hand.			
Fageol	5	5	5,300	172	own.	p-stl.		sol.	36x6	40x6d	Prud*.	wd*.	Wau.	4-4½x6¼-32.4	2	cent.	own.	cst.	Mod.	zz-t.	sing.	Spltf.	hand.			

ABBREVIATIONS—Types of Construction

*****—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external driveshaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jackshaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square-tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS			
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE		Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make			STEERING GEAR					Name and Model	
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make					Foot	Hand	Placed	Make	Levers	Type	Make		
cent.	own.	motor	1200	18	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Timkn.	7.00	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer	Clydesdale	42
cent.	own.	motor	1100	14	Zenith.	grv.	d-d.	B-Lipe	selec	B-Lipe.	amid.	4	worm.	Timkn.	8.50	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Clydesdale	65
cent.	own.	motor	1100	13	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe.	amid.	4	worm.	Timkn.	10.33	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Clydesdale	90
cent.	own.	motor	1100	10	Stmbg.	vac	d-d.	B-Lipe.	selec.	B-Lipe.	amid	4	worm.	Timkn.	11.67	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Clydesdale	120B
suct.	Mnrch.	motor			Zenith.	vac.	d-d.			Fuller.	motr.	3	worm.						int-r-w	int-r-w						Collier	18
suct.	Mnrch.	motor			Zenith.	vac	d-d.	Fuller		Fuller.	motr	3	worm.						int-r-w	int-r-w						Collier	19
suct.	Mnrch.	motor			Zenith.	vac.	d-d.	Fuller.		Fuller.	motr.	4	worm.						int-r-w	int-r-w						Collier.	20
cent.	Pierce.	motor	1200	18	Stmbg.	grv.	d-d.	Detlaf.	selec	Covert.	motr.	3	int-g.	Russl.	7.70	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	own.	ctr.	mtl	Spicer.	Colombia	F
cent.	Hink.	motor	1200	15	Stmbg.	vac	d-d.	Detlaf.	selec.	Covert	amid.	3	int-g.	Russl.	9.40	sprgs.	sprgs.	S-P.	ext-r-w	int-r-w	l.	own.	ctr.	mtl	Spicer.	Colombia	G
none.	none.	none.	2200	30	Zenith.	vac.	conc	Detrt.	selec.	Detrt.	motr.	3	int-g.	Torbn.		sprgs.	sprgs.	Dtr.	ext-r-w.	int-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Commerce.	E
none.	none.	none.	2200	30	Zenith.	vac.	conc.	Detrt.	selec.	Detrt.	motr.	3	int-g.	Torbn.		sprgs.	sprgs.	Dtr.	ext-r-w.	int-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Commerce	EP
suct.	Mnrch.	motor	1170	18	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe.	motr.	3	worm.	Timkn.	7.75	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Concord	A
suct.	Mnrch.	motor	1266	16	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe.	motr.	3	worm.	Timkn.	8.50	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Concord	B
			1800	25	Stmbg.	grv.	d-p.	B-Beck.	selec	Muncie	motr.	3	int-g	Torbn.	6.50	sprgs.	sprgs.	Iron.	ext-r-w.	int-r-w	l.	CAS.	ctr.	mtl	Spicer.	Conestoga	12
			1350	17	Stmbg.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	worm.	Wis.	7.75	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Sterl.	Conestoga	20
	Dplx.		1350	14	Stmbg.	grv	d-d.	Fuller.	selec	Fuller.	motr	3	worm.	Wis.	9.66	sprgs.	sprgs.	Iron	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Sterl.	Conestoga	30
cent.	Dplx.	motor	1500	18	Stmbg.	vac	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Shel.	6.50	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Corbitt	E
cent.	Dplx.	motor	1200	18	Stmbg.	vac	d-d	Fuller	selec	Fuller.	motr.	3	worm.	Shel.	8.67	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Corbitt	D
cent	Dplx.	motor	1200	16	Stmbg.	vac.	d-d.	B-Lipe	selec	B-Lipe.	motr.	3	worm	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Hart.	Corbitt	C
cent.	Dplx.	motor	1200	16	Stmbg.	vac.	d-d.	B-Lipe	selec.	B-Lipe.	motr.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Hart.	Corbitt	B
cent.	Pierce.	motor	1100	14	Stmbg.	vac.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	4	worm.	Shel.	11.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Corbitt	A
cent.	Con.	motor	1000	11	Stmbg.	vac.	d-d.	Detlaf.	selec.	B-Lipe.	amid.	4	worm.	Shel.	11.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Blood.	Corbitt	AA
none	none.		1200	25	Zenith.	vac	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Timkn.	7.00	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Dart.	E
cent.	Pierce.	motor	1200	15	Zenith.	grv.	d-d.	Fuller	selec.	Fuller.	motr.	4	worm.	Timkn.	8.50	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Dart.	CC4
cent.	Pierce.	motor	1200	10	Zenith.	grv.	d-d.	Fuller	selec.	Fuller	amid.	4	worm.	Timkn.	10.75	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Dart.	L
none.	none.		1280	16	Zenith.	grv.	d-d.	Covert.	selec.	Covert.	motr.	3	worm.	Wis.	7.75	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Russ.	ctr.	mtl	Hart.	Day-Elder	A
none.	none.		1250	15	Zenith.	grv.	d-d.	Covert.	selec	Covert.	motr.	3	worm.	Wis.	8.33	sprgs.	sprgs.	Iron.	Int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Day-Elder	B
suct.	Mnrch.	motor	1000	14	Zenith.	grv.	d-d.	Covert	selec.	Covert	motr.	3	worm.	Wis.	7.67	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Day-Elder	D
suct.	Mnrch.	motor	950	14	Zenith.	grv.	d-d.	Covert.	selec.	Covert.	motr.	3	worm.	Wis.	8.67	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Day-Elder	C
suct.	Mnrch.	motor	900	12	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe	motr.	4	worm.	Wis.	10.10	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Day-Elder	F
suct.	Mnrch.	motor	800	10	Zenith.	grv.	d-d.	B-Lipe	selec	B-Lipe.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Iron.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Day-Elder.	E
						vac.	d-d.	Fuller.		Fuller.	motr.	3	worm.	Chic.		sprgs.	sprgs.		int-r-w	int-r-w	l.		ctr.	mtl	Hart.	Dearborn.	F
					Stmbg.	vac.	d-d.	B-Beck.	selec.	G-Lees.	motr.	3	worm.	Chic.		sprgs.	sprgs.		int-r-w	int-r-w	l.		ctr.	mtl.	Hart.	Dearborn	BW
none.	none.		1700	25	Stmbg.	vac	d-p.	B-Beck.	selec.	G-Lees.	motr.	3	int-g.	Torbn.	7.60	sprgs.	sprgs.	Dtr.	int-r-w	int-r-w	l.		ctr.	mtl		Defiance	D
none.	none.		1800	25	Stmbg.	vac.	d-p.	B-Beck.	selec.	G-Lees.	motr.	3	int-g.	Torbn.	9.10	sprgs.	sprgs.	Dtr.	int-r-w	int-r-w	l.	own.	ctr.	mtl.		Defiance	E
none.	none.		1500	18	Mast.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Timkn.	8.50	r-rd.	t-arm.	Mth	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	DeKalb	E2
none.	none.		1500	14	Mast.	grv.	d-d	Fuller.	selec.	Fuller.	motr.	3	worm	Timkn.	9.33	r-rd.	t-arm.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Hart.	DeKalb	E2½
suct.	Mnrch.	motor			Stmbg.		d-d	Fuller.		Fuller.		3	int-g.	Russl.				Dtr.				Ross.			Univl.	Denby	12
suct.	Mnrch	motor			Stmbg.		d-d.	Fuller		Fuller.		4	int-g.	Russl				Dtr.				Gem.			Univl.	Denby	134
suct.	Mnrch.	motor			Stmbg.		d-d.	Fuller.		Fuller.		4	int-g.	Russl.				Dtr.				Gem.			Univl.	Denby	25
	Simp.				Stmbg.		d-d			Warn		4	int-g.	Clrk.				Dtr.				Ross.			Univl.	Denby	210
				18	Stmbg.	vac.	d-d.		selec.		motr.	3	worm		8.25	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl*.	Spicer*	Diamond-T.	T
				18	Stmbg.	vac.	d-d.		selec.		motr.	3	worm.		8.25	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl*.	Spicer*	Diamond-T	TS
cent.	Pierce.	motor		16	Stmbg.	grv.	d-d	B-Lipe	selec.	B-Lipe.	motr.	3	worm.		7.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl*	Spicer*	Diamond-T.	J4
cent.	Pierce.	motor		15	Stmbg.	grv.	d-d	B-Lipe	selec.	B-Lipe	motr.	3*	worm.		7.75*	sprgs.	sprgs.	Mth	int-r-w	int-r-w	l*.		ctr.	mtl*.	Spicer*	DiamondT-.	J3
cent.	Pierce.	motor		12	Stmbg.	grv.	d-d	B-Lipe.	selec.	B-Lipe	amid.	4	worm.		8.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl	Spicer.	Diamond-T.	LB
cent.	Pierce.	motor		10	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.		13.66	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl	Spicer.	Diamond-T.	R
cent.	Pierce.	motor		10	Stmbg.	grv.	d-d.	B-Lipe.	selec	B-Lipe	amid.	4	worm.		13.66	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.		ctr.	mtl.	Spicer.	Diamond-T.	S
cent.	own.	motor	1100	15	Stmbg.	grv.	d-d.	Warner	selec	Warner	amid.	4	worm.	Timkn.	7.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Dorris	K-4
cent.	own.	motor	1100	12	Stmbg.	grv.	d-d.	Warner	selec.	Warner	amid.	4	worm.	Timkn.	10.33	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Dorris	K-7
cent.		motor	1800	18	Schblr.	vac	d-d.	Fuller.	selec	Fuller.	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	own.	ext-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Arvac.	Douglas.	C
cent.		motor	1400	15		vac.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Torbn.	4.00	sprgs.	sprgs.	own.	ext-r-w.	int-r-w	l.	Ross.		mtl	Arvac.	Douglas.	E
cent.	Dplx.	dplx.	1120	15	Schblr.	vac.	d-d.	B-Lipe.	selec	B-Lipe.	motr.	4	int-g-4	own.	38.4*	r-rd.	sprgs.	Tuth.	ext-d-s.	ext-r-w	l.	Lavn.	ctr.	mtl.	Blood	Duplex.	E
none.	none.	none.	2200	35	Zenith.	vac	cone.	own.	selec	Warn.	motr.	3	int-g.	Torbn.	6.51	sprgs.	sprgs.	S-P.	ext-r-w.	int-r-w	l.	Jacox	ctr.	mtl	Hart.	Economy	T-LHD
none.	none.		2200	35	Hol*.	grv.	cone.	own.	prog.	own.	amid.	2	bevel.	own.	3.60	sprgs.	sprgs.	Tuth	int-r-w	int-r-w	l.	own.	l.	mtl	own.	Elmira	C
cent.	Pierce.				Stmbg.	grv.	d-d.				amid.	4	worm.	Timkn.												Erie	1½
cent.	Pierce.				Stmbg.	grv.	d-d				amid.	4	worm.	Tmkn.												Erie	2
cent.	Pierce.				Stmbg.	grv.	d-d.				amid.	4	worm.	Tmkn.												Erie	2½
cent.	Pierce.				Stmbg.	grv.					amid.	4	worm.	Tmkn.												Erie	3½
cent.	Wau.	motor	1000	20	Zenith.	grv.	d-d.	B-Lipe	prog.	B-Lipe	motr.	5	worm.	Timkn.	5.60	sprgs.		Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	fab*	Therm*	Fageol	2½
cent.		motor	950		Zenith.	vac.	d-d.	B-Lipe	selec	own.	amid.	5	worm.	Timkn.	7.47	r-rd.	t-arm	Mth	int-r-w	int-r-w	l.	Ross.	ctr.	fab*.	Therm*	Fageol.	3½
cent.	Wau.	motor	950		Zenith.	vac.	d-d	B-Lipe.	selec.	own.	amid.	5	worm.	Timkn.	9.85	r-rd.	t-arm	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	fab*.	Therm*	Fageol	5

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malleable
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE													
								Size in Ins.							COOLING					IGNITION			ELEC. SYSTEM		
																Radiator									
																CASE		CORE							
				Make	Material	Type	Kind	Front	Rear	Make	Type	Make	No. Cyl Bore and Stroke N.A.C.C. Hp.	Cylinders Cast	Water Circ.	Make	Type	Make	Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
Famous B10	1	1,690	120	Savg	p-stl	flex	sol*	36x3½	36x4	Bim	wd	Con	4-3½x5-19.6	4	ther	Chgn	cst	Chgo	fin	sing	Eismn	fixed	lghtg	Eismn	120
Federal SD	1	2,300	132	Drt	p-stl	s-flex	pnu	35x5	36x6	Drt	mt	Con	4-3¾x5-22.5	4	cent	own	prs	McC*	fin	sing	Eismn	fixed	lghtg*	Aut-L	none
Federal TE	1½	2,500	144	Drt	p-stl	s-flex	sol	36x3½	36x5	Sch*	wd	Con	4-4⅛x5¼-27.2	4	cent	own	prs	McC*	fin	sing	Eismn	fixed			
Federal UE	2	2,800	156	Drt	p-stl	s-flex	sol	36x4	36x7	Sch*	wd	Con	4-4⅛x5¼-27.2	4	cent	own	prs	McC*	fin	sing	Eismn	fixed			
Federal WD	3½	3,650	156	Drt	p-stl	s-flex	sol	36x5	36x5d	Sth	mt	Con	4-4½x5½-32.4	2	cent	own	prs	McC*	fin	sing	Eismn	fixed			
Federal XC	5	4,500	156	Rus	rol-c	s-flex	sol	36x6	40x6d	Sth	mt	Con	4-4½x5½-32.4	2	cent	own	prs	McC*	fin	sing	Eismn	fixed			
Federal Tractor		2,950	120	Drt	p-stl	s-flex	sol	36x4	36x5	Sch*	wd	Con	4-4⅛x5¼-27.2	4	cent	own	prs	McC*	fin	sing	Eismn	fixed	none	none	none
Federal Tractor		3,775	114½	Rus	rol-c	s-flex	sol	36x5	36x5d	Sth	mt	Con	4-4½x5½-32.4	2	cent	own	prs	McC*	fin	sing	Eismn	fixed	none	none	none
Ford TT	1	550	124	P&B	p-stl	flex	p&s	30x3½	32x3½	Prud*	wd	own	4-3¾x4 -22.5	4	ther	own	sht	own	fin	sing	own	hand	lghtg		
Forschler AX	1½	2,375	120	own	rol-c	flex	sol*	36x3½	36x5	Sth	mt	Con	4-3½x 5-19.6	4	cent	own	cst	own	fin	sing	Bosch	fixed			
Forschler B	2	2,750	144	own	rol-c	flex	sol*	36x4	36x7	Sth	mt	Con	4-4⅛x5¼-27.2	4	cent	own	cst	own	fin	sing	Bosch	fixed			
Forschler BX	3	3,450	144	own	rol-c	flex	sol*	36x4	36x8	Sth	mt	Con	4-4⅛x5¼-27.2	4	cent	own	cst	own	fin	sing	Bosch	fixed			
F. W. D. B	3	4,500	124	Prsh	p-stl	flex	sol*	36x6	36x6	Sch*	wd*	Wsc	4-4¾x5½-36.2	2	cent	Lng.	cst	Lng	fin	sing	Eismn	hand	s&l	N-E	350
Fulton A	1		130		p-stl		pnu				wd		4-3½x5 -19.6	4	ther							hand	s&l		
Fulton C	2	2,350	137	P&B	p-stl	s-flex	sol	34x4	34x6	E&O	wd	H-S	4-3¼x5 -16.9	4	ther	G&O	cst	G&O	zz-t	sing	Simms	hand	none	none	none
Gabriel C	1	2,000	136	Prsh	p-stl	s-flex	pnu	35x5	35x5	Stn	wd	Buds	4-4¼x5½-29.0	4	cent	G&O	cst	G&O	cel	sing	Bosch	hand	s&l-2	L-N	100
Gabriel E	2	3,250	156	Prsh	p-stl	s-flex	sol*	36x4*	36x7*	Stn	wd	Buda	4-4¼x5½-29.0	4	cent	G&O	cst	G&O	cel	sing	Bosch	hand	s&l-2	L-N	100
Gabriel F	4	4,300	180	Prsh	p-stl	s-flex	sol	36x5	40x6d*	Sth	mt	Buda	4-4½x6 -32.4	4	cent	G&O	cst	G&O	cel	sing	Bosch	hand	s&l-2	L-N	100
Garford 25	1¼	1,890	135	own	p-stl	s-flex	sol	36x3½	36x4		wd	Buda	4-3¾x5⅛-22.5	4	cent	own	cst	Fed	fin	sing	Splft	hand	sl&i	West	125
Garford 70-B	2	3,300	142	own	p-stl	s-flex	sol*	36x4	36x7	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	own	fin	sing	Splft	hand	s&l	West	175
Garford 68	5	5,000	128	own	p-stl	s-flex	sol	36x6	40x6d	Sth	mt	Wsc	4-4¾x5½-36.2	2	cent	own	cst	own	fin	dual	Eismn	hand	lghtg	West	125
Garford 69	6	5,300	128	own	p-stl	s-flex	sol	36x6	40x7d	Sth	mt	Wsc	4-5¹⁄₁₆x5½-40.1	2	cent	own	cst	own	fin	dual	Eismn	hand	lghtg	West	125
Gary F	1	1,900	130	P&B	p-stl	rigid	sol	36x3½	36x4	Bim	wd	Buda	4-3¼x5 -16.9	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand			
Gary GT	1½	2,250	142	P&B	p-stl	rigid	sol	36x3½	36x5	Bim	wd	Buda	4-4 x5½-25.6	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand			
Gary J	2½	2,750	148	P&B	p-stl	rigid	sol	36x4	36x7	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand			
Gary KT	3½	3,850	162	P&B	p-stl	rigid	sol	36x5	40x5d	Bim	wd	Buda	4-4½x6 -32.4	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand			
Gary M	5	4,850	170	P&B	p-stl	rigid	sol	36x6	40x6d	Dny	mt	Buda	4-5 x6½-40.0	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand			
G. M. C. 16	¾	1,495	132	Smh	p-stl	s-flex	pnu	35x5	35x5		wd	Con	4-3¾x5 -22.5	4	cent	McC	prs	McC	fin	sing	Eismn	hand	sl&i-2	Delco	
G. M. C. 21	1½	2,395	130	Smh	p-stl	s-flex	sol	36x3½	36x5	opt	wd	Con	4-3¾x5 -22.5	4	cent	McC	cst	McC	fin	sing	Eismn	hand	lghtg-2	Eismn	
G. M. C. 41	2	2,725	144	Smh	p-stl	s-flex	sol	36x4	36x7	own	mt	Con	4-4⅛x5¼-27.2	4	cent	McC	cst	McC	fin	sing	Eismn	hand	lghtg-2	Eismn	
G. M. C. 71	3½	3,750	163	own	rol-c	s-flex	sol	36x5	40x5d	own	mt	Con	4-4½x ½-32.4	2	cent	McC	cst	McC	fin	sing	Eismn	hand	lghtg-2	Eismn	
G. M. C. 101	5	4,350	163	own	rol-c	s-flex	sol	36x6	40x6d		wd	Con	4-4½x5½-32.4	2	cent	McC	cst	McC	fin	sing	Eismn	hand	lghtg-2	Eismn	
Giant 15	1	1,950	138	Hyd	p-stl	s-flex	sol*	34x3½	34x5	Wsy	wd	Con	4-3¾x 5-22.5	4	ther	Idl	prs	Idl	cel	sing	Eismn	hand	none	none	none
Giant 14	1½		144	Hyd	p-stl	s-flex	sol*	34x3½	34x5	Wsy	wd	Buds	4-3¾x5¼-22.5	4	ther	Idl	prs	Idl	cel	sing	Eismn	hand	none	none	none
Giant 16	2	2,850*	144*	Hyd	p-stl	s-flex	sol*	36x4	36x7	Way	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Idl	cel	sing	Eismn	hand	none	none	none
Giant 17	3½	3,850	176	own	rol-c	s-flex	sol	36x5	36x5d	Wsy	wd	Con	4-4½x5½-32.4	2	cent	own	cst	Jck	cel	sing	Eismn	hand	none	none	none
Gramm-Bernstein 15	1½		138		p-stl		sol*	36x3½	36x5			Con	4-3¾x5 -22.5	4		own		own						N-E	
Gramm-Bernstein W-15	1½						sol*	36x3½	36x5		wd		4-3¾x 5-22.5	4	ther	own		own			N-E				
Gramm-Bernstein 20	2	2,900					sol*	36x4	36x7		wd		4-4⅛x5¼-27.2	4	cent	own		own			N-E				
Gramm-Berstein 25	2½						sol*	36x4	36x4d		wd		4-4¼x5½-29.0	4	cent	own		own			Eismn				
Gramm-Bernstein 35	3½						sol*	36x5	40x5d		mt		4-4½x5½-32.4	4	cent	own		own			Eismn				
Gramm-Bernstein 50	5						sol*	36x6	40x6d		mt		4-4¾x 6-36.2	2	cent	own		own			Eismn				
Grant 10	1½	1,885	124	Savg	p-stl	rigid	p&s	34x4½	34x5	Bim	wd	Con	4-3¾x 5-22.5	4	ther	Fed	sht	Fed	cel	dual	Spltf	hand	sl&i-2	Remy	none
Grant 11	1½	1,935	140	Savg	p-stl	rigid	p&s	34x4½	34x5	Bim	wd	Con	4-3¾x 5-22.5	4	ther	Fed	sht	Fed	cel	dual	Spltf	hand	sl&i-2	Remy	none
Grant 15	2	2,150	124	Savg	p-stl	rigid	p&s	34x4½	34x6	Bim	wd	Con	4-3¾x 5-22.5	4	ther	Fed	sht	Fed	cel	dual	Spltf	hand	sl&i-2	Remy	none
Grant 16	2	2,250	140	Savg	p-stl	rigid	p&s	34x4½	34x6	Bim	wd	Con	4-3¾x 5-22.5	4	ther	Fed	sht	Fed	cel	dual	Spltf	hand	sl&i-2	Remy	none
Hal-Fur C	1	2,000	136	P&B	p-stl		pnu	35x5	35x5	Stn	wd	Buda	4-4 x5 -25.6	4	cent		cst	G&O	fin	sing	Bosch	hand	sl&i	West	150.
Hal-Fur B	2½	2,750	168	P&B	p-stl	s-flex	sol*	35x5	36x7	Msc	mt	Buds	4-4¼x5½-29.0	4	cent		cst	G&O	fin	sing	Bosch	hand	none	none	none
Harvey WEA	1½	2,350	128	own	p-stl	flex	sol	34x3½	34x5	Sch	wd	Buda	4-4⅛x5¼-27.2	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	fixed			
Harvey WFA	2½	3,300	150	own	rol-c	s-flex	sol	36x4	36x7	Sch	wd	Buda	4-4¼x5½-29.0	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	auto			
Harvey WHA	3½	4,300	160	own	rol-c	s-flex	sol	36x5	36x5d	Sch	wd	Buda	4-4½x 6-32.4	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	auto			
Harvey WKA	5	5,000	160	own	rol-c	s-flex	sol	36x6	40x6d	Sth	mt	Buda	4-4½x 6-32.4	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	auto			
Hawkeye K	1½	1,995	148½	own	rol-c	s-flex	sol*	34x3½	34x5	Bim	wd	Buds	4-3¾x5½-22.5	4	cent	own	cst	Idl	zz-t	sing	Eismn	hand			
Hawkeye M	2½	2,650	148½	own	rol-c	s-flex	sol*	36x4	36x6	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Idl	zz-t	sing	Eismn	hand	lghtg	West	85
Highway-Knight A	4	4,800	159	Hyd	p-stl	flex	sol*	36x5	36x6d	Sch	wd	R&V	4-4 x6 -25.6	4	ther	own	cst	R-T	fin	sing	Eismn	hand	sl&i-2	Wag	none
Highway-Knight B	5	5,600	159	Hyd	p-stl	flex	sol	36x5	40x6d	Sch	wd	R&V	4-4 x6 -25.6	4	ther	own	cst	R-T	fin	sing	Eismn	hand	s&l-2	Wag	none
Huffman B	1½		140	Hyd	p-stl	s-flex	sol*	34x3½	34x4	Roy	wd	Con	4-3¼x5 -16.9	4	ther	Lvgn	cst	Lvgn	cel	sing	Spltf	hand			
Huffman C	1½		140	Hyd	p-stl	s-flex	sol*	34x3½	34x4	Roy	wd	Con	4-3¼x5 -16.9	4	ther	Lvgn	cst	Lvgn	cel	sing	Spltf	hand			
Hurlburt	1½	2,850	148		p-stl		sol	34x4	34x5				4-4 x5½-25.6	.	cent							hand			
Hurlburt	2½	3,750	170		p-stl		sol	36x4	36x4d				4-4¼x5½-29.0	.	cent							hand			
Hurlburt	3½	4,400	156		p-stl		sol	36x5	36x5d				4-4½x6 -32.4	.	cent							hand			
Hurlburt	5	5,250	156		p-stl		sol	36x5	40x6d				4-4½x6 -32.4		cent							hand			

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
f'n—tinned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Cru—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
suct.	Mnrch.	motor	1350	18	Stmbg.	vac.	d-d.	Fuller.	selec.	Fuller.	motr.	3	int-g.	Clrk.	7.00	sprgs.	sprgs.	Shel.	ext-d-s.	ext-r-w.	l.	Ross.	ctr.	mtl.	Sterl.	Famous B10
cent.	Pharo.	motor	1450	25	Zenith.	vac.	d-p.	B-Beck.	selec.	own.	amid.	3	worm.	Timkn.	6.20	r-rd.	sprgs.	Mth.	int-r-w.	int-r-w	l.	Gem.	ctr.	mtl.	Peters.	Federal SD
cent.	Pharo.	motor	1190	15	Zenith.	grv.	d-p.	B-Beck.	selec.	Detrt.	amid.	4	worm.	Timkn.	8.50	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl.	Spicer.	Federal TE
cent.	Pharo.	motor	1125	13	Zenith.	grv.	d-p.	B-Beck.	selec.	Detrt.	amid.	4	worm.	Timkn.	9.25	r-rd.	sprgs.	Mth.	int-r-w.	int-r-w.	l.	Gem.	ctr.	mtl.	Spicer.	Federal UE
cent.	Pharo.	motor	1150	12	Zenith.	grv.	d-p.	B-Beck.	selec.	Warn.	amid.	4	worm.	Tmkn.	10.33	r-rd.	sprgs.	Mth.	int-r-w	int-r-w.	l.	Gem.	ctr.	mtl.	Spicer.	Federal WD
cent.	Pharo.	motor	1150	10	Zenith.	grv.	d-p.	B-Beck.	selec.	Warn.	amid.	4	worm.	Tmkn.	13.66	r-rd.	sprgs.	Mth.	int-r-w.	int-r-w.	l.	Gem.	ctr.	mtl	Spicer.	Federal XC
cent.	Pharo.	motor	1125	13	Zenith.	grv.	d-p.	B-Beck.	selec.	Detrt.	amid.	4	worm.	Timkn.	9.25	r-rd.	sprgs.	Mth.	int-r-w.	int-r-w	l.	Gem.	ctr.	mtl	Spicer.	Federal Tractor
cent.	Pharo.	motor	1150	12	Zenith.	grv.	d-p.	B-Beck.	selec.	Warn.	amid.	4	worm.	Timkn.	12.00	r-rd.	sprgs.	Mth.	int-r-w.	int-r-w.	l.	Gem.	ctr.	mtl	Spicer.	Federal Tractor
			1373	18	own.	grv.	w-d.	own.	plan.	own.	motr.	2	worm.	own.		r-rd.	t-t.	Mth*.	ext-d-s.	int-r-w	l.	own.	l.	mtl	own.	Ford TT
cent.	Dplx.	dplx.	1200	16	Zenith.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	own.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl.	own.	Forschler AX
cent.	Dplx.	plx.	1200	12	Zenith.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Shel.	8.66	sprgs.	sprgs.	own.	int.	int.	l.	Ross.	ctr.	mtl.	own.	Forschler B
cent.	Dplx.	plx.	1200	12	Zenith.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	4	worm.	Shel.	8.75	sprgs.	sprgs.	own.	int-r-w	int-r-w.	l.	Ross.	ctr.	mtl.	own.	Forschler BX
cent.	Pierce.	motor	1350	15	Stmbg.	grv.	w-d.	H-Shaw	ind-c.	Cotta	amid.	3	bevel-4	own.	8.90	sprgs.	sprgs.	Tuth.	ext-d-s.	ext-r-w.	r.	Ross.	r.	mtl.	Blood.	F. W. D. B
			2000				d-d.	B-Beck.			motr.	3	int-g.						ext-r-w.	ext-d-s.	l*.					Fulton A
cent.	Pierce.	motor	3200	35	Cart.	grv.	d-p.	B-Beck.	selec.	Dur.	motr.	3	int-g.	Russl.	10.20	sprgs.	sprgs.	Rowl.	ext-r-w.	ext-d-s.	l.	Lavn.	ctr.	mtl	Univl.	Fulton C
none.	none.		1200	25	Rayfld.	grv.	d-p.	B-Beck.	selec	B-Lipe.	amid.	3	worm.	Timkn.		r-rd.	t-arm	Merl.	int-r-w.	int-r-w.	l.	Gem.	ctr.	mtl.	Spicer.	Gabriel C
cent.	Dplx.	motor	1100	18	Rayfld.	grv.	d-p.	B-Beck.	selec.	B-Lipe.	amid.	4	worm.	Timkn.		r-rd.	sprgs.	Merl.	int-r-w.	int-r-w.	l.	Gem.	ctr.	mtl	Spicer.	Gabriel E
cent.	Dplx.	motor	1000	12	Rayfld.	grv.	d-p.	B-Beck.	selec.	B-Lipe	amid.	4	worm.	Timkn.		r-rd.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Gem.	ctr.	mtl	Spicer.	Gabriel F
suct.	Mnrch.	motor	1300	18	Stmbg.	grv.	d-d.	B-Lipe	selec.	own.	amid.	3	worm.	Timkn.	7.75	sprgs.	sprgs.	S-P.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl	Spicer.	Garford 25
cent.	Dplx.	motor	1045	15	Rayfld.	grv.	d-d.	B-Lipe.	selec.	own.	amid.	4	worm.	Timkn.	7.75	sprgs.	sprgs.	S-P.	int-r-w.	int-r-w.	r.	Ross.	ctr.	mtl	Spicer.	Garford 70-B
cent.	Dplx.	motor	1057	11	Rayfld.	grv.	d-d.	B-Lipe.	selec.	own.	amid.	4	chn.	own.	11.44	r-rd.		S-P.	ext-d-s.	int-r-w.	r.	Ross.	ctr.	mtl.	Spicer.	Garford 68
cent.	Dplx.	motor	1057	10	Rayfld.	grv.	d-d.	B-Lipe.	selec.	own.	amid.	4	chn.	own.	12.39	r-rd.		S-P.	ext-d-s.	int-r-w.	r.	Ross.	ctr.	mtl	Spicer.	Garford 69
cent.	Pierce.	motor	1000	15	Mast.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Timkn.		sprgs.	sprgs.	Tuth.	int-r-w.	int-r-w.	l.	Lavn.	ctr.	mtl	Blood.	Gary F
cent.	Pierce.	motor	1000	15	Mast.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Timkn.	7.25	sprgs.	sprgs.	Tuth.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl.	Blood.	Gary GT
	McCn.	motor	1000	15	Mast.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	worm.	Timkn.	8.50	sprgs.	sprgs.	Tuth.	int.	int.	l.	Ross.	ctr.	mtl.	Spicer.	Gary J
	McCn.	motor	1000	15	Mast.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	10.33	sprgs.	sprgs.	Detr.	int.	int.	l.	Ross.	ctr.	mtl.	Spicer.	Gary KT
	McCn.	motor	1000	15	Mast.	grv.	d-d.	B-Lipe	selec.	B-Lipe.	amid.	4	worm.	Timkn.	11.66	sprgs.	sprgs.	Detr.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl.	Spicer.	Gary M
suct.	Mnrch.	motor	1150	20	Marvl.	grv.	d-d.	own.	selec.	own.	motr.	3	bevel.	own.	6.00	r-rd.	sprgs.	Detr.	ext-r-w.	int-r-w.	l.	own.	ctr.	mtl.	Unvsl.	G. M. C. 16
suct.	Mnrch.	motor	1300	15	Marvl.	grv.	d-d.	own.	selec.	own.	motr.	4	worm.	timkn.	9.25	r-rd	sprgs.	Detr	int-r-w.	int-r-w.	l.	own.	ctr.	mtl.	own.	G. M. C. 31
suct.	Mnrch.	motor	1210	14	Marvl.	grv.	d-d.	own.	selec.	own.	motr	4	worm.	Timkn.	9.25	r-rd	sprgs.	Detr	int-r-w.	int-r-w.	l.	own.	ctr.	mtl	own.	G. M. C. 41
suct.	Mnrch.	motor	1210	12	Marvl.	grv.	d-d.	own.	selec.	own.	amid.	4	worm.	Timkn.	12.00	r-rd.	sprgs.	Detr	int-r-w.	int-r-w.	l.	own.	ctr.	mtl.	own.	G. M. C. 71
suct.	Mnrch.	motor	1150	10	Marvl.	grv.	d-d.	own.	selec.	own.	amid.	4	worm.	Timkn.	13.67	r-rd	sprgs.	Detr	int-r-w.	int-r-w.	l.	own.	ctr.	mtl	own.	G. M. C. 101
cent.	Pierce.	motor	2000	26	Schblr.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	r.	Jacox.	ctr.	mtl	Spicer.	Giant 15
cent*	Pierce*	motor*	2000	26	Schblr.	grv.	d-d.	B-Lipe.	selec	B-Lipe.	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	l.	Ross	ctr.	mtl.	Spicer.	Giant 14
cent.	Pierce.	motor	1500	21	Schblr.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Shel.	8.66	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	r.	Ross	ctr.	mtl.	Spicer.	Giant 16
cent.	Pierce.	motor	1500	15	Stmbg.	grv.	d-d.	B-Lipe.	selec	B-Lipe.	amid.	4	worm.	Shel.	10.25	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	r.	Ross	ctr.	mtl.	Spicer.	Giant 17
					Stmbg.	grv.	d-p.					3	int-g.	Clrk.					int-r-w.	ext-r-w.		Ross				Gramm-Bernstein 15
							d-d.					3	worm.			sprgs.	sprgs.		r-w.	r-w.		Ross				Gramm-Bernst. W-15
							d-d.					4	worm.			sprgs.	sprgs.		r-w.	r-w.		Ross				Gramm-Bernstein 20
							d-d.					4	worm.			sprgs.	sprgs.		r-w.	r-w.		Ross				Gramm-Bernstein 25
							d-d.					4	worm.			sprgs.	sprgs.		r-w.	r-w.		Ross				Gramm-Bernstein 35
							d-d.					4	worm.			sprgs.	sprgs.		r-w.	r-w.		Ross				Gramm-Bernstein 50
cent.	Pierce.	d-s.	1100	16	Carter.	vac.	d-p.	B-Beck.	selec.	G-Lees	motr.	3	int-g.	Torbn.	7.00	sprgs.	sprgs.	S-P	ext-r-w.	int-r-w.	l.	Jacox.	ctr.	mtl.	Arvac	Grant 10
cent.	Pierce.	d-s.	1100	16	Carter.	vac	d-p.	B-Beck.	selec.	G-Lees	motr.	3	int-g.	Torbn.	7.00	sprgs.	sprgs.	S-P	ext-r-w.	int-r-w.	l.	Jacox.	ctr.	mtl.	Arvac	Grant 11
cent.	Pierce.	d-s.	1100	14	Carter.	vac.	d-p.	B-Beck.	selec.	G-Lees	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	S-P	ext-r-w.	int-r-w.	l.	Jacox.	ctr.	mtl.	Arvac	Grant 15
cent.	Pierce.	d-s.	1100	14	Carter.	vac.	d-p.	B-Beck.	selec.	G-Lees	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	S-P	ext-r-w.	int-r-w.	l.	Jacox.	ctr.	mtl.	Arvac	Grant 16
cent.	Dplx	motor	1400	25	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe.	motr.	4	worm.	Timkn.	6.35	r-rd	sprgs.	S-P.	int-r-w.	int-r-w.	l.	Gem	ctr.	mtl.	Peters.	Hal-Fur C
cent.	Dplx.	motor	1200	18	Stmbg.	grv.	d-p.	B-Beck	selec	B-Lipe.	amid.	4	worm.	Timkn.	7.00	r-rd.	sprgs.	S-P.	int-r-w.	int-r-w.	l.	Gem	ctr.	mtl.	Peters.	Hal-Fur B
suct.	Mnrch.	motor	1100	16	Zenith.	grv.	d-d.	Fuller.	selec.	Fuller.	motr	3	worm.	Shel.	7.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	l.	Ross	ctr.	mtl.	Arvac	Harvey WEA
cent.	Dplx.	motor	1100	16	Stmbg	grv.	d-p.	B-Beck.	selec.	B-Lipe	amid.	4	worm.	Shel.	7.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	l.	Ross	ctr.	mtl.	Spicer.	Harvey WFA
cent.	Dplx.	motor	1000	13	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl.	Spicer.	Harvey WHA
cent.	Dplx.	motor	900	11	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w.	l.	Ross.	ctr.	mtl.	Spicer.	Harvey WKA
cent.	Simp.	motor	1145	16	Zenith.	grv.	d-p.	Fuller.	selec	Fuller.	motr.	3	int-g.	Clrk.	7.60	sprgs	sprgs	Detr.	ext-r-w.	int-r-w.	l.	Ross.	ctr	mtl.	Hart.	Hawkeye K
cent.	Simp.	motor	1150	16	Zenith.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Clrk.	8.00	sprgs.	sprgs.	Detr.	ext-d-s.	int-r-w.	l.	Ross.	ctr.	mtl.	Hart.	Hawkeye M
suct.	Mnrch.	motor	1500	19	Zenith.	vac.	d-d.	B-Lipe.	selec.	own.	amid.	4	worm	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w.	l.	Ross.	ctr.	fab.	Therm.	Highway-Knight A
suct.	Mnrch.	motor	1200	15	Zenith.	vac.	d-d.	B-Lipe	selec.	own.	amid.	4	worm.	Shel.	10.20	sprgs.	sprgs.	Shel.	int-r-w	int-r-w.	l.	Ross.	ctr.	fab.	Therm.	Highway-Knight B
					Zenith.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Chic.	8.00	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Huffman B
					Zenith.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl.	Hart.	Huffman C
				18			d-d.		selec.		motr.	3	worm.						int-r-w	int-r-w.						Hurlburt 1½-Ton
				16			d-d.		selec.		motr.	3	worm.						ext-r-w.	int-r-w.						Hurlburt 2½-Ton
				13			d-d.		selec.		amid.	4	worm.						ext-r-w.	int-r-w.						Hurlburt 3½-Ton
				12			d-d.		selec.		amid.	4	worm.						ext-r-w.	int-r-w.						Hurlburt 5-Ton

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jos—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rnyfld—Rayfield
Rem—Remy
Rowl—Wm. H Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stnn—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts
Unv—Universal
Unvsl—Universal Mach
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model		Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE													
									Size in Ins.							COOLING					IGNITION			ELEC. SYSTEM		
																	Radiator									
																	CASE		CORE							
					Make	Materia	Type	Kind	Front	Rear	Make	Type	Make	No. Cyl Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	Water Circ.	Make	Type	Make	Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
Independent Iowa	E	1½	1,890	135	own	rol-c	rigid	sol*	34x3½	34x5	Prud.	wd.	Con.	4-3¾x5 -22.5	4	cent.	Chgo.	cst.	Chgo.	cel.	sing.	Bosch.	fixed.	none	none	none
Independent Iowa	F	2	2,290	146	own	ro -c	rigid	sol*	34x4	34x6	Prud.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Chgo.	cst.	Chgo.	cel.	sing.	Bosch.	fixed.	none	none	none
Independent Ohio	F	1	1,685	128	P&B	p-stl	s-flex	sol*	34x3½	34x4	Way*	wd*	Con.	4-3½x5 -19.6	4	ther.	Natl	sht.	Natl	zz-t	sing.	Eismn.	fixed.	lghtg.	Exide	none
Independent Ohio	G	2	2,300	144	P&B	p-stl	s-flex	sol*	34x4	34x6	Ind.	mt	Con.	4-4⅛x5¼-27 2	4	cent.	Yng.	prs.	Lng.	fin.	sing.	Eismn.	fixed.	lghtg.	Exide	none
Indiana	12	1¼	2,150	135	own	rol-c	s-flex	sol*	34x3½	34x5	Bim.	wd.	Wau.	4-3⅜x5¼-18.2	4	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	hand.	s&l-2*	West.	175
Indiana	20	2	2,750	150	own	rol-c	s-flex	sol*	36x4	36x7	Bim.	wd.	Rut.	4-4⅛x5½-27.2	2	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	hand.	s&l-2*	West.	175
Indiana	25	2½	2,950	156	own	rol-c	s-flex	sol*	36x4	36x8	Bim.	wd	Rut	4-4⅛x5½-27.2	2	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	hand.	s&l-2*	West.	175
Indiana	35	3½	3,600	160	own	rol-c	s-flex	sol*	36x5	36x5d	Sth.	mt.	Rut.	4-4⅜x5½-30.7	2	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	hand.	s&l-2*	West.	175
Indiana	50	5	4,600	170	own	rol-c	s-flex	sol*	36x5	40x6d	Sth.	mt.	Wau.	4-4¾x6¾-36.2	2	cent.	Lng.	cst.	Lng.	fin.	dual.	Eismn.	hand.	s&l-2*	West.	175
Inland	C	1½	1,950	136		rol-c		p&s	34x4	34x5		wd.		4-3¾x4½-22.5		ther.		sht.				Bosch.		s&l-2.	Dneto.	none
Inland	D	2	2,850	132		rol-c			34x5	34x6	Bim.	wd.	Wsc.	4-4 x5 -25.6			Lng.		Lng.	fin.		Spltf.		none	none	none
I. H. C	F	1	1,850	128¾	P&B	p-stl	s-flex	sol	36x3½	36x4	opt.	wd.	own	4-3½x5¼-19.6	4	cent.	McC*	prs.	McC*	fin.	sing.	Bosch.	hand.	s&l*	N-E	131
I. H. C.	K	1½	2,200	129	P&B	p-stl	s-flex	sol	36x3½	36x5	opt.	wd.	own	4-3½x5¼-19.6	4	cent.	McC*	prs.	McC*	fin.	sing.	Bosch.	hand.	s&l*	N-E	131
I. H C.	G	2	2,600	138¾	P&B	p-stl	s-flex	sol	36x4	36x6	opt.	wd.	own	4-4¼x5 -29.0	4	ther.	own	prs.	Lng.	fin.	sing.	Sum.	hand.	s&l*	N-E	131
I. H. C	L	3½		160	P&B	p-stl	s-flex	sol	36x5	40x10	opt.	wd.	own	4-4¼x5 -29.0	4	ther.	own	prs.	Lng.	fin.	sing.	Sum.	hand.	s&l*	N-E	
Jackson	C-1920	3½	4,250	150	Cas.	p-stl	rigid	ol.	36x7	36x7	Stn.	wd.	Con	4-4½x5½-32.4	2	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	hand.	sl&i-2.	Eismn.	none
Kearns	H	¾	1,350	118	Prsh	-stl	rigid	pnu	31x4	31x4	E&O.	wd.	Lght.	4-3¼x4½-16.9	4	ther.	G&O.	prs.	G&O.	fin.	sing.	Berlg.	hand	sl&i-2.	Dneto.	none
Kearns	N	1½	2,000	136	P&B	p-stl	rigid	sol	34x3½	34x6	E&O.	wd.	Con.	4-3½x5 -19.6	4	ther.	Bush.	cst.	Bush.	fin.	sing.	Berlg.	hand.	s&l-2.	Dneto.	none
Keldon.	19	2	2,885	144	own	rol-c	flex	sol	36x4	36x7	Sth.	mt.	Buda.	4-4¼x5½-29.0	4	cent.	own	cst.	Eurk.	cel.	sing.	Eismn.	hand.	none	none	none
Kelly-Springfield.	K-31		2,750	144	own	p-stl	flex	sol	36x3½	36x6	Crn.	wd.	own	4-3¾x5¼-22.5	4	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield	KS-32	1½	2,750	144	own	p-stl	flex	sol	36x3½	36x6	Crn.	wd.	own	4-3¾x5¼-22.5	4	cent.	Fed.	sht.	Fed.	cel	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield	K-35	2	3,250	144	own	p-stl	flex	sol	36x4	36x4d	Crn.	wd.	own	4-3¾x5¼-22.5	4	cent.	Fed.	sht.	Fed.	cel.	sing.		fixed.	sl&i-2*	West*	
Kelly-Springfield.	KS-36	2½	3,250	144	own	p-stl	flex	sol	36x4	36x4d	Crn.	wd.	own	4-3¾x5¼-22.5	4	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield.	K-40	3½	4,250	150	own	p-stl	flex	sol	36x5	40x5d	Crn.	wd.	own	4-4½x6½-32.4	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield.	K-45		4,400	150	own	p-stl	flex	sol	36x5	40x6d	Crn.	wd.	own	4-4½x6½-32.4	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield	K-50		4,900	150	own	p-stl	flex	sol	36x6	40x6d	Crn.	wd.	own	4-4½x6½-32 4	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Kelly-Springfield	K-60		5,200	150	own	p-stl	flex	sol	26x6	40x7d	Crn.	wd.	own	4-4½x6½-32.4	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	fixed.	sl&i-2*	West*	
Keystone.	40		1,795	144	own	rol-c	s-flex	p&s	34x4½	36x5	Way.	wd.	own	4-4 x4½-25.6	2	ther.	McC.	cst.	McC.	fin.	sing.	Berlg.	hand.	none	none	none
Kimball	AB	2	3,675	144	Prsh	p-stl	flex	pnu*	36x5	36x7	Sth.	mt	Wsc.	4-4 x6 -25.6	4	cent.	Flx.	prs.	Flx.	cel.	sing.	Eismn.	hand.	lghtg.	Spltf.	none
Kimball	AC	2½	3,975	159	Prsh	p-stl	flex	pnu*	36x6	38x7	Sth.	mt.	Wsc.	4-4¼x6 -29.0	4	cent.	Flx.	prs.	Flx.	cel.	sing.	Eric.	hand.	lghtg.	Spltf.	none
Kimball	AK	3	4,475	159	Prsh.	p-stl	flex	sol*	36x4	36x10	Sth.	mt.	Wsc.	4-4½x6 -32.4	4	cent.	Flx.	prs.	Flx.	cel.	sing.	Eismn.	hand.	lghtg.	Spltf.	none
Kimball	AE	4	4,975	170	Prsh	p-stl	flex	sol	36x5	40x10	Sth.	mt.	Wsc.	4-4¾x6 -36.2	2	cent.	Flx.	prs.	Flx.	cel.	sing.	Eismn.	hand.	lghtg.	Spltf.	..90
Kimball	AF	5	5,975	170	Prsh	p-stl	flex	sol	36x6	40x12	Sth.	mt.	Wsc.	4-5 x6 -40.0	2	cent.	Flx.	prs.	Flx.	cel.	t-p.	Eric.	hand.	lghtg.	Spltf.	.90
Kissel.	Delivery	¾	1,875	135	Smh.	p-stl	flex	pnu	34x4½	34x4½	Prud.	wd.	own	4-3⅞x5¼-24.2	4	cent.	McC.	sht.	Fed.	cel.	sing.	Eismn.	hand.	none	none	none
Kissel	Utility	1½	2,275	152	Smh.	p-stl	flex	sol	36x3½	36x5	Prud.	wd.	own	4-3⅞x5½-24.2	4	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none	none	none
Kissel.	Freighter	2	2,975	168	Smh.	p-stl	flex	sol*	36x4	36x7	Prud.	wd.	own	4-4¼x5½-29.0	4	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none	none	none
Kissel.	Heavy Duty	3½	3,975	168	Smh.	p-stl	flex	sol*	36x5	36x5d	Sth.	mt.	own	4-4¼x5½-29.0	4	cent.	McC.	cst.	McC.	fin.	sing.	Eismn.	hand.	none	none	none
Kleiber	AA	1	2,400	130	own	rol-c	s-flex	sol*	36x3½	36x6	W&L.	wd.	Con.	4-3¾x5¼-22.5	4	cent.	Pfx.	sht.	Pfx.	cel.	sing.	Bosch.	hand.	none	none	none
Kleiber.	A	1½	2,800	143	own	rol-c	s-flex	sol	36x3½	36x6	W&L.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Pfx.	sht.	Pfx.	cel.	sing.	Bosch.	hand.	none	none	none
Kleiber	BB	2	3,200	153	own	rol-c	s-flex	sol	36x4	36x7	W&L.	wd.	Con.	4-4⅛x5¼-27 2	4	cent.	Pfx.	sht.	Pfx.	cel.	sing.	Bosch.	hand.	none	none	none
Kleiber.	B	2½	3,800	160	own	rol-c	s-flex	sol	36x5	36x8	W&L.	wd.	Con.	4-4½x5 -32.4	2	cent	own	cst	R-T.	fin.	sing.	Bosch.	hand.	none	none	none
Kleiber	C	3½	4,400	163	own	rol-c	s-flex	sol	36x5	36x10	W&L.	wd.	Con.	4-4½x5 -32.4	2	cent.	own	cst	R-T.	fin.	sing	Bosch.	hand.	none	none	none
Kleiber.	D	5	5 300	180	own	rol-c	s-flex	sol	36x6	40x12	Sth.	mt.	Con.	4-5¼x5¾-44 2	2	cent.	own	cst.	R-T.	fin.	sing.	Bosch.	hand.	none	none	none
Knox	35-Tractor		5,500	108½	own	rol-c	s-flex	sol	36x5	38x6d	Way.	wd.	own	4-5 x5½-40.0	2	cent.	Fed	sht.	Fed.	cel.	sing.	Eismn.	hand.	s&l-2.	G&D.	none
Koehler	C	1¼	1,765	131	Prsh.	p-stl	s-flex	sol	34x3	34x5	Way.	wd.	H-S.	4-3½x5 -19.6	4	ther.	own	cst.	Lng.	fin	sing.	Eismn.	fixed.	s&l-2.		
Koehler.	M	2½	2,965	162	Prsh.	p-stl	s-flex	sol	36x4	36x7	Way.	wd.	Her.	4-4 x5½-25.6	4	cent.	own	cst	Lng.	fin.	sing.	Eismn.	fixed.	s&l-2.		
Lange	B	2	2,950	136	own	ol-c	rigid	sol	36x4	36x6	H&D.	wd.	Con.	4-4⅛x5¼-27.2	4	ther.	own	sht.	own	sq-t	sing.	Bosch.	hand.	none	none	none
Larrabee	V	1½	2,150	138	Savg.	p-stl	s-flex	sol	34x3½	34x5	H&D.	wd.	Con.	4-3¾x5 -22.5	4	ther.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	lghtg.	Eismn.	125
Larrabee	C	2½	3,000	157	Savg.	p-stl	s-flex	sol	36x4	36x7	H&D.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	lghtg.	Eismn	125
Larrabee	B	3½	3,950	154	Savg.	p-stl	s-flex	sol	36x5	36x5d	H&D	wd.	Con.	4-4½x5½-32.4	2	cent.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	lghtg.	Eismn.	125
Larrabee	T	5	4,750	178	Savg.	p-stl	s-flex	sol	36x6	40x6d	Sth.	mt.	Con.	4-4½x5 -32.4	2	cent.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	none	none	none
L. M. C.	2-20	2½	2,950	164	FAC.	rol-c	s-flex	sol	36x4	36x4d	Bim.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Lng.	cst.	Lng.	fin.	sing.	Bosch.	hand.	sl&i-2.	Remy.	
Loyal		½	950	110	P&B	p-stl	flex	pnu	32x4	32x5	Bim.	wd.	LeR.	4-3⅛x4½-15.6	4	ther.	Fed.	prs.	Fed.	pln.	dual.	A-Knt	auto.	sl&i-2.	W-L.	none
Loyal.	Special	¾	1,245	120	P&B	p-stl	flex	pnu	32x4½	32x4½	Bim.	wd.	H-S.	4-3¼x5 -16.9	4	ther.	Fed.	cst.	Fed	pln.	dual.	A-Knt	auto.	sl&i-2.		none
Loyal		1	1,500	130	P&B	p-stl	flex	pnu	33x5	33x5	Bim.	wd.	H-S.	4-3¼x5 -16.9	4	ther.	Fed.	cst.	Fed.	pln.	sing.	A-Knt	auto.	sl&i-2.	W-L.	none
Maccar	L	1½	2,750	150	Prsh	p-stl	rigid	sol	36x4	36x5	Sch.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	opt.	opt.	
Maccar	H	2½	3,500	162	Prsh	p-stl	rigid	sol	36x4	36x4d	Sch.	wd.	Con.	4-4½x5½-32.4	2	cent.	own	cst.	Bus.	fin.	sing.	Bosch.	hand.	opt.	opt.	
Maccar	M	3½	4,300	174	Prsh	p-stl	rigid	sol	36x5	36x5d	Sch.	wd.	Con.	4-4½x5½-32.4	2	cent.	own	cst	Bush.	fin.	sing.	Bosch.	hand.	opt.	opt.	
Maccar	G	5	5,250	186	Prsh	p-stl	rigid	sol	36x5	40x6d	Day.	mt.	Con.	4-4¾x6 -36.2	2	cent.	own	cst.	Bush.	fin.	sing.	Bosch.	hand.	opt.	opt.	
Mack	AB	1½	3,000	144	own	p-stl	flex	sol*	36x4	36x3½d	Sch*	wd.	own	4-4 x5 -25.6	2	cent.	own	sht.	own	cel.	sing.	Spltf.	hand.	lhtg-2*	L-N.	175*
Mack	AB	1½	3,000	144	own	p-stl	flex	sol*	36x4	36x3½d	Sch*	wd.	own	4-4 x5 -25.6	2	cent.	own	sht.	own	cel.	sing.	Spltf.	hand.	lhtg-2*	L-N.	175*

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square-tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carburetor Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
none	none	none			Stmbg.	vac	d-d.	Fuller	selec	Fuller	motr	3	int-g.	Russl.		sprgs.	sprgs.	GCS	ext-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Blood.	Independent (Iowa) E
none	none	none				vac	d-d.	Fuller	selec.	Fuller	motr	3	int-g.	Russl.		sprgs.	sprgs.	GCS	ext-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Blood.	Independent (Iowa) F
suct.	Mnrch	motor			Zenith.	grv.	d-d.	Fuller	selec.	Fuller	motr.	3	worm.	Chic.	7.75	sprgs.	sprgs.	Iron	int-r-w	int-r-w	l.		ctr.	mtl	Sterl.	Independent (Ohio) F
suct.	Mnrch.	motor			Zenith.	grv.	d-d.	Fuller	selec.	Fuller	motr.	3	worm.	Wis.	9.66	sprgs.	sprgs.	Iron	int-r-w	int-r-w	l.	Wol.	ctr.	mtl	Sterl.	Independent (Ohio) G
cent.	Wau.	motor	1300	17	Stmbg.	grv.	d-p.	B-Beck.	selec.	Covert.	amid.	3	worm.	Shel.	7.80	r-rd.	sprgs.	Shel.	int-r-w	int-r-w	l.	Wol.	ctr.	mtl	Acme.	Indiana 12
cent.	Pierce.	motor	1150	16	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe	amid.	4	worm.	Shel.	7.75	r-rd.	sprgs.	Shel.	int-r-w	int-r-w	l.	Wol.	ctr.	mtl	Acme.	Indiana 20
cent.	Pierce.	motor	1160	15	Stmbg.	grv.	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm.	Shel.	7.75	r-rd.	sprgs.	Shel.	int-r-w	int-r-w	l.	Wol.	ctr.	mtl	Acme.	Indiana 25
cent.	Pierce.	motor	1150	12	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe.	amid.	4	worm.	Shel.	10.25	r-rd.	sprgs.	Shel.	int-r-w	int-r-w	l.	Wol.	ctr.	mtl	Spicer.	Indiana 35
cent.	Wau.	motor	800	11	Stmbg.	grv.	d-p.	B-Beck.	selec	B-Lipe.	amid.	4	worm.	Shel.	8.75	r-rd.	sprgs.	Shel.	int-r-w.	int-r-w	l.	Wol.	ctr.	mtl	Spicer.	Indiana 50
					Schblr.				selec.	Detrt	motr.	3	int-g.	Torbn.					ext-r-w.	int-r-w						Inland C
					Zenith.		d-p.			Fuller.	motr.		int-g.	Torbn.				Mth.				Lavn.				Inland D
cent.	own.	motor	1275	17	Ens.	grv.	d-d.	own.	selec.	own.	amid.	3	int-g.	own.	7.91	sprgs.	sprgs.	Stand.	int-r-w.	int-r-w	l.	own.	ctr.	mtl	own.	I. H. C. F
cent.	own.	motor	1275	15	Ens.	grv.	d-d.	own.	selec.	own.	amid.	3	int-g.	own.	8.96	sprgs.	sprgs.	Stand.	int-r-w	int-r-w	l.	own.	ctr.	mtl	own.	I. H. C. K
cent.	own.	motor	1100	13	Ens.	grv.	d-d.	own.	selec.	own.	amid.	3	int-g.	own.	8.96	sprgs.	sprgs.	Stand.	int-r-w	int-r-w	l.	own.	ctr.	mtl.	own.	I. H. C. G
cent.	own.	motor	1100	12	Ens.	grv.	d-d.	own.	selec.	B-Lipe.	amid.	4	int-g.	own.	16.50	sprgs.	sprgs.	Stand.	int-r-w	int-r-w	l.	own.	ctr.	mtl	own.	I. H. C. L
cent.	Pierce.	motor	1000	12	Stmbg.	vac.	d-p.	B-Beck.	selec.	own.	amid.	4	bevl-4	own.	9.18	sprgs.	sprgs.	S-P.	int-r-w	ext-d-s	r	Ross.	r.	mtl.	Spicer.	Jackson. C-1920
suct.	Mnrch.	motor	1000	25	Zenith.	grv.	d-p.	B-Beck.	selec.	G-Lees.	motr.	3	int-g.	Torbn.	6.00	sprgs.	sprgs.	Mth.	int-r-w.	ext-r-w	l*.	Lavn.	ctr.	mtl.	Peters.	Kearns H
suct.	Mnrch.	motor		20	Zenith.	grv.	d-p.	B-Beck.	selec	G-Lees.	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l*.	Lavn.	ctr.	mtl	Peters.	Kearns. M
cent.	Pierce.	motor	1200	17	Stmbg.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Russl.	7.40	sprgs.	sprgs.	Chmp	ext-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Univl	Keldon. 19
cent.	Pierce.	motor	1400	17	Zenith.	grv.	cone	own.	selec.	Covert.	amid.	3	chn.	own.	8.66	r-rd.		S-P.	int-r-w	int-r-w	l.	Gem.	l&c	mtl	own.	Kelly-Springfield K-31
cent.	Pierce.	motor	1400	17	Zenith.	grv.	cone.	own.	selec	Covert.	amid.	3	worm.	Shel.	8.66	r-rd.	t-t.	S-P.	int-r-w.	int-r-w	l.	Gem.	l&c	mtl	Spicer.	Kelly-Spring. KS-32
cent.	Pierce.	motor	1400	14	Zenith.	grv.	cone.	own.	selec.	Covert	amid.	3	chn.	own.	10.64	r-rd.		S-P.	int-r-w	int-r-w	l.	Gem.	l&c.	mtl.	own.	Kelly-Springfield K-35
cent.	Pierce.	motor	1400	15	Zenith.	grv.	cone.	own.	selec	Covert	amid.	3	worm.	Shel.	10.33	r-rd.	t-t.	S-P.	int-r-w	int-r-w	l.	Gem.	l&c	mtl	Spicer.	Kelly-Spring. KS-36
cent.	Pierce.	motor	1400	16	Rayfld.	grv.	cone.	own.	selec	Covert.	amid.	3	chn.	own.	10.48	r-rd.		S-P.	int-r-w	int-r-w	l.	Gem.	l&c	mtl	own.	Kelly-Springfield K-40
cent.	Pierce.	motor	1400	16	Rayfld.	grv.	cone.	own.	selec	Covert	amid.	3	chn.	own.	10.71	r-rd.		S-P.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl.	own.	Kelly-Springfield K-45
cent.	Pierce.	motor	1400	14	Rayfld.	grv.	cone.	own.	selec	Covert	amid.	3	chn.	own.	12.24	r-rd.		S-P.	int-r-w	int-r-w	l.	Gem.	l&c.	mtl.	own.	Kelly-Springfield K-50
cent.	Pierce.	motor	1400	14	Rayfld.	grv.	cone.	own.	selec.	Covert	amid.	3	chn.	own.	12.39	r-rd.		S-P.	int-r-w.	int-r-w	l.	Gem.	l&c.	mtl.	own.	Kelly-Springfield K-60
cent.	Pierce.	motor	1350	16	Zenith.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	int-g.	Russl.	8.90	sprgs.	sprgs.	Rowl.	int-r-w	int-r-w	l.	Ditw	ctr.	mtl.	Spicer.	Keystone 40
cent.	Dplx.	dplx.	1600	18	Zenith.	vac.	d-d.	B-Lipe	selec	B-Lipe	amid.	4	worm.	Shel.	6.50	sprgs.	sprgs.	U.S.	int-r-w	int-d-s.	l.	Ross.	ctr.	mtl.	Spicer.	Kimball AB
cent.	Dplx.	dplx.	1600	17	Zenith.	vac.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Shel.	7.75	sprgs.	sprgs.	U.S.	int-r-w	ext-d-s	l.	Ross.	ctr.	mtl.	Spicer.	Kimball AC
cent.	Dplx.	dplx.	1250	16	Zenith.	vac.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Shel.	7.75	sprgs.*	sprgs.	U.S.	int-r-w	ext-d-s	l.	Ross.	ctr.	mtl.	Spicer.	Kimball AK
cent.	Dplx.	dplx	1400	14	Zenith.	vac.	d-d.	Fuller	selec.	Fuller.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	U.S.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Kimball AE
cent.	Dplx.	dplx.	1400	12	Zenith.	vac.	d-d.	Fuller.	selec	Fuller.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	U.S.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Kimball AF
cent.	Pierce.	motor	1200	25	Stmbg.	vac.	d-d	Warn.	selec	Warn.	motr.	3	bevel.	own.	5.00	sprgs.	sprgs.	Mth.	ext-r-w.	ext-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Kissel Delivery
cent.	Pierce.	motor	1150	17	Stmbg.	vac.	d-d.	Warn	selec	Warn.	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	Dtr.	int-r-w.	int-r-w	l.	Jacox	ctr.	mtl	Spicer.	Kissell Utility
cent.	Pierce.	motor	1190	15	Stmbg.	vac	d-d.	Warn	selec	Warn	amid.	4	worm.	Timkn	8.50	sprgs.	sprgs.	Mth.	int-r-w.	int-r-w	l.	Lavn.	ctr.	mtl	Spicer.	Kissel. Freighter
cent.	Pierce.	motor	1315	12	Stmbg.	vac.	d-d.	Warn	selec	Warn.	amid.	4	worm.	Shel.	11.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Kissell Heavy Duty
cent.	Pierce.	motor	1200	20	Stmbg.	grv.	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Timkn.	7.00	sprgs.	sprgs.	Bet.	int-r-w	int-r-w	r	Ross.	ctr.	mtl.	Spicer.	Kleiber. AA
cent.	Pierce.	motor	1200	18	Stmbg.	grv	w-d.	M&E	selec	B-Lipe.	amid.	4	worm	Shel.	7.75	sprgs.	sprgs.	Bet.	int-r-w.	int-r-w	r	Ross.	ctr.	mtl.	Spicer.	Kleiber A
cent.	Pierce.	motor	1200	18	Stmbg.	grv.	w-d.	M&E.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	7.75	sprgs.	sprgs.	Bet.	int-r-w	int-r-w	r.	Ross.	ctr.	mtl	Spicer.	Kleiber BB
cent.	Pierce.	motor	1200	18	Stmbg.	grv	w-d.	M&E.	selec.	B-Lipe.	amid.	4	worm.	Shel.	7.75	sprgs.	sprgs.	Bet.	int-r-w.	int-r-w	r.	Ross.	ctr.	mtl.	Spicer.	Kleiber B
cent.	Pierce.	motor	1200	17	Stmbg.	grv.	w-d.	M&E	selec.	B-Lipe.	amid.	4	worm.	Timkn	8.75	sprgs.	sprgs.	Bet.	int-r-w	int-r-w	r	Ross.	ctr.	mtl	Spicer.	Kleiber C
cent.	Pierce.	motor	1200	15	Stmbg.	grv	w-d.	M&E	selec	B-Lipe.	amid.	4	worm.	Timkn	11.66	r-rd.	sprgs.	Bet.	int-r-w	int-r-w	r	Ross.	ctr.	mtl	Spicer.	Kleiber D
none.	none	none.	1000	9	Zenith.	vac	d-p.	own.	selec	own.	jst.	2	chn.	own.		r-rd.			ext-jst.	int-r-w	l.	Ross.	ctr.	mtl	own.	Knox—Tractor. 35
cent.	Dplx.	motor	1250	18	Zenith.	grv	d-d.	Mech	selec	Mech.	motr.	3	int-g.	Torbn.	7.00	sprgs.	sprgs.	Mth.	ext-r-w.	int-r-w	l.	own.	ctr.	mtl	Spicer.	Koehler C
cent.	Dplx.	motor	1225	14	Zenith.	grv	d-d.	B-Lipe	selec	B-Lipe	amid.	4	worm.	Timkn	9.30	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl*.	Spicer*	Koehler. M
cent.	Pierce.	motor	1250	15	Stmbg.	vac.	w-d.	M&E	ind-c.	own.	amid.	3	chn.	own.	9.00	r-rd.		Stand.	ext-r-w.	int-r-w	l.	Gem.	ctr.	mtl	M&E.	Lange B
cent.	Pierce.	motor	1225	16	Schblr.	grv.	d-d.	B-Lipe	selec	B-Lipe	motr.	3	worm	Shel.	7.8	sprgs.	sprgs.	Merl.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Unvsl.	Larrabee V
cent.	Pierce.	motor	1200	15	Schblr.	grv	d-d.	B-Lipe	selec	B-Lipe.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Unvsl.	Larrabee C
cent.	Pierce.	motor	1000	12	Schblr.	grv.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Unvsl.	Larrabee B
cent.	Pierce.	motor	1000	10	Schblr.	grv	d-d.	B-Lipe	selec.	B-Lipe.	amid.	4	worm.	Shel.	11.75	sprgs.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Unvsl.	Larrabee. T
cent.	Pierce.	motor	1150	14	Stmbg.	vac	d-p.	B-Beck.	selec.	Detrt	amid.	4	int-g.	Rossl.	8.80	sprgs.	sprgs.	Mth.	ext-r-w.	int-r-w	l.	Lavn.	ctr.	fab*.	Therm*	L. M. C. 2-20
			1000	30	Stmbg.	grv.	d-p.	B-Beck.	selec	Covert	motr.	3	int-g.	Torbn.		sprgs.	sprgs.		int-r-w.	ext-r-w	l.	Ross.	ctr.	mtl	Blood.	Loyal
			1000	30	Stmbg.	grv.	d-d.	B-Beck.	selec.	Covert.	motr.	3	int-g.	Torbn.		sprgs.	sprgs.		ext-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Blood.	Loyal. Special
			1000	20	Stmbg.	grv.	d-p.	B-Beck.	selec	Covert	motr.	3	int-g.	Torbn.		sprgs.	sprgs.		int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Blood.	Loyal
cent.	Pierce.	motor	1200	18	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Timkn.	7.00	r-rd.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Maccar L
cent.	Pierce.	motor	1200	16	Stmbg.	grv.	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Timkn.	7.75	r-rd.	sprgs.	Merl.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Maccar. H
cent.	Pierce.	motor	1200	15	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe	motr.	3	worm.	Timkn.	8.75	r-rd.	sprgs.	Merl.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Maccar. M
cent.	Con.	motor	1050	12	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Timkn.	10.25	r-rd.	sprgs.	Merl	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Maccar. G
cent.	own.	motor	1250	16	Zenith.	grv	d-d.	B-Lipe	selec	B-Lipe.	motr.	4	worm.	Timkn*	8.50	sprgs.	sprgs.	Merl.	int-r-w	int-r-w	l.	own.	ctr.	mtl	Spicer.	Mack AB
cent.	own.	motor	1250	19	Zenith.	grv	d-d.	B-Lipe.	selec	B-Lipe	motr	4	chn.	own.	6.99	r-rd.		Merl.	ext-d-s.	int-r-w	l.	own.	ctr.	mtl	Blood.	Mack AB

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel & Co.
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Rossl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwel -Johnson
S-M—Standard Malleable
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME Make	FRAME Material	FRAME Type	TIRES Kind	TIRES Size in Ins. Front	TIRES Size in Ins. Rear	WHEELS Make	WHEELS Type	ENGINE Make	No. Cyl Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	COOLING Water Circ.	Radiator CASE Make	Radiator CASE Type	Radiator CORE Make	Radiator CORE Type	IGNITION Type	IGNITION Make	IGNITION Spark Advance	ELEC. SYSTEM Type	ELEC. SYSTEM Make	ELEC. SYSTEM Extra Cost $
Mack AB	2	$3,300	144	own	p-stl	flex	sol*	36x4	36x4d	Sch*	wd	own	4-4 x5 -25.6	2	cent	own	sht	own	cel	sing	Spltf	hand	htg-2*	L-N	175*
Mack AB	2	3,300	144	own	p-stl	flex	sol*	36x4	36x4d	Sch*	wd	own	4-4 x5 -25.6	2	cent	own	sht	own	cel	sing	Spltf	hand	htg-2*	L-N	175*
Mack AC	3½	4,950	168	own	p-stl	flex	sol*	36x5	40x5d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	pln*	dual	Spltf	hand	htg-2*	L-N	175*
Mack Tractor AB	5	3,400	120	own	p-stl	flex	sol*	36x4	36x4d	Sch*	wd	own	4-4 x5 -25.6	2	cent	own	sht	own	cel	sing	Spltf	hand	htg-2*	L-N	175*
Mack AC	5½	5,500	168	own	p-stl	flex	sol	36x6	40x6d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	pln*	dual	Spltf	hand	htg-2*	L-N	175*
Mack Tractor AC	7	4,950	119	own	p-stl	flex	sol	36x5	40x5d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	pln*	dual	Spltf	hand	htg-2*	L-N	175*
Mack AC	7½	6,000	168	own	p-stl	flex	sol	36x7	40x7d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	pln*	dual	Spltf	hand	htg-2*	L-N	175*
Mack Tractor AC	11	5,500	119	own	p-stl	flex	sol	36x6	40x6d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	cel	dual	Spltf	hand	htg-2*	L-N	175*
Mack Tractor AC	15	6,000	119	own	p-stl	flex	sol	36x7	40x7d	Sch*	wd	own	4-5 x6 -40.0	2	cent	own	cst	own	pln*	dual	Spltf	hand	htg-2*	L-N	175*
Master JW	1½	2,290	142	P&B	p-stl	s-flex	sol	34x3½	34x5	Prud	wd	Buda	4-4⅛x5½-27.2	4	cent	own	cst	Chgo	cel	sing	Eismn	fixed	s&l*	West	150
Master J1	1½	2,190	142	P&B	p-stl	s-flex	sol	34x3½	34x5	Prud	wd	Buda	4-4⅛x5½-27.2	4	cent	own	cst	Chgo	cel	sing	Eismn	fixed	s&l*	West	150
Master M	2	2,590	144	P&B	p-stl	s-flex	sol	34x4	36x7	Prud	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Chgo	pln	sing	Eismn	fixed	s&l*	West	150
Master W	2	2,890	144	P&B	p-stl	s-flex	sol	34x4	36x7	Prud	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Chgo	pln	sing	Eismn	fixed	s&l*	West	150
Master A	3½	3,990	168	P&B	p-stl	s-flex	sol	36x5	40x6d	Prud	wd	Buda	4-4½x6 -32.4	4	cent	own	cst	Chgo	cel	sing	Eismn	auto	s&l*	West	150
Master B	5	4,990	170	P&B	p-stl	s-flex	sol	36x6	40x6d	Sth	mt	Buda	4-4¾x6½-36.2	4	cent	own	cst	Chgo	fin	sing	Eismn	auto	lghtg*	West	150*
Master Tractor T	6	2,850	110	P&B	p-stl	s-flex	sol	34x4	36x4d	Prud	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Chgo	fin	sing	Eismn	fixed	lghtg*	West	150*
Maxwell 1½	1½	1,185	124	Prsh	p-stl	s-flex	sol*	32x3	32x4	Kel	wd	own	4-3⅝x4½-21.1	4	ther	own	prs	own	fin	sing	A-Knt	hand	lghtg	Aut-L	none
Moreland 19N	1	2,300	126	Smh	p-stl	rigid	pnu	35x5	35x5	Drt	mt	Buda	4-3¾x5¼-22.5	4	cent	own	cst	Mod	cel	sing	Spltf	hand	lghtg	West	
Moreland 19B	1½	2,930	126	Smh	p-stl	rigid	sol	36x3½	36x5	Sth	mt	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Mod	cel	sing	Spltf	hand	lghtg	West	
Moreland 19C	2½	3,775	144	Smh	p-stl	rigid	sol	36x4	36x7	Sth	mt	Con	4-4½x5½-32.4	4	cent	own	cst	Mod	cel	sing	Spltf	hand	lghtg	West	
Moreland 19G	4	4,875	162	Smh	p-stl	rigid	sol	36x5	40x5d	Sth	mt	Con	4-4¾x6 -36.2	2	cent	own	cst	Mod	cel	sing	Spltf	hand	lghtg	West	
Moreland 19V	5	5,350	192	Smh	p-stl	rigid	sol	36x6	40x6d	Sth	mt	Con	4-4¾x6 -36.2	4	cent	own	cst	Mod	cel	sing	Spltf	hand	lghtg	West	
Muskegon 20	2	2,325	144	P&B	p-stl	flex	sol	36x4	36x6	Prud	wd	Con	4-4⅛x5¼-27.2	2	cent	own	cst	M-R	cel	sing	Eismn	fixed	none	none	none
Mutual 2A	2	3,375	150	P&B	p-stl	s-flex	sol*	36x4	36x8	Sth*	mt*	Wsc	4-4 x6 -25.6	4	cent	S-M	cst	Pfx	cel	sing	Bosch	hand	s&l	West	none
Mutual 2½A	2½		153	P&B	p-stl	s-flex	pnu	38x7	42x9	Day*	mt	Wsc	4-4 x6 -25.6			Pfx		Pfx	cel	sing	Bosch	hand	s&l	West	none
Mutual 3½A	3½			P&B	p-stl	s-flex	sol	36x5	40x10	Sth*	mt	Wsc	4-4½x6 -32.4	4		Pfx		Pfx	cel	sing	Bosch	hand	s&l	West	none
Mutual 5A	5			P&B	p-stl	s-flex	sol	36x6	40x12	Sth*	mt	Wac	4-5 x6 -40.0	4		Pfx		Pfx	cel	sing	Bosch	hand	s&l	West	none
Napoleon 9	1	1,385	132	own	rol-c	rigid	sol*	32x3½	34x4	Roy	wd	Gray	4-3½x5 -19.6	4	ther	Chgo	cst	Chgo	fin	sing	Aut-L	hand	lghtg	Aut-L	none
Napoleon 11	1½	1,660	132	own	rol-c	rigid	sol*	32x4	34x5	Roy	wd	Gray	4-3½x5 -19.6	4	ther	Chgo	cst	Chgo	fin	sing	Aut-L	hand	lghtg	Aut-L	none
Nash 2018	1	1,650	130	Smh	p-stl	rigid	sol*	34x3	34x4	Auto	wd	own	4-3¾x5¼-22.5	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	Aut-L	none
Nash 3018	1½	2,250	144	Smh	p-stl	rigid	sol*	34x4	36x6	Auto	wd	own	4-3¾x5¼-22.5	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	Aut-L	none
Nash 4017	2	3,250	124	own	p-stl	rigid	sol*	36x5	36x5	Clrk	mt	Buda	4-4¼x5½-29.0	4	cent	McC	cst	McC	fin	sing	Eismn	hand	none	none	none
Nelson & LeMoon F1½	1½		opt	own	rol-c	s-flex	sol*	36x3½	36x5	Prud	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Chgo	fin	sing	Bosch	hand	s&l-2*	West	175
Nelson & LeMoon F2	2		opt	own	rol-c	s-flex	sol	36x4	36x7	Prud	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Chgo	fin	sing	Bosch	hand	s&l-2*	West	175
Nelson & LeMoon F3½	3½		opt	own	rol-c	s-flex	sol	36x5	36x5d	Prud	wd	Con	4-4½x5½-32.4	2	cent	own	cst	Chgo	fin	sing	Bosch	hand	s&l-2*	West	175
Nelson & LeMoon FC5	5		opt	own	rol-c	s-flex	sol	36x6	40x6d	Prud	wd	Con	4-4¾x6 -36.2	2	cent	own	cst	Chgo	fin	dual	Bosch	hand	s&l-2*	West	175
Netco D	2	3,200	144	P&B	p-stl	flex	sol*	36x4	36x7	Arch	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	R-T	fin	sing	Eismn	fixed	none	none	none
Netco H	2½	3,400	168	P&B	p-stl	s-flex	sol*	36x4	36x8	Arch	wd	Con	4-4½x5½-32.4	2	cent	own	cst	R-T	fin	sing	Eismn	fixed	none	none	none
Niles E	2	2,800	140	Savg	p-stl	flex	sol	36x4	36x7	H&D	wd	Con	4-4⅛x5¼-27.2	4	cent	Fed	sht	Fed	cel	sing	Eismn	hand	none	none	none
Noble A20	1		144	P&B	p-stl	s-flex	sol*	36x3½	36x4	Bim	wd	Buda	4-3¾x5¼-22.5	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	s&l-2	Eismn	
Noble B30	1½		144	P&B	p-stl	s-flex	sol*	36x3½	36x5	Bim	wd	Buda	4-3¾x5¼-22.5	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	s&l-2	Eismn	
Noble C40	2		148	P&B	p-stl	s-flex	sol*	36x4	36x7	Bim	wd	Buda	4-4 x5½-25.6	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	s&l-2	Eismn	
Noble D50	2½		162	P&B	p-stl	s-flex	sol*	36x4	36x8	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	lghtg	Eismn	
Noble E70	3½		182	P&B	p-stl	s-flex	sol	36x5	36x10	Bim	wd	Buda	4-4½x6 -32.4	4	cent	Chgo	cst	Chgo	fin	sing	Eismn	hand	lghtg	Eismn	
Northway B-2	2	3,250	146	Drt	p-stl	s-flex	sol	36x5	36x4d	Clrk	mt	own	4-4 x6 -25.6	4	cent	G&O	cst	G&O	cel	sing	Wag	hand	sl&i-2	West	none
Northway B-3½	3½	4,250	160	Drt	p-stl	s-flex	sol	36x5	40x5d	Clrk	mt	own	4-4 x6 -25.6	4	cent	G&O	cst	G&O	cel	dual	Wag	hand	sl&i-2	West	none
Old Hickory M	¾	995	112	own	rol-c	s-flex	pnu	33x4	33x4	Sal	wd	Lyc	4-3¼x5 -16.9	4	ther	Can	prs	Can	cel	dual	Conn	hand	sl&i	Dneto	none
Old Hickory W	1	2,175	135	own	rol-c	s-flex	sol*	36x3½	36x4	Stn	wd	Con	4-3¾x5 -22.5	4	ther	own	cst	Lng	fin	sing	Eismn	hand	none	none	none
Old Reliable A	1½	2,350	138	Savg	p-stl	flex	sol	34x4	36x6	Prud	wd	Wsc	4-4 x5 -25.6	4	cent	Chgo	sht	Chgo	fin	sing	Bosch	hand	lghtg	Vesta	50*
Old Reliable B	2½	3,250	160	own	rol-c	rigid	sol	34x4	36x4d	Crn	wd	Wsc	4-4¼x6 -29.0	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	lghtg	Vesta	50*
Old Reliable C	3½	4,000	160	own	rol-c	rigid	sol	36x5	36x5d	Crn	wd	Wsc	4-4¼x6 -29.0	4	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	lghtg	Vesta	50*
Old Reliable D	5	5,000	166	own	rol-c	rigid	sol	36x6	40x6d	Crn	wd	Wsc	4-5⅒x5½-41.6	2	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	lghtg	Vesta	50*
Old Reliable K	7½	6,000	136	own	rol-c	rigid	sol	36x6	40x7d	Crn*	wd*	Wau	4-4¾x6¾-36.2	2	cent	Chgo	cst	Chgo	fin	sing	Bosch	hand	none	none	none
Oneida A	1	2,290	144				sol	36x3½	36x5			Con	4-3¾x5¼-22.5		cent	Lng		Lng			Bosch		start*		
Oneida B	1½	2,650	144				sol	36x3½	36x6			Con	4-4⅛x5¼-27.2		cent	Lng		Lng			Bosch		start*		
Oneida C	2	3,000	144				sol	36x4	36x7			Con	4-4⅛x5¼-27.2		cent	Lng		Lng			Bosch		start		
Oneida D	3½	3,700	160				sol	36x5	36x5d			Con	4-4½x5½-32.4		cent				fin		Bosch				
Oneida E	5	4,750	180				sol	36x6	40x12			Con	4-5¼x5¾-44.1		cent				cel		Bosch		start*		
Packard 1½-E	1½	3,200	144	own	rol-c	s-flex	sol	34x3½	34x3½d	own	wd	own	4-4 x5½-25.6	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230
Packard 2-E	2	3,600	144	own	rol-c	s-flex	sol	34x4	34x4d	own	wd	own	4-4 x5½-25.6	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230
Packard 3-E	3	4,350	156	own	rol-c	s-flex	sol	36x5	36x5d	own	wd	own	4-4½x5½-32.4	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
cent.	own....	motor	1250	19	Zenith.	grv..	d-d..	B-Lipe.	selec..	B-Lipe.	motr..	4	chn...	own...	6.99	r-rd...	....	Merl..	ext-d-s..	int-r-w	l...	own...	ctr.	mtl	Blood.	**Mack AB**
cent.	own....	motor	1250	16	Zenith.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	motr..	4	worm.	Timkn*	8.50	sprgs..	sprgs..	Merl..	int-r-w	int-r-w	l...	own...	ctr.	mtl.	Spicer.	**Mack AB**
cent.	own....	motor	1000	13	Zenith.	grv...	d-p...	own..	selec.	own..	jst....	3	chn...	own...	9.18	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr.	mtl	Spicer..	**Mack AC**
cent.	own....	motor	1250	13	Zenith.	grv...	d-d..	B-Lipe.	selec..	B-Lipe.	motr..	4	chn..	own...	10.53	r-rd...	....	Merl..	ext-d-s..	int-r-w	l...	own...	ctr..	mtl	Blood..	**Mack—Tractor AB**
cent.	own....	motor	1000	13	Zenith.	grv...	d-p...	own....	selec..	own....	jst....	3	chn...	own...	9.10	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr..	mtl	Spicer..	**Mack AC**
cent.	own....	motor	1000	10	Zenith.	grv...	d-p.	own...	selec..	own...	jst...	3	chn...	own...	11.65	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr..	mtl	Spicer..	**Mack—Tractor AC**
cent.	own..	motor	1000	9	Zenith.	grv..	d-p...	own....	selec..	own...	jst....	3	chn...	own....	12.54	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr..	mtl..	Spicer..	**Mack AC**
cent.	own..	motor	1000	9	Zenith.	grv....	d-p..	own....	selec..	own...	jst....	3	chn...	own...	12.54	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr..	mtl..	Spicer..	**Mack—Tractor AC**
cent.	own....	motor	1000	7	Zenith.	grv...	d-p...	own....	selec..	own....	jst....	3	chn...	own...	15.27	r-rd...	....	Merl..	ext-jst...	int-r-w	l...	own...	ctr..	mtl.	Spicer.	**Mack—Tractor AC**
suct..	McCn..	motor		15	own....	grv...	d-d...	Fuller..	selec..	Fuller..	motr..	3	worm.	Timkn.	7.75	sprgs..	sprgs..	Detr..	ext-r-w..	int-r-w	l...	Ross..	ctr..	mtl.	Arvac..	**Master JW**
suct..	McCn..	motor	1200	15	own....	grv...	d-d...	Fuller..	selec..	Fuller..	motr..	3	int-g..	Torbn..	8.00	sprgs..	sprgs..	Detr..	ext-r-w..	int-r-w	l...	Ross..	ctr..	mtl.	Arvac..	**Master J1**
suct..	McCn..	motor	1200	16	own....	grv*..	d-d...	B-Lipe	selec..	B-Lipe	motr..	4	int-g..	Timkn.	8.00	sprgs..	sprgs..	Detr..	ext-r-w..	int-r-w	l...	Ross..	ctr..	mtl.	Arvac.	**Master M**
suct..	McCn..	motor	1200	15	own....	grv*..	d-d...	B-Lipe	selec..	B-Lipe.	motr..	4	worm.	Timkn.	8.50	sprgs..	sprgs..	Detr..	ext-r-w..	int-r-w	l...	Ross..	ctr..	mtl.	Arvac..	**Master W**
cent.	Pierce..	motor	1100	12	own...	grv*..	w-d...	B-Lipe.	selec...	B-Lipe.	amid..	4	worm.	Timkn.	10.33	sprgs..	sprgs..	Detr..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl.	Spicer*	**Master A**
cent.	Pierce..	motor	1000	10	own...	grv*..	d-d..	B-Lipe.	selec...	B-Lipe.	amid..	4	worm.	Timkn.	10.25	sprgs..	sprgs..	Detr..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl	Spicer..	**Master B**
suct..	McCn..	motor	1200	15	own....	grv*..	d-d.	B-Lipe*	selec..	B-Lipe*	motr..	4	int-g..	Timkn*	8.00	sprgs..	sprgs..	Detr..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl	Arvac..	**Master—Tractor T**
none.	none!..	.....	1562	22	John...	grv...	cone..	own..	selec...	own...	motr..	3	worm.	own...	7.25	sprgs..	sprgs..	Detr..	int-r-w.	int-r-w	l...	own...	ctr..	mtl	own..	**Maxwell**
none.	none...	none..	1150	20	Miller..	grv...	d-d..	own..	selec...	own..	amid..	4	worm.	Timkn.	6.20	r-rd...	sprgs..	U.S...	int-r-w.	int-r-w	l...	Gem..	ctr..	fab..	own....	**Moreland 19N**
none.	none...	none..	1150	18	Miller..	grv...	d-d..	own...	selec..	own..	amid..	4	worm.	Timkn.	12.32	r-rd...	sprgs..	U.S...	int-r-w.	int-r-w	l...	Ross..	ctr..	fab..	own..	**Moreland 19B**
none.	none..	none..	1100	17	Miller..	grv...	d-d.	own...	selec...	own...	amid..	4	worm.	Timkn.	6.80	r-rd...	sprgs..	U.S...	int-r-w.	int-r-w	l...	Ross..	ctr..	fab..	own..	**Moreland 19C**
cent.	Con..	motor	1050	16	Miller..	grv...	d-d..	own...	selec...	own...	amid..	4	worm.	Timkn.	7.80	r-rd...	sprgs..	U.S...	int-r-w.	int-r-w	l...	Ross..	ctr..	fab..	own..	**Moreland 19G**
cent.	Con...	motor	1050	13	Miller..	grv..	d-d.	own..	selec..	own...	amid..	4	worm.	Timkn.	10.25	r-rd...	sprgs..	....	int-r-w	int-r-w	l...	Ross..	ctr..	fab..	own..	**Moreland 19V**
cent.	Pierce..	gset...	1260	15	Detrt..	vac..	d-d..	Fuller..	selec...	Fuller..	motr..	3	int-g..	Torbn..	1.00	sprgs..	sprgs..	Caot..	ext-r-w..	int-r-w	l...	Lavn..	ctr..	mtl..	Arvac*	**Muskegon 20**
cent.	Dplx...	Dplx..	1500	14	Stmbg.	grv.	w-d...	H-S*...	selec..	Fuller..	amid..	4	worm.	Shel...	1.00	r-rd...	sprgs..	Mth..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl..	Spicer..	**Mutual 2A**
cent.	Dplx...	Dplx..	1013	13	Stmbg.	grv..	w-d...	H-S..	......	......	amid..	4	worm.	Shel...	......	r-rd...	r-rd...	Mth..	int-r-w..	int-r-w	.....	Ross..	ctr..	mtl.	Spicer..	**Mutual 2½A**
cent.	Dplx...	Dplx..	......	...	Stmbg.	grv..	w-d...	H-S..	......	......	amid..	4	worm.	Shel...	....	r-rd...	r-rd...	Mth..	int-r-w.	int-r-w	....	Ross..	ctr..	mtl.	Spicer.	**Mutual 3½A**
cent.	Dplx..	Dplx..	......	...	Stmbg.	grv...	......	H-S....	......	......	amid..	4	worm.	Shel...	....	r-rd...	r-rd...	Mth..	int-r-w.	int-r-w	....	Ross..	ctr..	mtl..	Spicer..	**Mutual 5A**
cent.	Pierce..	motor	1400	12	Stmbg.	grv...	d-d..	Fuller..	selec..	Fuller..	motr..	3	int-g..	Clrk..	6.00	sprgs..	sprgs..	Mth..	ext-r-w..	ext-d-s	l...	Lavn..	ctr..	mtl..	Unvsl..	**Napoleon 9**
cent.	Pierce..	motor	1400	12	Stmbg.	grv...	d-d.	Fuller..	selec..	Fuller..	motr..	3	int-g..	Clrk.	8.00	sprgs..	sprgs..	Mth..	ext-r-w..	ext-d-s	l...	Lavn..	ctr..	mtl	Unvsl..	**Napoleon 11**
cent.	Dplx...	motor	1351	20	Stmbg.	grv...	d-p...	B-Beck.	selec...	Detrt..	motr..	3	int-g..	Clrk..	6.83	sprgs..	sprgs..	Aloy..	ext-r-w..	ext-d-s	l...	Jacox.	ctr..	mtl	own..	**Nash 2018**
cent.	Dplx...	motor	1400	15	Stmbg.	grv...	d-p...	B-Beck.	selec..	Detrt..	amid..	4	int-g..	Clrk...	8.00	sprgs..	sprgs..	Mth..	ext-r-w..	ext-d-s	l...	Jacox.	ctr..	mtl..	own..	**Nash 3018**
cent.	Dplx...	motor	1270	16	Stmbg.	grv...	d-p...	B-Beck.	selec..	own..	amid..	4	int-g-4	own...	8.05	sprgs..	sprgs..	Mth..	ext-r-w..	ext-d-s	l...	Lavn..	ctr..	mtl..	own..	**Nash 4017**
cent.	Pierce..	motor	1200	16	Stmbg.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	motr..	3	worm.	Timkn.	6.75	sprgs..	sprgs..	Tuth..	int-r-w..	int-r-w	r...	Lavn..	ctr..	fab...	own..	**Nelson & LeMoon F1½**
cent.	Pierce..	motor	1200	16	Stmbg.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	motr..	3	worm.	Timkn.	7.00	sprgs..	sprgs..	Tuth..	int-r-w..	int-r-w	r...	Lavn..	ctr..	fab..	own..	**Nelson & LeMoon F2**
cent.	Pierce..	motor	1100	12	Stmbg.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	motr..	4	worm.	Timkn.	8.75	sprgs..	sprgs..	Tuth..	int-r-w..	int-r-w	r...	Lavn..	ctr..	fab..	own..	**Nelson & LeMoon F3½**
cent.	Pierce..	motor	1100	10	Stmbg.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	amid..	4	worm.	Timkn.	10.33	sprgs..	sprgs..	Tuth..	int-r-w.	int-r-w	r...	Lavn..	ctr..	fab..	own..	**Nelson & LeMoon FC5**
none.	none..	none..	1500	24	Zenith.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	motr..	3	worm.	Timkn.	1.00	sprgs..	sprgs..	S-P..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl..	Hart...	**Netco D**
none.	none...	none..	1500	24	Zenith.	grv...	d-d...	B-Lipe.	selec...	B-Lipe.	amid..	4	worm.	Timkn.	1.00	sprgs..	sprgs..	S-P...	int-r-w..	int-r-w	l...	Ross..	ctr..	mtl..	Hart...	**Netco H**
cent.	Pierce..	motor	2500	25	Stmbg.	grv...	d-d...	B-Beck.	selec...	Covert.	amid..	3	worm.	Timkn.	8.50	r-rd...	sprgs..	Iron..	int-r-w.	int-r-w	l...	Gem..	ctr..	mtl..	Blood..	**Niles E**
cent.	Pierce..	motor	1468	20	Stmbg.	grv...	d-d...	Fuller.	selec...	Fuller..	motr..	3	worm.	Shel....	7.80	sprgs..	sprgs..	Tuth..	int-r-w	int-r-w	l...	Lavn..	ctr..	mtl	M&E.	**Noble A20**
cent.	Pierce..	motor	1290	18	Stmbg.	grv...	d-d...	Fuller..	selec...	Fuller..	motr..	3	worm.	Shel....	7.75	sprgs..	sprgs..	Tuth..	int-r-w.	int-r-w	l...	Lavn..	ctr..	mtl..	M&E.	**Noble B30**
cent.	Pierce..	motor	1075	15	Stmbg.	grv...	d-d...	Fuller..	selec...	Fuller..	motr..	3	worm.	Shel....	7.75	sprgs..	sprgs..	Tuth..	int-r-w.	int-r-w	l...	Lavn..	ctr..	mtl.	M&E.	**Noble C40**
cent.	Pierce..	motor	1215	15	Stmbg*	grv...	d-d...	Fuller..	selec...	Fuller..	amid..	4	worm.	Shel...	7.75	sprgs..	sprgs..	Tuth..	int-r-w.	int-r-w	l...	Lavn..	ctr..	mtl..	M&E.	**Noble D50**
cent.	Pierce..	motor	972	12	Stmbg*	grv*..	d-d...	Fuller..	selec...	Fuller..	amid..	4	worm.	Shel...	8.75	sprgs..	sprgs..	Tuth..	int-r-w..	int-r-w	l...	Lavn..	ctr.	mtl..	M&E.	**Noble E70**
cent.	Pierce..	motor	1300	18	Schblr..	vac...	d-d...	Fuller..	selec...	Fuller..	motr..	4	worm.	Shel...	7.75	sprgs..	sprgs..	S-P...	int-r-w	int-r-w	l...	Ross..	ctr..	mtl	Spicer..	**Northway B-2**
cent.	Pierce..	motor	1350	14	Schblr..	vac...	d-d...	Fuller..	selec...	Fuller..	motr..	4	worm.	Shel...	10.25	sprgs..	sprgs..	S-P..	int-r-w.	int-r-w	l...	Ross..	ctr..	mtl.	Spicer..	**Northway B-3½**
none.	none.	none..	1900	25	Cotta	grv...	cone..	Lyc....	selec...	G-Lees.	motr..	3	bevel..	Sal....	6.00	t-t....	sprgs..	S-P..	ext-r-w..	int-r-w	l...	CAS.	ctr..	fab..	Therm.	**Old Hickory M**
cent.	Pierce..	motor	1200	18	Stmbg.	vac...	d-p...	B-Beck.	selec..	G-Lees.	motr..	3	worm.	Timkn.	1.00	sprgs..	sprgs..	S-P...	int-r-w.	int-r-w	l...	Lavn..	ctr..	mtl.	Blood..	**Old Hickory W**
none.	none.	none..	1135	15	Stmbg.	vac...	d-d...	B-Lipe.	selec..	B-Lipe	motr..	3	worm.	Shel...	7.75	sprgs..	sprgs..	Shel...	int-r-w.	int-r-w	r...	Ross..	ctr..	mtl.	Spicer..	**Old Reliable A**
suct..	Mnrch.	motor	1135	15	Stmbg.	vac...	d-d...	Fuller..	selec..	Fuller..	amid..	4	worm.	Shel...	7.75	sprgs..	sprgs..	Shel...	int-r-w..	int-r-w	r...	Ross..	ctr..	mtl.	Spicer..	**Old Reliable B**
suct..	Mnrch.	motor	1280	15	Stmbg.	vac...	d-d...	Fuller..	selec...	Fuller..	amid..	4	worm.	Shel...	8.75	sprgs..	sprgs..	Shel...	int-r-w.	int-r-w	r...	Ross..	ctr..	mtl.	Spicer..	**Old Reliable C**
suct..	Mnrch.	motor	1155	15	Stmbg.	vac...	w-d...	Unv....	selec...	Savg...	amid..	4	worm.	Shel...	8.75	sprgs..	sprgs..	Shel...	int-r-w.	int-r-w	r...	Ross..	r...	mtl.	Spicer..	**Old Reliable D**
cent.	Wau...	motor	955	10	Stmbg.	grv....	w-d...	Unv...	selec...	Savg...	jst...	4	chn..	Shel...	10.86	r-rd...	.....	Shel...	ext-d-s..	int-r-w	r...	Ross..	r...	mtl.	Hart...	**Old Reliable K**
cent.	Pierce..	.....	......	..	Stmbg.	......	.....	H-S...	......	Cotta	.....	3	worm.	Timkn.	....	....	....	Mth..	......	......	....	Ross..	..	...	Spicer..	**Oneida A**
cent.	Pierce..	.....	......	...	......	......	.....	H-S...	......	Cotta..	....	3	worm.	Timkn.	....	....	....	Mth..	......	......	....	Ross..	..	...	Spicer..	**Oneida B**
cent.	Pierce..	.....	......	..	Stmbg.	......	.....	H-S...	......	Cotta	....	3	worm.	Timkn.	....	....	....	Mth..	......	......	....	Ross..	..	...	Spicer..	**Oneida C**
cent.	Pierce..	.....	......	..	Rayfld.	......	d-d...	......	......	Cotta	.....	3	worm.	Timkn.	....	....	....	Mth..	......	......	....	Ross..	..	...	Spicer..	**Oneida D**
cent.	Pierce..	....	......	..	Stmbg.	......	......	H-S...	......	Cotta	....	3	worm.	Timkn.	....	....	....	Mth..	......	......	....	Ross..	..	...	Spicer..	**Oneida E**
cent.	own..	motor	1000	16	own....	pres..	d-d...	own...	selec..	own...	amid..	4	worm.	own...	6.25	r-rd...	t-arm.	Sp-P..	ext-d-s..	int-r-w	l...	own...	l&c.	mtl*.	Spicer*	**Packard 1½-E**
cent.	own..	motor	1000	14	own....	pres...	d-d...	own...	selec..	own..	amid..	4	worm.	own...	7.25	r-rd..	t-arm	Sp-P..	ext-d-s..	int-r-w	l...	own...	l&c.	mtl*.	Spicer*	**Packard 2-E**
cent.	own..	motor	1000	12	own...	pres...	d-d..	own...	selec..	own...	amid..	4	worm.	own...	9.00	r-rd...	t-arm.	Sp-P..	ext-d-s..	int-r-w	l...	own...	l&c.	mtl*.	Spicer*	**Packard 3-E**

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Unvt—Universal Prdts
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME Make	FRAME Material	FRAME Type	TIRES Kind	TIRES Size in Ins. Front	TIRES Size in Ins. Rear	WHEELS Make	WHEELS Type	ENGINE Make	No. Cyl Bore and Stroke N.A.C.C. Hp.	Cylinders Cast	COOLING Water Circ.	Radiator CASE Make	Radiator CASE Type	Radiator CORE Make	Radiator CORE Type	IGNITION Type	IGNITION Make	IGNITION Spark Advance	ELEC. SYSTEM Type	ELEC. SYSTEM Make	Extra Cost $
Packard 4-E	4	$4,550	156	own	rol-c	s-flex	sol	36x5	40x5d	own	wd	own	4-4½x5½-32.4	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230
Packard 5-E	5	5,450	156	own	rol-c	s-flex	sol	36x6	40x6d	own	wd	own	4-5 x5½-40.0	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230
Packard 6-E	6	5,700	156	own	rol-c	s-flex	sol	36x6	40x7d	own	wd	own	4-5 x5½-40.0	4	cent	Fed	cst	Fed	fin	dual	Spltf	hand	s&l-2	Bijur	230
Paige 50-18	2½	2,950	150	Prsh	p-stl	s-flex	sol*	36x4	36x7		mt	Con	4-4⅛x5¼-27.2	4	cent	Natl	cst	Natl	fin	sing	Bosch	fixed	none	none	none
Paige 51-18	3½	3,950	160	Prsh	p-stl	s-flex	sol*	36x5	36x5d*	Day	mt	Con	4-4½x5½-32.4	2	cent	Natl	cst	Natl	fin	sing	Bosch	hand	none	none	none
Parker F9C	2	3,325	150	Smh	p-stl	s-flex	sol	34x4	36x4d	Bim	wd	Con	6-3½x5¼-29.5	4	cent	own	cst	Brem	zz-t	sing	Bosch	hand	s&l-2	West	none
Parker F9W	2	3,325	150	Smh	p-stl	s-flex	sol	34x4	36x4d	Bim	wd	Wsc	4-4 x6 -25.6	4	cent	own	cst	Brem	zz-t	sing	Bosch	hand	s&l-2	West	none
Parker J9	3½	4,150	160	Smh	p-stl	s-flex	sol	36x5	40x5d	Bim	wd	Wsc	4-4½x6 -32.4	4	cent	own	cst	Brem	zz-t	sing	Bosch	hand	s&l-2	West	none
Parker M9	5	5,225	160	Smh	p-stl	s-flex	sol	36x6	40x6d	Bim	wd	Con	4-4¾x6 -36.2	2	cent	own	cst	Brem	zz-t	sing	Bosch	hand	s&l-2	West	none
Pierce-Arrow X4	2	4,300	150	Prsh	p-stl	flex	sol*	36x4	36x4d	own	wd	own	4-4 x5½-25.6	2	cent	own	cst	own	fin	dual	opt	hand	sl&i-2	Vesta	...
Pierce-Arrow R9	5	5,500	168	Prsh	p-stl	flex	sol	36x5	40x6d	own	wd	own	4-4⅞x6 -38.2	2	cent	own	cst	own	fin	dual	opt	hand	sl&i-2	Vesta	300
Pioneer All Steel F	2	2,790	144	Prsh	p-stl		sol	36x4	36x7	Budd	mt	Con	4-4⅛x5¼-27.2	4	cent	McC	cst	McC	fin	dual	Eismn	auto	none	none	none
Pony	¼	320	90	own	rol-c	rigid	pnu	28x3	28x3	Prud	wd	own	4-2¾x4 -12.1	4	ther	own	prs	own	cel	sing	A-Knt	auto	opt	opt	
Power B	2	2,950	150	own	rol-c	s-flex	sol	36x4	36x4d	Hay	wd	Con	4-4⅛x5¼-27.2	4	cent	Can	cst	Can	cel	sing	Simms	hand	none	none	none
Rainier R-11	¾	1,750	125	Prsh	p-stl	s-flex	pnu	34x4½	34x4½	Sch	wd	Con	4-3½x5 -19.6	4	ther	Har	sht	Har	cel	sing	Bosch*	fixed	opt	Bosch*	125*
Rainier R-9	1	1,875	125	Prsh	p-stl	s-flex	sol	32x3	32x4	Sch	wd	Con	4-3½x5 -19.6	4	ther	Har	prs	Har	cel	sing	Simms	fixed	opt	Bosch*	125*
Rainier R-6	1½	1,975	133	Prsh	p-stl	s-flex	sol	34x3	34x4	Sch	wd	Con	4-3½x5 -19.6	4	ther	Har	prs	Har	cel	sing	Bosch*	fixed	opt	Bosch*	125*
Rainier R-8	2	2,400	147	Prsh	p-stl	s-flex	sol	34x5	34x6	Sch	wd	Con	4-3¾x5 -22.5	4	ther	Har	prs	Har	cel	sing	Simms	fixed	none	none	none
Reo F	¾	1,285	128	own	p-stl	rigid	pnu	34x4½	34x4½	Prud	wd	own	4-4⅛x4½-27.2	2	cent	own	prs	own	fin	sing	Rem	hand	sl&i-2	Rem	none
Republic 10	1	1,555	124	Drt*	p-stl	s-flex	sol*	34x3	34x4		wd	Con	4-3¾x5 -22.5	4	ther	own	cst	G&O	cel	sing	Eismn	fixed	s&l-2	Aut-L	175
Republic 11	1½	1,885	144	Drt*	p-stl	s-flex	sol*	34x3½	34x5		wd	Con	4-3¾x5 -22.5	4	ther	own	cst	G&O	cel	sing	Eismn	fixed	s&l-2	Aut-L	175
Republic 19	2½	2,395	144	Drt*	p-stl	s-flex	sol*	36x4	36x7		wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	G&O	cel	sing	Eismn	hand	s&l-2	Vesta	175
Republic 20	3½	3,595	165	Drt*	p-stl	s-flex	sol*	36x5	36x5d	Sth	mt	Con	4-4½x5½-32.4	2	cent	own	cst	G&O	fin	sing	Eismn	hand	none	none	none
Riker B	3	4,600	150	Prsh	p-stl	rigid	sol	36x5	36x5d	Jns	wd	own	4-4¼x6 -29.0	2	cent	own	cst	G&O*	fin	sing	Berlg	hand	s&l-2	West	225
Riker BB	4	4,700	150	Prsh	p-stl	rigid	sol	36x5	36x6d	Jns	wd	own	4-4¼x6 -29.0	2	cent	own	cst	G&O*	fin	sing	Berlg	hand	s&l-2	West	225
Rock Falls .9	1¼	3,500	150	Smh	p-stl	rigid	pnu	35x5	35x5	Mut	wd	Buda	6-3½x5¼-29.5	4	cent	S-W	cst	S-W	ce	sing	Bosch	hand	s&l-2	West	none
Rowe C.D.W.	2	3,000		own	rol-c	rigid	sol	34x4	36x7	H&D	wd	Wsc	4-4 x5 -25.6	4	cent	Fed	sht	M-R			Bosch		none	none	none
Rowe C.D.W.	2½	3,250		own	rol-c	rigid	sol	34x4	36x4d	H&D	wd	Wsc	4-4 x5 -25.6	4	cent	Fed	sht	M-R			Bosch		none	none	none
Rowe D.E.W.	3	3,800		own	rol-c	rigid	sol	36x5	36x5d	H&D	wd		4-4 x6 -25.6	4	cent	Fed	sht	M-R			Bosch		none	none	none
Rowe D.G.W.	3	4,500	170	own	rol-c		pnu	38x7	42x9	own*	mt*	H-S	8-3¼x5 -33.8		cent	M-R	sht	M-R	cel		A-Knt	auto	sl&i	West	none
Rowe F.W.	5	4,900		own	rol-c	rigid	sol	36x6	40x6d	H&D	wd	Wsc	4-4¾x5½-36.2	2	cent	Fed*	sht				Bosch				
Sandow C	1	1,795	120	Savg	p-stl	flex	sol*	34x3½	34x5	Prud	wd	Con	4-3½x5 -19.6	4	ther	own	cst	Chgo	fin	sing	Eismn	auto	lghtg		125
Sandow I	1¼		150	Savg	p-stl	s-flex	sol*	36x4	36x6	Prud	wd	Con	4-3¾x5 -22.5	4	cent	own	cst	Chgo	fin	sing	Eismn	auto			
Sandow CG	1½	2,090	135	Savg	p-stl	flex	sol*	34x3½	34x5	Prud	wd	Con	4-3¾x5 -22.5	4	cent	own	cst	Chgo	fin	sing	Eismn	auto			
Sandow J	2½	2,975	165	Savg	p-stl	s-flex	sol*	36x4	36x7	Prud	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Chgo	fin	sing	Bosch	auto			
Sandow M	3½	3,975	175	Savg	p-stl	s-flex	sol	36x5	36x5d	Prud	wd	Con	4-4½x5½-32.4	2	cent	own	cst	Chgo	fin	sing	Bosch	auto			
Sandow L	5	4,750	175	Savg	p-stl	s-flex	sol	36x6	40x6d	Prud	wd	Con	4-4½x5½-32.4	2	cent	own	cst	Chgo	fin	sing	Bosch	auto			
Sanford 25	2½	3,000	156	P&B	p-stl	s-flex	sol	36x4	36x4d	H&D	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	McC	fin	sing	Bosch	hand	lghtg	Vesta	150
Sanford 35	3½	3,975	174	P&B	p-stl	s-flex	sol	36x5	36x5d	H&D	wd	Con	4-4½x5½-32.4	2	cent	own	cst	McC	fin	sing	Bosch	hand	lghtg	Vesta	150
Sanford 50	5	4,750	174	P&B	p-stl	s-flex	sol	36x5	40x6d	H&D	wd	Con	4-4½x5½-32.4	2	cent	own	cst	McC	fin	sing	Bosch	hand	lghtg	Vesta	150
Schacht 2-Ton	2	3,350	144	own	rol-c	flex	sol	36x4	36x7	Crn	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Brem	pln	sing	Bosch	hand	none	none	none
Schacht 2½-Ton	2½	3,650	156	own	rol-c	flex	sol	36x4	36x4d	Crn	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Brem	pln	sing	Bosch	hand	none	none	none
Schacht 3½-Ton	3½	4,150	168	own	rol-c	flex	sol	36x5	36x5d	Crn	wd	Buda	4-4¼x5½-29.0	4	cent	own	cst	Brem	pln	sing	Bosch	hand	none	none	none
Schacht 5-Ton	5	4,950	168	own	rol-c	flex	sol	36x5	40x6d	Crn	wd	Buda	4-4½x6 -32.4	4	cent	own	cst	Brem	pln	sing	Bosch	hand	none	none	none
Schwartz B	1½	2,175	140	Prsh	p-stl	s-flex	sol*	34x3½	34x5	Sch	wd	Con	4-3¾x5 -22.5	4	ther	own	cst	Fed	cel	sing	Bosch	hand	none	none	none
Schwartz C	2½	2,675	146	Prsh	p-stl	s-flex	sol	36x4	36x7	Sch	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Fed	cel	sing	Bosch	hand	none	none	none
Schwartz D	5	4,500	170	Prsh	p-stl	s-flex	sol	36x6	36x6d	Sth	mt	Buda	4-4½x6 -32.4	4	cent	own	cst	Fed	cel	sing	Bosch	hand	lghtg	Bijur	
Selden 1½B	1½	2,185	137½	P&B	p-stl	rigid	sol*	34x3½	35x5	Arch	wd	Con	4-3¾x5 -22.5	4	ther	Bush	cst	Bush	fin	sing	Bosch	fixed	s&l-2*	N-E	160*
Selden 2½A	2½		145	P&B	p-stl	flex	sol	36x4	36x7	Arch	wd	Con	4-4⅛x5¼-27.2	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2*	N-E	..
Selden 3½A	3½	3,850	162	P&B	p-stl	flex	sol	36x5	36x10	Arch	wd	Con	4-4½x5½-32.4	2	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2*	N-E	
Selden DL	5	4,950	170	P&B	p-stl	rigid	sol	36x6	40x12	Sth	mt	Con	4-4½x5½-32.4	2	cent	Bush	cst	Bush	fin	sing	Eismn	hand	s&l-2*	N-E	160*
Seneca F-2	½	1,060-c	108	P&B	p-stl	s-flex	pnu	30x3½	30x3½	AWW	wd	LeR	4-3⅛x4½-15.6	4	ther	Knz	prs	Knz	cel	sing	Conn	hand	sl&i	Al-Ch	none
Service 220	1	2,100	137	own	p-stl	flex	sol	34x3½	34x5	Bim	wd	Buda	4-3½x5¼-19.6	4	ther	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	West	120*
Service 31	1½	2,500	150	own	p-stl	flex	sol	36x3½	36x6	Bim	wd	Buda	4-4 x5½-25.6	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	West	140*
Service 36	1½	2,930	150	own	p-stl	flex	pnu	35x5	38x7	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2*	West	140*
Service 51	2½	3,000	160	own	p-stl	flex	sol	36x4	36x7	Bim	wd	Buda	4-4¼x5½-29.0	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	West	140*
Service 76	3½	4,200	171	own	p-stl	flex	sol	36x5	36x5d	Bim	wd	Buda	4-4½x6 -32.4	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	West	140*
Service 101	5	5,000	171½	own	p-stl	flex	sol	36x6	40x6d	Bim	mt	Buda	4-4½x6 -32.4	4	cent	Lng	cst	Lng	fin	sing	Eismn	hand	s&l-2	West	140*
Signal F	1	2,400	146	Savg	p-stl	s-flex	sol	36x6	36x6	Hay	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	McC	fin	sing	Eismn	fixed	lghtg-2	Nich	80
Signal H	1½	2,700	146	Savg	p-stl	s-flex	sol	34x4	36x6	Hay	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	McC	fin	sing	Eismn	fixed	lghtg-2	Nich	80
Signal J	2	3,100	150	Savg	p-stl	s-flex	sol	36x6	36x8	Hay	wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	McC	fin	sing	Eismn	fixed	lghtg-2	Nich	80
Signal M	3½	4,100	168	Savg	p-stl	s-flex	sol	36x5	40x5d	Hay	wd	Con	4-4½x5½-32.4	2	cent	own	cst	McC	fin	sing	Eismn	fixed	lghtg-2	Nich	80

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in [illegible]
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
cent.	own.	motor	1000	12	own.	pres.	d-d.	own.	selec.	own.	amid.	4	worm.	own.	10.00	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	l.	own.	l&c.	mtl*	Spicer*	Packard 4-E
cent.	own.	motor	1000	11	own.	pres.	d-d.	own.	selec.	own.	amid.	4	worm.	own.	10.66	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	l.	Ross.	l&c	mtl*	Spicer*	Packard 5-E
cent.	own.	motor	1000	11	own.	pres.	d-d	own.	selec.	own.	amid.	4	worm.	own.	10.66	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	l.	Ross.	l&c	mtl*	Spicer*	Packard 6-E
cent.	Dplx.	motor	1200	15	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Timkn.	1.00	t-arm.	sprgs.	S-P.	int-r-w	int-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Paige 50-18
cent.	Dplx.	motor	1050	11	Stmbg.	grv.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Timkn	1.00	t-arm.	sprgs.	S-P.	int-r-w	int-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Paige 51-18
suct.	Mnrch.	motor	1600	18	Stmbg.	grv	d-d.	B-Lipe	selec	Fuller.	amid.	4	worm.	own.	7.75	r-rd.	sprgs.	Tuth.	ext-d-s.	int-r-w	l.	Ross.	ctr.	mtl*	Arvac*.	Parker 9-C
suct.	Mnrch.	motor	1250	18	Stmbg.	grv.	d-d.	B-Lipe	selec	Fuller.	amid.	4	worm.	own.	7.75	r-rd.	sprgs.	Tuth.	ext-d-s.	int-r-w	l.	Ross.	ctr.	mtl*.	Arvac*.	Parker F9W
suct.	Mnrch	motor	1030	16	Stmbg.	grv	d-d.	B-Lipe	selec	Warn	amid.	4	worm.	own.	7.80	r-rd.	sprgs.	Tuth.	ext-d-s.	int-r-w	l.	Ross.	ctr.	mtl*	K-B*	Parker J9
cent.	Con.	motor	1100	12	Stmbg.	vac.	d-d.	B-Lipe.	selec	Warn.	amid.	4	worm.	Timkn.	10.25	r-rd.	sprgs.	Tuth.	ext-d-s.	int-r-w	l.	Ross.	ctr.	mtl*.	K-B*.	Parker M9
cent.	own.	motor	1300	16	own.	grv	cone	own.	selec	own.	amid.	4	worm.	own.	8.25	r-rd.	t-arm	Sp-P.	ext-d-s.	int-r-w	r.	own.	r.	mtl	own.	Pierce-Arrow X4
cent.	own.	motor	950	14	own.	grv	cone	own.	selec.	own.	amid.	3	worm.	own.	7.80	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	r.	own.	r.	mtl	own.	Pierce-Arrow R9
cent.	Pierce.	gset.	1500	16	Stmbg.	grv	d-d.	B-Lipe		B-Lipe	amid.	4	worm.	Timkn.	8.75	r-rd.	sprgs.	S-P.	int.	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Pioneer All Steel F
opt	opt	opt.	1250	25	Stmbg.	grv.	none.		fric.		jst.	3	chn.	own.	4.00	r-rd.		Tuth.	int.		l.	own.	l.			Pony.
cent.	Pierce.	motor	1200	15	Stmbg.	grv	d-d	Fuller.	selec.	Fuller.	motr.	4	worm.	Timkn.	7.75	sprgs.	Sprgs	Detr.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Univl.	Power B
suct.	Mnrch.	motor	1800	25	Zenith.	vac	d-d.	B-Lipe	selec.	B-Lipe.	motr.	3	worm	Timkn.	7.20	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Rainier R-11
suct.	Mnrch.	motor	1800	20	Zenith.	vac	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Rainier R-9
suct.	Mnrch.	motor	1800	20	Zenith.	vac.	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Hart.	Rainier R-6
suct.	Mnrch.	motor	1800	15	Zenith.	vac.	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Shel.	8.70	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Hart.	Rainier R-8
none.	none.	none.		22	John.	grv.	d-d.	own.	selec.	own.	amid.	3	bevel.	own.	4.66	sprgs.	t-arm.	Penn.	ext-r-w.	int-r-w	l.	own.	l&c.	mtl.	own.	Reo F
suct.	own.	motor	1200	17	Stmbg.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	int-g.	Torbn.	7.15	sprgs.	sprgs.	Mth*.	ext-r-w.	int-r-w	l.	Sag.	ctr.	mtl	Hart.	Republic 10
suct.	Rugl.	motor	1200	15	Stmbg.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	Mth*.	ext-r-w.	int-r-w	l.	Sag.	ctr.	mtl.	Spicer.	Republic 11
cent.	Pharo.	motor	1000	12	Stmbg.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Torbn.	8.00	sprgs.	sprgs.	Mth*.	int-r-w	int-r-w	l.	Sag.	ctr.	mtl.	Spicer.	Republic 19
cent.	Pharo.	motor	1200	12	Stmbg.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Torbn.	10.26	sprgs.	sprgs.	Mth*.	int-r-w.	ext-d-s	l.	Sag.	ctr.	mtl.	Hart.	Republic 20
l-b.	own.	motor	1350	14	B&B.	grv.	cone.	own.	selec.	own.	amid.	4	worm.	own.	10.00	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	r.	Ross.	r.	mtl.	own.	Riker B
l-b.	own.	motor	1350	14	B&B.	grv.	cone.	own.	selec.	own.	amid.	4	worm.	own.	10.00	r-rd.	t-arm.	Sp-P.	ext-d-s.	int-r-w	r.	Ross.	r.	mtl.	own.	Riker BB
none.	none.	none.	2200	50	Rayfld.	vac.	d-p.	B-Beck.	prog.	G-Lees.	motr.	3	bevel.	Col.	4.67	sprgs.	t-arm	Tuth.	ext-r-w.	int-r-	l.	Gem.	l&c.	mtl.	Spicer.	Rock Falls 9
cent.	Dplx.	motor			Zenith.	grv.	w-d.	B-Lipe.	selec.	B-Lipe	motr.	4	worm.	Timkn.		r-rd.	sprgs.	Shel.	r-w.	r-w.	l.	Ross.	ctr.	mtl	Arvac.	Rowe G.D.W
cent.	Dplx.	motor			Zenith.	grv	w-d.	B-Lipe	selec.	B-Lipe.	motr.	4	worm.	Shel.		r-rd.	sprgs.	Shel.	r-w.	r-w.	l.	Ross.	ctr.	mtl	Arvac.	Rowe C.D.W
cent.	Dplx.	motor			Zenith.	grv	w-d.	B-Lipe	selec	B-Lipe.	motr.	4	worm.	Shel.		r-rd.	sprgs.	Shel.	r-w.	r-w.	l.	Ross.	ctr.	mtl	M&E.	Rowe D.E.W
none.	none.	none.			Zenith.	vac.	w-d.	B-Lipe	selec	B-Lipe	motr.	4	worm.	Shel.		r-rd.		Shel.	r-w.	r-w	l.	Ross.	ctr.	mtl	M&E.	Rowe G.W
cent.	Dplx	motor			Zenith.	grv.	w-d.	B-Lipe	selec.	B-Lipe.	amid.	4	worm	Shel.		r-rd.	sprgs.	Shel.	r-w	r-w	l.	Ross.	ctr.	mtl	M&E.	Rowe F.W
			1200	15	Stmbg.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	worm.	Shel.	6.05	sprgs.	sprgs.	GCS.	int.	int-r-w	l.	Ross.	ctr.	mtl	Spicer*	Sandow C
			1200	15	Stmbg.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	3	worm.	Shel.	7.80	sprgs.	sprgs.	GCS.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer*	Sandow CG
suct.		motor	1000	15	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe	motr.	4	worm.	Timkn.	9.25	sprgs.	sprgs.	GCS.	int-r-w	int-r-w	r.	Ross.	ctr.	mtl	Spicer*	Sandow J
suct.		motor	1100	15	Stmbg.	grv.		B-Lipe	selec	B-Lipe.	amid.	4	worm.	Timkn.	9.25	r-rd.	sprgs.	GCS.	int-r-w	int-r-w	r.	Ross.	ctr.	mtl	Spicer*	Sandow M
suct.		motor	1200	12	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe.	amid.	4	worm.	Timkn.	13.66	r-rd.	sprgs.	GCS.	int-r-w	int-r-w	r.	Ross.	ctr.	mtl.	Spicer*	Sandow L
			1350	15	Stmbg.	grv	d-d.	Fuller.	selec	Fuller.	motr.	3	int-g.	Torbn.	10.00	sprgs.	sprgs.	GCS.	ext-r-w.	int-r-w	l.	Ross.		mtl	Spicer*	Sandow I
cent.	Pierce.	motor	1000	12	Stmbg.	grv	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*	Spicer*	Sanford 25
cent.	Pierce.	motor	1000	12	Stmbg.	grv.	d-p.	B-Beck.	selec.	B-Lipe	amid.	4	worm	Shel.	8.75	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*.	Spicer*	Sanford 35
cent.	Pierce.	motor	1000	10	Stmbg.	grv.	d-p	B-Beck.	selec	B-Lipe	amid.	4	worm.	Shel.	11.70	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*	Spicer*	Sanford 50
cent.	Dplx.	motor	1000	16	Schblr.	grv	cone	Hart.	selec	own.	amid.	3	worm.	own.	8.66	r-rd.	t-arm.	Nat.	ext-d-s.	int-r-w	l.	own.	ctr.			Schacht. 2-Ton
cent.	Dplx.	motor	1000	14	Schblr.	grv.	cone	Hart.	selec	own.	amid.	3	worm.	own.	9.66	r-rd.	t-arm.	Nat.	ext-d-s.	int-r-w	l.	own.	ctr.			Schacht. 2½-Ton
cent.	Dplx.	motor	1000	12	Schblr.	grv	cone.	Hart.	selec	own.	amid.	3	worm.	own.	10.33	r-rd.	t-arm.	Nat.	ext-d-s.	int-r-w	l.	own.	ctr.			Schacht. 3½-Ton
cent.	Dplx.	motor	1000	20	Schblr	grv	cone.	Hart.	selec	own.	amid.	8	worm.	own.	10.33	r-rd.	t-arm.	Nat.	ext-d-s.	int-r-w	l.	own.	ctr.			Schacht. 5-Ton
cent.	Pierce.	motor	1200	16	Stmbg.	grv.	d-d	B-Lipe.	selec	B-Lipe	motr.	3	int-g.	Torbn.	7.50	sprgs.	sprgs.	Rowl.	ext-r-w	ext-r-w	l.	Ross.	ctr.	mtl	Hart.	Schwartz B
cent.	Pierce.	motor	1000	14	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe	motr.	3	int-g.	Torbn.	8.10	sprgs.	sprgs.	Rowl.	ext-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Hart.	Schwartz C
cent.	Dplx.	motor	1000	12	Stmbg.	grv.	d-d.	B-Lipe.	selec	B-Lipe	motr.	4	int-g.	Torbn.	10.20	sprgs.	sprgs.	Rowl.	int-r-w.	ext-d-s	l.	Ross.	ctr.	mtl	Hart.	Schwartz D
cent.	Pierce.	motor	1240	18	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe.	motr.	3	worm	Timkn.	7.00	sprgs.	sprgs.	S-P.	int-r-w.	int-r-w	l.	Lavn.	ctr.	mtl	Spicer.	Selden 1½B
cent.	Pierce.	motor	1220	17	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	7.75	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	r.	Gem.	ctr.	mtl.	Spicer.	Selden 2½A
cent.	Pierce.	motor	1125	14	Stmbg.	grv.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Timkn.	8.75	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	r.	Gem.	ctr.	mtl.	Spicer.	Selden 3½A
cent.	Pierce.	motor	1295	11	Stmbg.	grv.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Timkn.	10.25	r-rd.	sprgs.	S-P.	int-r-w	int-r-w	r.	Ross.	ctr.	mtl	Spicer.	Selden DL
none	none.	none.	2200	40	Schblr.	vac.	d-d.	Detrt	selec.	Detrt	motr.	3	bevel.	Peru.	4.5	sprgs.	t-arm.	Mth.	ext-r-w.	int-r-w	l.	Ditw.	ctr.	mtl.	Unvsl.	Seneca F-2
none.	none.	none.			Stmbg.	vac	d-d.	Fuller	selec	Fuller.	motr.	3	worm	Timkn.	7.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Arvac.	Service 220
cent.	Simp.	motor	1100	15	Stmbg.	grv	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm.	Timkn	6.80	sprgs.	sprgs.	Mth	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl*.	Spicer*	Service 31
cent.	Simp.	motor	1100	18	Stmbg.	grv	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm	Timkn.	6.80	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*	Spicer*	Service 36
cent.	Simp.	motor	1100	14	Stmbg.	grv	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm	Timkn	7.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*.	Spicer*	Service 51
cent.	Simp.	motor	1000	14	Stmbg.	grv	d-p.	B-Beck.	selec	B-Lipe	amid.	4	worm	Timkn.	7.80	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*	Spicer*	Service 76
cent.	Simp.	motor	1000	11	Stmbg.	grv	d-p	B-Beck.	selec	B-Lipe	amid.	4	worm	Timkn	10.25	r-rd.	sprgs.	Mth	int-r-w	int-r-w	l.	Ross.	ctr.	mtl*	Spicer*	Service 101
cent.	Pierce.	gset.	1300	15	Stmbg.	grv	d-d.	B-Lipe	selec	B-Lipe.	amid.	3	worm	Timkn		r-rd.	sprgs.	Detr	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Signal F
cent.	Pierce.	gset.	1300	15	Stmbg.	grv	d-d	B-Lipe	selec	B-Lipe	amid.	3	worm	Timkn		r-rd.	sprgs.	Detr	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer	Signal H
cent.	Pierce.	gset.	1300	15	Stmbg.	grv	d-d	B-Lipe	selec	B-Lipe	amid.	3	worm	Timkn		r-rd.	sprgs.	Detr.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Signal J
cent.	Pierce.	gset.	1300	15	Stmbg.	grv.	d-d.	B-Lipe	selec	B-Lipe.	amid.	3	worm	Timkn		r-rd.	sprgs	Detr.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Signal M

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Nat'l—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumiter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE													
				Make	Materia	Type	Kind	Size in Ins.		Make	Type	Make	No. Cyl. Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	COOLING					IGNITION			ELEC. SYSTEM		
															Water Circ.	Radiator				Type	Make	Spark Advance	Type	Make	Extra Cost $
								Front	Rear							CASE		CORE							
																Make	Type	Make	Type						
Signal R	5	5,100	180	Savg.	p-stl.	s-flex.	sol.	40x6	40x6d	Sth.	mt.	Con.	4-4¾x6 -36.2	2	cent.	own.	cst.	McC.	fin.	sing.	Eismn.	hand.	lghtg-2	Nich.	80
Southern A	1	1,495		P&B.			sol*	34x4	34x4		wd.	Buda.	4-3½x5⅛-19.6	1			cst.			sing.	Delco.	hand.			
Southern B	1½	1,795		P&B.	p-stl.		sol*	34x4	34x4	Bim.	wd.	Con.	4-3¾x5 -22.5	1			cst.				Delco.	hand.			
Standard 56	1	1,900	134	Prsh.	p-stl.	s-flex.	sol.	34x3½	34x4	Crn.	wd.	Con.	4-3¾x5 -22.5	4	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	fixed.			
Standard 76	2	2,800	140	own.	rol-c.		sol.	36x4	36x6	Auto*.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Lng.	cat.	Lng.	fin.	sing.	Eismn.	fixed.			
Standard 66	3½	3,675	160	Drt.	p-stl.	s-flex.	sol.	36x5	36x5d	Auto.	wd.	Con.	4-4½x5½-32.4	2	cent.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	fixed.			
Standard 86	5	4,650	160	P&B.			sol.	36x6	40x6d	Day.	mt.	Con.	4-4½x5½-32.4	2	g-p.	Lng.	cst.	Lng.	fin.	sing.	Eismn.	fixed.	none.	none.	none
Sterling 1½	1½	2,480	142	Smh.	p-stl.	s-flex.	opt.	36x3½	36x5	Way.	wd*.	own.	4-4 x5¾-25.6	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	s&l-2.	West.	
Sterling 2½	2½	3,475	156	Smh.	p-stl.	s-flex.	opt.	36x4	36x4d	Way.	wd*.	own.	4-4⅜x5¾-30.7	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	s&l-2.	West.	
Sterling 3½	3½	4,550	162	Smh.	p-stl.	s-flex.	sol.	36x5	40x5d	Way.	wd*.	own.	4-4½x6¼-32.4	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	s&l-2.	West.	
Sterling 5-W	5	5,350	168	Smh.	p-stl.	s-flex.	sol.	36x6	40x6d	Way.	wd*.	own.	4-5 x6¼-40.0	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	a&l-2.	West.	
Sterling 5-C	5	5,600	174	Smh.	p-stl.	s-flex.	sol.	36x6	40x5d	Sth.	mt.	own.	4-5 x6½-40.0	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	s&l-2.	West.	none
Sterling 7½	7½	6,000	174	Smh.	p-stl.	s-flex.	sol.	36x6	40x7d	Sth.	mt.	own.	4-5 x6¼-40.0	2	cent.	own.	cst.	opt.	cel.	sing.	Eismn.	hand.	s&l-2.	West.	none
Stewart 11	¾	1,195	110	Hyd.	p-stl.	rigid.	pnu.	32x4	32x4	Way*.	wd.	LeR.	4-3⅛x4½ 15.6	4	ther.	Bush.	cst.	Bush.	pln.	sing.	Eismn.	fixed.	sl&i-2.	Eismn.	none
Stewart 8	1	1,650	130	Hyd.	p-stl.	rigid.	sol.	34x3½	34x4	Way*.	wd.	Con.	4-3½x5 -19.6	4	ther.	Bush.	cst.	Bush.	pln.	sing.	Eismn.	fixed.	lght-2*	Eismn.	75
Stewart 9	1½	1,975	140	Hyd.	p-stl.	rigid.	sol.	34x3½	34x5	Way.	wd.	Con.	4-3¾x5 -22.5	4	ther.	Bush.	cst.	Bush.	pln.	sing.	Eismn.	fixed.	lght-2*	Eismn.	75
Stewart 7	2	2,575	156	Savg.	p-stl.	rigid.	sol.	34x4	34x7	Way*.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Bush.	cst.	Bush.	pln.	sing.	Eismn.	fixed.	lght-2*	Eismn.	75
Stewart 10	3½	3,500	165	Savg.	p-stl.	rigid.	sol.	36x5	36x5d	Clrk.	mt.	Con.	4-4½x5½-32.4	2	cent.	Bush.	cst.	Bush.	pln.	sing.	Eismn.	fixed.	lght-2*	Eismn.	75
Sullivan F	1½	2,350	130	own.	rol-c.		sol.	36x4	36x5	Way.	wd.	Buda.	4-3¾x4½-22.5	4	ther.	Bush.	sht.	Bush.	fin.	sing.	Bosch.	fixed.			
Sullivan E	2	2,975	150	P&B.	p-stl.	s-flex.	sol.	36x4	36x7	Way.	wd.	Buda.	4-4⅛x5½-27.2	4	cent.	own.	cst.	Bush.	fin.	sing.	Bosch.	fixed.			
Sullivan H	3½		160	P&B.	p-stl.		sol.	36x5	36x5d	Way.	wd.	Buda.	4-4½x6 -32.4	4	cent.	own.	cst.	Bush.	fin.	sing.	Bosch.	hand.			
Tiffin GW	1½	2,300	135	P&B.	p-stl.	flex.	sol.	36x3½	36x5	Sth.	mt.	Con.	4-4⅛x5¼-27.2	4	cent.	own.	cst.	G&O.	fin.	sing.	Bosch.	hand.	sl&i.	West.	175
Tiffin MW	2½	3,050	148	P&B.	p-stl.	flex.	sol.	36x4	36x3½d	Sth.	mt.	Con.	4-4⅛x5¼-27.2	4	cent.	own.	cst.	G&O.	fin.	sing.	Bosch.	hand.	sl&i.	West.	175
Tiffin PW	3½	3,980	160	own.	rol-c.	s-flex.	sol.	36x5	36x5d	Sth.	mt.	Con.	4-4½x5½-32 4	2	cent.	own.	cst.	G&O.	fin.	sing.	Bosch.	hand.	sl&i.	West.	175
Tiffin TW	5	5,000	168	own.	rol-i.	rigid.	sol.	36x6	40x6d	Sth.	mt.	Con.	4-4¾x6 -36.2	2	cent.	own.	cst.	G&O.	fin.	sing.	Bosch.	hand.	sl&i.	West.	200
Tiffin UW	6	5,200	168	own.	rol-i.	rigid.	sol.	36x6	40x12	Sth.	mt.	Con.	4-4¾x6 -36.2	2	cent.	own.	cst.	G&O.	fin.	sing.	Bosch.	hand.	sl&i.	West.	200
Titan Transport	3½	4,300	162	P&B.	p-stl.	s-flex.	sol*	36x5	40x5d	Day.	mt.	Buda.	4-4½x6 -32.4	4	cent.	own.	cst.	B&W.	zz-t.	sing.	Eismn.	hand.	lghtg.	West.	none
Titan 5-Ton	5	5,150	156	P&B.	p-stl.	s-flex.	sol*	36x5	40x6d	Clrk.	mt.	Buda.	4-4½x6 -32.4	4	cent.	own.	cst.	B&W.	zz-t.	sing.	Eismn.	hand.	lghtg.	West.	none
Traffic C	2	1,395	132	own.	rol-c.	s-flex.	sol.	34x3½	34x5	Roy.	wd.	Con.	4-3¾x5 -22.5	4	ther.	own.	cst.	own.	cel.	sing.	Bosch.	hand.		none.	none
Transport 20	1	1,650	130					34x3½	34x4			Con.	4-3¾x5 -22.5		ther.				cel.		Eismn.				
Transport 30	1½	1,950	140					36x3½	36x5			Con.	4-3¾x5 -22.5		ther.				cel.		Eismn.				
Transport 50	2	2,585	150					36x4	36x6			Con.	4-4⅛x5¼-27.2		pist.				cel.		Eismn.				
Triangle A	1½	2,185	144	Mas.	rol-c.	s-flex.	sol*	34x3½	34x6	Hay*.	wd.	Wau.	4-3¾x5½-22.5	4	cent.	Pfx.	prs.	Pfx.	zz-t.	sing.	Eismn.	fixed.	none.	none.	none
Triangle B	2½	2,850	151	Mas.	rol-c.	s-flex.	sol*	36x4	36x7	Clrk.	mt.	Rut.	4-4⅛x5½-27.2	2	cent.	Pfx.	prs.	Pfx.	zz-t.	sing.	Eismn.	hand.	none.	none.	none
Union F	2½	2,675	152	own.	p-stl.	rigid.	sol*	36x4	36x7	Prud.	wd.	Wsc.	4-4 x6 -25.6	4	cent.	own.	cst.	G&O.	fin.	sing.	Eismn.	hand.	lghtg.	Eismn.	.75
Union H	4	3,500	171	own.	p-stl.	rigid.	sol.	36x6	36x10	Sth.	mt.	Wsc.	4-4½x6 -32.4	4	cent.	own.	cst.	G&O.	fin.	sing.	Eismn.	hand.	lghtg.	Eismn.	.75
United	1½		145		p-stl.	flex.	sol.	34x3½	34x5		wd.	Buda.	4-3¾x5½-22.5	4			cst.					hand.	lghtg.		
United	2½		151		p-stl.	flex.	sol.	36x4	36x7		wd.	Buda	4-4¼x5½-29.0	4			cst.					hand.	lghtg.		
United	3½		157		p-stl.	flex.	sol.	36x5	36x5d		wd.	Buda.	4-4¼x5½-29.0	4			cst.					hand.	lghtg.		
United	5		160		p-stl.	flex.	sol.	36x5	40x6d		mt.	Buda.	4-4½x6 -32.4	4			cst					hand.	lghtg.		
U. S N	1½	2,150	144	own.	p-stl.	flex.	sol*	36x3½	36x5	Sch.	wd.	Con.	4-3¾x5 -22.5	4	cent.	Lng.	cst	Lng.	fin	sing.	Eismn.	hand.	s&l-2*.	G&D*.	185
U. S H	2½	3,250	144	own.	rol-c.	flex.	sol*	34x4	36x4d	Sch.	wd.	Con.	4-4⅛x5¼-27.2	4	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	hand.	lghtg.	Eismn.	125
U. S. J	3½	3,950	162	own.	rol-c.	flex.	sol.	36x5	10x5d	Sch.	wd.	Con.	4-4½x5½-32.4	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	hand.	lghtg.	Eismn.	125
U. S. K	5	4,850	168	own.	rol-c.	flex.	sol.	36x5	40x6d	Sth*.	mt.	Wau.	4-4¾x6¾-36.2	2	cent.	Fed.	sht.	Fed.	cel.	sing.	Eismn.	hand.	lghtg.	Eismn.	125
Velie 46	1½	1,925	133	Dun.	p-stl.	s-flex.	sol.	36x3½	36x5	Bim.	wd.	Con.	4-3¾x5 -22.5	4	cent.	own.	cst.	McC.	fin.	sing.	Bosch.	hand.	none.	none.	none
Velie 25-B	2	2,950	152	Smh.	p-stl.	s-flex.	sol.	36x4	36x7	Bim.	wd.	Con.	4-4⅛x5¼-27.2	2	cent.	own.	cst.	R-T.	fin.	sing.	Bosch.	hand.	none.	none.	none
Velie 26-B	3½	3,900	174	Smh.	p-stl.	s-flex.	sol.	36x5	36x5d	Prud.	wd.	Con.	4-4½x5½-32.4	2	cent.	own.	cst.	R-T.	fin.	sing.	Bosch.	hand.	none.	none.	none
Victor A	1½	1,950	140	own.	rol-c.	rigid	sol*	34x4	34x5	Bim.	wd.	Con.	4-3¾x5 -22.5	4	ther.	Mod.	cst.	Mod.	fin.	dual.	Eismn.	fixed.	lghtg.	Eismn.	100
Victor B	2	2,225	140	own.	rol-c.	rigid	sol*	34x4	34x5	Bim.	wd.	Con.	4-3¾x5 -22.5	4	ther.	Mod.	cst.	Mod.	fin.	dual.	Eismn.	fixed.	lghtg.	Eismn.	100
Vim 21	½	1,095	108	P&B.	p-stl.	s-flex.	pnu.	31x4	31x4	H&D.	wd.	own.	4-3 x4½-14.4	4	ther.	McC.	prs.	McC.	fin.	sing.	A-Knt	hand.	lghtg.	West.	none
Vim 26	½	1,350	127	P&B.	p-stl.	s-flex.	pnu.	32x4½	32x4½	H&D.	wd.	own.	4-3 x4½-14.4	4	ther.	McC.	prs.	McC.	fin.	sing.	A-Knt	hand.	lghtg.	West.	none
Vim 25	1	2,195	125	P&B.	p-stl.	rigid	sol*	34x4	34x5	H&D.	wd.	Her.	4-3¾x5⅛-22.5	4	g-p.	McC.	cst.	McC.	fin.	sing.	Spltf.	hand.	none.	none.	none
Vim 22	2	3,150	142	P&B.	p-stl.	rigid	sol.	36x4	36x6	Sth.	mt.	Her.	4-3¾x5⅛-22.5	4	cent.	McC.	cst.	McC.	fin.	sing.	Spltf.	hand.	none.	none.	none
Vim 23	3	3,950	150	P&B.	p-stl.	rigid	sol.	36x5	36x5d	Sth.	mt.	Her.	4-4¼x5½-29.0	4	cent.	McC.	cst.	McC.	fin.	sing.	Spltf.	hand.	none.	none.	none
Walker-Johnson B	2½	2,890	150	P&B.	p-stl.	s-flex.	sol*	36x4	36x8	Arch.	wd.	Buda.	4-4¼x5½-29.0	4	cent.	Bush.	cst.	Bush.	fin.	sing.	Eismn.	hand.	none.	none.	none
Walter Tractor M.O.-35	3		108	own.	rol-c.	rigid	sol.	40x4d	40x4d	own.	mt.	own.	4-4⅜x6 -30.7	4	cent.		sht.		fin.	sing.	Amer.	hand.	none.	none.	none
Walter S	5		168	own.	p-stl.	flex.	sol.	36x6	40x6d	Day.	mt.	Wau.	4-4½x6¼-32.4	2	cent.	Bush.	cst.	Bush.	fin.	sing.	Bosch.	hand.	a&l-2.	West.	none
Ward-La France 2A	2½	3,350	166	Drt.	p-stl.	flex.	opt.	36x4	36x7	H&D.	wd.	Wau.	4-4¾x5¾-36.2	2	cent.	own.	cst.	Lng.	fin.	sing.	opt.	hand.	s&l*.	opt.	150
Ward-La France 4A	3½		158		p-stl	s-flex.	opt.	36x5	36x5d	H&D*	wd*.	Wau.	4-4½x6¼-32.4	2	cent.	own.	cst.	Lng.	fin.	sing.	opt.	hand.	s&l*.	opt.	150
Ward-La France 5A	5½		162	P&B.	p-stl.	s-flex.	sol*	36x6	40x6d	Sth*.	mt.	Wau.	4-5 x6¼-40.0	2	cent.	own.	cst.	Lng.	fin.	sing.	opt.	hand.	s&l*.	opt.	150

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square-tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		Name and Model	
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE		Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make			STEERING GEAR		Levers				
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make					Foot	Hand	Placed	Make		Type	Make		
cent.	Pierce	gset.	1175	12	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	3	worm	Timkn.		r-rd.	sprgs.	Detr.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Signal	R
cent.	Pierce				Zenith.			B-Beck.						Chic.										mtl	Spicer.	Southern	A
cent.	Pierce				Zenith.			B-Beck.						Chic			sprgs.					Ross.		mtl.	Spicer.	Southern	B
suct.	Mnrch.	motor	1200	18	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Timkn.	7.20	sprgs.	sprgs.	S-P.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Standard	56
suct.	Mnrch.	motor	1200	15	Stmbg.	grv.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Timkn.	7.75	r-rd.		Tuth.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Standard	76
suct.	Mnrch.	motor	1100	12	Stmbg.	vac.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Timkn.	10.33	r-rd.		Detr.	int.	int.	l.	Gem.	ctr.	mtl	Spicer.	Standard	66
suct.	Mnrch.	motor	1000	10	Stmbg.	vac.	d-d.	B-Lipe.	selec	B-Lipe	amid.	4	worm.	Timkn.	11.66	r-rd.	sprgs.	Tuth.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl.	Spicer.	Standard	86
cent.	Wau.	motor	1000	16	Rayfld.	vac	d-d	B-Lipe.	selec	B-Lipe.	motr.	4	worm.	Timkn.	7.00	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Sterling	1½
cent.	Wau.	motor	1000	16	Rayfld.	vac.	d-d.	B-Lipe.	selec.	B-Lipe	motr.	4	worm.	Timkn.	7.70	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Sterling	2½
cent.	Wau.	motor	1000	13	Rayfld.	vac.	w-d.	M&E.	ind-c.	own.	amid.	3	worm.	Timkn.	8.75	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Unvsl*.	Sterling	3½
cent.	Wau.	motor	1000	13	Rayfld.	vac.	w-d.	M&E.	ind-c.	own.	amid.	3	worm.	Timkn.	8.80	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Unvsl*.	Sterling	5W
cent.	Wau.	motor	1000	7	Rayfld	vac.	w-d.	M&E.	ind-c.	own.	amid.	6	chn.	own.	7.04	r-rd.		Mth.	int-r-w	int-d-s	l.	Ross.	ctr.	mtl.	Unvsl.	Sterling	5C
cent.	Wau.	motor	1000	8	Rayfld	vac.	w-d.	M&E.	ind-c.	own.	amid.	6	chn.	own.	7.26	r-rd.		Mth.	int-r-w	int-d-s	l.	Ross.	ctr.	mtl.	Unvsl.	Sterling	7½
none.	none.	none.	1400	22	Zenith.	grv.	l-p.	B-Beck.	selec	Dur.	motr.	3	int-g.	Clrk.	6.00	sprgs.	sprgs.	Detr.	ext-r-w.	ext-d-s	l.	CAS.	ctr.	mtl.	Hart.	Stewart	11
suct.	Mnrch.	motor	1200	20	Zenith.	grv.	d-p.	B-Beck.	selec	Dur.	motr.	3	int-g.	Clrk.	6.80	sprgs.	sprgs.	Detr.	ext-r-w.	ext-d-s	l.	Gem.	ctr.	mtl.	Hart.	Stewart	8
suct.	Mnrch.	motor	1250	18	Zenith.	grv.	d-p.	Fuller.	selec.	Fuller.	motr.	3	int-g.	Clrk.	7.60	sprgs.	sprgs.	Detr.	ext-r-w.	ext-d-s	l.	Gem.	ctr.	mtl.	Hart.	Stewart	9
cent.	Pierce	motor	1100	14	Zenith.	grv.	d-p.	Fuller.	selec.	Fuller.	motr.	3	int-g.	Clrk.	9.00	sprgs.	sprgs.	Detr*	ext-r-w.	ext-d-s	l.	Ross.	ctr.	mtl	Hart.	Stewart	7
cent.	Pierce	motor	1120	12	Zenith.	grv.	d-p.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Clrk.	10.00	sprgs.	sprgs.	Iron.	ext-r-w.	ext-d-s	l.	Ross.	ctr.	mtl.	Hart.	Stewart	10
none.	none.	none.			Stmbg.	grv.	cone.		selec	Covert	amid.	3	worm.	Timkn.	8.50	sprgs.	sprgs.	Merl.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Hart.	Sullivan	F
none.	none.	none.			Stmbg.	vac.	d-d	B-Lipe.	selec.	B-Lipe.	motr.	3	worm.	Timkn.	7.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Sullivan	E
none.	none.	none.			Stmbg.	vac.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	10.33	r-rd.	sprgs.	Shel.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Sullivan	H
cent.	Pierce	motor	1000	13½	Schblr.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	worm.	Shel.	7.75	r-rd.	sprgs.	Kal.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl.	Pet	Tiffin	GW
cent.	Pierce	motor	1000	12	Schblr.	grv.	d-d.	Fuller.	selec	Fuller.	motr.	4	worm.	Shel.	8.70	r-rd.	sprgs.	Kal.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Pet.	Tiffin	MW
cent.	Pierce	motor	1000	12	Schblr.	grv.	d-p.	B-Beck.	selec	Fuller.	amid.	4	worm.	Shel.	8.70	r-rd.	sprgs.	Kal.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Pet	Tiffin	PW
cent.	Pierce	motor	1000	10	Schblr.	grv.	d-p.	B-Beck.	selec.	Covert.	amid.	4	worm.	Shel.	11.75	r-rd.	sprgs.	Kal.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Pet	Tiffin	TW
cent.	Pierce	motor	1000	9	Schblr.	grv.	d-p.	B-Beck.	selec.	Covert.	amid.	4	worm.	Shel.	13.00	r-rd.	sprgs.	Kal.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Pet	Tiffin	UW
cent.	Simp.	motor	1050	12	Stmbg.	grv.	d-p.		ind-c.	Cotta	amid.	4	int-g.	Clrk.	8.00	r-rd.	sprgs.	Shel.	int-r-w	ext-d-s	l.	Lavn.	ctr.	mtl	Unvsl.	Titan	Transport
cent.	Simp.	motor	1050	12	Stmbg.	grv.	d-p.		ind-c.	Cotta	amid.	4	int-g.	Clrk.	11.00	r-rd.	sprgs.	Shel.	int-r-w	est-d-s	l.	Lavn.	ctr.	mtl	Unvsl.	Titan	5 Ton
none.	none.	none.	1300	16	Cart.	grv.	d-d.	Covert.	selec.	Covert.	motr.	3	int-g.	Russl.	8.20	sprgs.	sprgs.	Detr.	ext-r-w.	int-r-w	l.	Ditw.	ctr.	mtl*.	Unvsl.	Traffic	C
	Simp.				Stmbg.			Fuller.		Fuller.		3	int-g.	Clrk.				Detr.				Jacox.		fab	Therm.	Transport	20
	Simp.				Stmbg.			Fuller.		Fuller.		3	int-g.	Clrk.				Detr.				Jacox.		mtl.	Arvac.	Transport	30
	Dplx.				Stmbg.			Fuller.		Fuller.		4	int-g.	Clrk.				Detr.				Jacox.		mtl.	Arvac.	Transport	50
cent.	Wau.	motor	1450	18	Stmbg.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	3	int-g.	Clrk.	6.80	sprgs.	sprgs.	Detr.	ext-d-s.	ext-r-w	l.	Gem.	ctr.	mtl.	Unvsl.	Triangle	A
cent.	Pierce	motor	1350	16	Stmbg.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Clrk.	8.00	sprgs.	sprgs.	Detr.	ext-d-s.	ext-r-w	l.	Gem.	ctr.	mtl	Unvsl.	Triangle	B
cent.	Dplx.	motor	1100	15	Schblr.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Russl.	7.80	sprgs.	sprgs.	Mth.	ext-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Univ.	Union	F
cent.	Dplx.	motor	1100	12	Schblr.	grv.	d-d.	Fuller.	selec.	Fuller.	motr.	4	int-g.	Torbn.	10.25	sprgs.	sprgs.	Mth.	ext-r-w.	ext-d-s	l.	Ross.	ctr.	mtl.	Univl.	Union	H
cent.		motor		16	Stmbg.	pres.	d-d.		selec.	B-Lipe.	motr.	3	int-g.	Clrk.	7.00	sprgs.					l*.		ctr.			United	
cent.		motor		14	Stmbg.	pres.	d-d.		selec.	B-Lipe.	amid.	4	int-g.	Clrk.	8.15	sprgs.					l*.		ctr.			United	
cent.		motor		12	Stmbg.	pres.	d-d.		selec.	B-Lipe.	amid.	4	int-g.	Clrk.	10.00	sprgs.					l*.		ctr.			United	
cent.		motor		10	Stmbg.	pres.	d-d.		selec.	B-Lipe	amid.	4	int-g.	Clrk.	12.50	sprgs.					l*.		ctr.			United	
suct.	Mnrch.	motor	1400	19.8	Stmbg.	vac.	d-d.	B-Lipe.	prog.	B-Lipe.	motr.	3	int-g.	Clrk.	7.60	sprgs.	sprgs.	Shel.	ext-r-w.	int-r-w	l.	Lavn.	ctr.	mtl	Blood.	U. S.	N
cent.	Pierce	motor	1160	14.2	Stmbg.	grv.	cone.	Hart.	prog.	B-Lipe.	amid.	4	worm.	Shel.	8.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Blood.	U. S.	H
cent.	Pierce	motor	1090	11.0	Stmbg.	grv.	cone.	Hart.	prog.	B-Lipe.	amid.	4	worm.	Shel.	11.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Lavn.	ctr.	mtl	Blood.	U. S.	J
cent.	Wau.	motor	950	12.9	Stmbg.	grv.	d-p.	B-Beck.	ind-c.	Cotta	amid.	3	worm.	Shel.	8.70	r-rd.	sprgs.	Shel.	int-r-w.	int-r-w	l.	Lavn.	ctr.	mtl.	Blood.	U. S.	K
suct.	Mnrch.	motor		18	Stmbg.	grv.	d-p.	B-Beck.	selec.	Dur.	motr.	3	int-g.	Torbn.	8.00	sprgs.	sprgs.	Mth.	ext-r-w.	int-r-w	l.	Gem.	ctr.	mtl	Arvac.	Velie	46
cent.	Pierce	motor		16	Stmbg.	vac.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	7.75	sprgs.	sprgs.	Mth.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl	Spicer.	Velie	25 B
cent.	Pierce	motor		14	Stmbg.	vac.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Timkn.	10.30	r-rd.	sprgs.	Mth.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl.	Spicer.	Velie	26B
none.	none.	none.			Stmbg.	grv.	w-d.	Fuller.	prog.	Fuller.	motr.	3	int-g*.	Clrk.	7.00	sprgs.		Tuth.		int-r-w	l.	Ross.	ctr.	mtl.	Acme.	Victor	A
none.	none.	none.			Stmbg.	grv.	w-d.	Fuller.	prog.	Fuller.	motr.	3	int-g*.	Clrk.	7.00	sprgs.		Tuth.		int-r-w	l.	Ross.	ctr.	mtl	Acme.	Victor	B
none.	none.	none.	1200	25	Zenith.	grv.	cone.	own.	selec.	own.	motr.	3	bevel.	Flint.	5.25	sprgs.	sprgs.	Shel.	ext-r-w.	int-r-w	l.	Jacox.	ctr.	mtl	Spicer.	Vim	21
none.	none.	none.	1200	25	Zenith.	grv.	cone.	own.	selec.	own.	motr.	3	bevel.	Flint.	5.25	sprgs.	sprgs.	Shel.	ext-r-w.	int-r-w	l.	Jacox	ctr.	mtl	Spicer.	Vim	26
none.	none.	none.	1600	30	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe	motr.	3	worm.	Shel.	6.50	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Jacox.	ctr.	mtl.	Spicer.	Vim	25
cent.	Dplx.	motor	1250	16	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe	motr.	4	worm.	Shel.	7.75	sprgs.	sprgs.	Shel.	int-r-w	int-r-w	l.	Gem.	ctr.	mtl	Spicer.	Vim	22
cent.	Dplx.	motor	1100	14	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Shel.	7.75	sprgs.	sprgs.	Shel.	int-r-w.	int-r-w	l.	Gem.	ctr.	mtl.	Spicer.	Vim	23
cent.	Pierce	motor	1600	16	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe.	amid.	4	worm.	Timkn.	8.50	sprgs.	sprgs.	S-P.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Walker Johnson	B
cent.	own.	motor	1200	15	Zenith.	grv.	cone.	own.	selec.	own.	motr.	4	ext-g.	own.	9.50	sprgs.	sprgs.		ext-d-s.	ext-d-s	l.	own.	ctr.	fab.	own.	Walter-Trac. M.O.	35
cent.	Wau.	motor	1100	14	Stmbg.	grv.	d-d.	B-Lipe.	selec.	Warn.	amid.	4	d-rd.	own.	10.00	sprgs.	sprgs.	S-P.	ext-d-s.	ext-r-w	l.	Ross.	ctr.	fab.	M&E.	Walter	S
cent.	Wau.	motor	1000	16	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe	amid.	4	worm.	Shel.	7.75	r-rd.	sprgs.	Merl.	int-r-w	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Ward-LaFrance	2A
cent.	Wau.	motor	900	14	Zenith.	grv.	d-d.	B-Lipe.	selec.	B-Lipe	amid.	4	worm.	Shel.	8.75	r-rd.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl.	Spicer.	Ward-LaFrance	4A
cent.	Wau.	motor	900	12	Zenith.	grv.	d-d.	B-Lipe	selec.	B-Lipe.	amid.	4	worm.	Shel.	10.25	r-rd.	sprgs.	Merl.	int-r-w.	int-r-w	l.	Ross.	ctr.	mtl	Spicer.	Ward-LaFrance	5A

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Detailed Technical Specifications of

Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	FRAME			TIRES			WHEELS		ENGINE													
				Make	Materia	Type	Kind	Size in Ins.		Make	Type	Make	No. Cyl, Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	COOLING					IGNITION			ELEC. SYSTEM		
															Water Circ.	Radiator									
																CASE		CORE							
								Front	Rear							Make	Type	Make	Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
Ware A-3½	3½	3,500	140	Drt.	rol-i		sol	36x5	36x5d	opt.	wd	H-S.	4-3½x5 -19.6	4	ther		cst		cel	sing			none	none	
Watson 3½	3½		168	Prsh	p-stl	rigid	sol	36x5	36x10	Crn	wd	Con	4-4½x5½-32.4	2	cent	own	cst	R-T	fin	sing.	Simms	hand	none.	none	none
White 15	¾	2,400	133½		rol-i	s-flex	pnu	34x4½	34x4½		wd	own	4-3¾-5⅛-22.5	4	cent		sht		cel	dual		auto			
White 30	2	3,300	157½		p-stl	s-flex	sol*	36x4*	36x7*		wd	own	4-3¾x5⅛-22.5	4	cent		sht		cel	dual		auto			
White 40	3	4,300	174		rol-i	rigid.	sol	36x5	40x5d		mt	own	4-3¾x5¾-22.5	4	cent	own	cst		fin	dual		auto			
White 45	5	5,000	174		rol-i	rigid	sol	36x6	40x6d		mt	own	4-4¼x5¾-29.0	4	cent	own	cst		fin	dual		auto			
Wichita L	1½	2,350	144				sol	36x3½	36x5			own	4-3½x5 -19 6		ther	Pfx.		Pfx.							
Wichita M	2	2,750	144				sol	36x4	36x6			Wau	4-3¾x5¼-22.5		g-p	Pfx		Pfx.			Bosch.				
Wichita R	2½	2,950	144				sol	36x4	36x7			Wau	4-3¾x5¼-22.5		g-p	Pfx		Pfx.							
Wichita O	3½	3,750	165				sol	36x5	36x5d			Wau	4-4½x5¾-32.4		cent	E-M		E-M							
Wichita S	6	5,400	165				sol	36x6	40x6d			Bvr	4-4½x6 -32.4			E-M		E-M							
Wilcox A-1	1		130	Smh	p-stl	flex.	pnu*	35x5	35x5	Crn	wd	Buda	4-3¾x5½-22.5	4	cent	own	cst	Lng	fin	sing.	Bosch.	hand	lghtg	none	none
Wilcox B	1½		144	Smh	p-stl	flex	sol	36x4	36x5	Sth.	mt	own	4-4¼x5 -29.0	2	cent	own	cst	Lng.	fin	sing.	Bosch.	hand	lghtg	none	none
Wilcox C	2½		150	Smh	p-stl.	flex.	sol	36x4	36x3½d	Sth.	mt	own	4-4¼x5-29.0.	2	cent	own	cst	Lng	fin	sing.	Bosch.	hand	lghtg	none	none
Wilcox D	3½		154	Smh	p-stl	flex	sol	36x5	36x5d	Sth.	mt.	own	4-4¼x5-29.0	2	cent	own	cst	Lng.	fin.	sing	Bosch.	hand.	lghtg	none.	none
Wilcox W	5		162	Smh.	p-stl	flex	sol	36x5	40x6d	Sth	mt	Wau	4-4¾x6¾-36.2	2	cent	own	cst	Lng.	fin	sing.	Bosch.	hand	lghtg	none	none
Wilson 1½	1½	2,450	140		rol-c	s-flex	sol	36x3½	36x5		wd	Con	4-3¾x5-22.5	4	ther	own	cst	Lng.	fin	sing	Eismn.	hand.	lghtg.		
Wilson 2½	2½	3,150	152		rol-c	s-flex	sol	36x4	36x7		wd	Con	4-4⅛x5¼-27.2	4	cent	own	cst	Lng.	fin	sing	Eismn.	hand	lghtg		
Wilson 3½	3½	3,950	160		rol-c	s-flex	sol	36x5	36x5d		wd	Con	4-4½x5½-32.4	2	cent	own	cst	Lng.	fin	sing.	Eismn.	hand	lghtg		
Wilson 5	5	4,800	160		rol-c	s-flex	sol	36x6	40x6d		wd	Con	4-4½x5½-32.4	2	cent	own	cst	Lng.	fin.	sing.	Eismn.	hand	lghtg		
Winther-Marwin 430-A	1½		132	own	rol-c	s-flex	sol*	32x4	32x4	own	mt	Wsc	4-3¾x5 -22.5	4	cent	own	cst	Brem.	pln	sing	Eismn.	hand	s&l-2*	Eismn*	
Winther-Marwin 459	2½		152	own	rol-c	s-flex	sol	34x5	36x6	own	mt	Wsc	4-4 x5 -25.6	4	cent	own	cst	Brem	pln	sing.	Eismn.	hand	s&l-2*	Eismn*	
Winther-Marwin 479	3½		158	own	rol-c	s-flex	sol	36x6	36x5d	own	mt	Wsc	4-4¼x6 -29.0	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	s&l-2*.	Bijur.	
Winther 39	1½		140	own	rol-c	s-flex	sol	34x3½	34x5	own	mt	Wsc	4-3¾x5 -22.5	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	s&l-2*.	Eismn*	
Winther 49A	2		147	own	rol-c	s-flex	sol	34x4	34x4d	own	mt	Wsc	4-4 x5 -25.6	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	s&l-2*	Eismn*	
Winther 69	3		150	own	rol-c	s-flex	sol	36x6	36x5d	Clrk.	mt	Wsc	4-4 x6 -25.6	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	s&l-2*.	Bijur.	
Winther 979	3½		168	own	rol-c	s-flex	pnu	38x7	42x9	own	mt	Wsc	4-4½x6 -32.4	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	s&l-2*.	Bijur.	
Winther 89	4		156	own	rol-c	s-flex	sol	36x5	40x5d	Clrk.	mt	Wsc	4-4¼x6 -29.0	4	cent	own	cst	Brem.	pln	sing.	Eismn	hand	s&l*	Bijur.	
Winther 109	5		162	own	rol-c	s-flex	sol	36x5	40x5d	Clrk.	mt	Wsc	4-4¾x5½-36 2	2	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	lghtg	Bijur.	
Winther 129	6		162	own	rol-c	s-flex	sol	36x6	40x6d	Clrk.	mt	Wsc	4-5⅛x6 -42.2	4	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	lghtg	Bijur.	
Winther 149	7		162	own	rol-c	s-flex	sol	36x6	40x7d	Clrk.	mt.	Wsc	4-5⅛x6 -42.2	2	cent	own	cst	Brem.	pln	sing.	Eismn.	hand	lghtg	Bijur.	
Witt-Will N	1	2,000	120	Prsh	p-stl	flex	sol	36x3½	36x4	Arch.	wd	Con	4-3¾x5 -22.5	4	cent	Brem.	cst	Brem.	cel	sing	Eismn.	auto.	none	none	none
Witt-Will N. Special	1½	2,150	120	Prsh	p-stl	flex	sol	36x3½	36x5	Arch.	wd	Con	4-3¾x5 -22.5	4	cent	Brem	cst	Brem.	cel	sing	Eismn.	auto.	none	none.	none
Witt-Will P	2½	2,950	144	Prsh	p-stl	flex	sol	36x3½	36x7	Arch.	wd	Con	4-4⅛x5¼-27.2	4	cent	Mod.	cst	Mod.	cel	sing	Eismn.	auto.	none.	none	none
Wolverine C	1½		140	P&B	p-stl	s-flex	sol*	34x3½	34x5		wd	Con	4-3¾x5 -22.5	4	ther	Lng.	cst	Lng.	fin	sing	Bosch*	hand	sl&i-2.	G&D.	none

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Watson	¾	1,750	128	Prsh	p-stl	rigid	pnu.	34x4½	34x4½		wd	Wau	4-3¾x5¼-22 5	4	cent	G&O.	prs	G&O.	zz-t	sing	Dneto	hand.	sl&i-2.	Dneto	none

Steam Trucks

and Model	Capacity in Pounds	Price of Chassis	Wheelbase in Inches	FRAME			TIRES					BOILER							WATER	
							SIZE IN INCHES							BURNER		PRESSURE			CONDENSER	
				Material	Construction	Kind	Front	Rear	Wheels	Location	Type	Heating Surface in Sq. In.	Horsepower	Type	Regulation	Normal in Lbs.	Maximum in Lbs.	Water Capacity in Gal.	Type	Circulation
Steam-O-Truck	10,000	5,000	157	I-beam		solid	36x6	40x6d	c-st	under hood	Wat-tube		40	atomiz.	auto.		600	40	flat	natural

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in three
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor & driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-t—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front solids in rear
p-stl—pressed steel
r—right
r&c—right & center
r-rd—radius rods
rol-c—rolled channel
rol-i—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting & lighting
sl&i-2—starting, lighting & ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square-tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aloy—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

Gasoline Motor Trucks for 1920—Cont.

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
ceat.	Pierce..	mntor	2000	16	Rayfld.	grv..	d-d..	B-Beck.	ind-c...		jst	3	bevl-4	owa..		t-arm.	t-arm.		ext-d-s..	ext-r-w	r ..		r...			Ware A-3½
ceat.	Pierce.	motor	1100	11	Stmbg.	grv.	d-d.	B-Lipe.	selec..	B-Lipe.	amid.	4	worm.	Timka.	8.75	sprgs.	sprgs.	Shel...	int-r-w	int-r-w	l...	Gem..	ctr..	mtl*	Spicer	Watson. 3½
noae.	none.	none..	1400		owa....	grv....	w-p...	owa..	selec..	own..	amid..	4	bevel..	own..		r-rd...	sprgs.		ext-r-w..	int-r-w	l...	own...	etr.	mtl	own...	White... 15
ooae.	none..	none..	1400		own..	grv..	w-p...	own..	selec...	owo..	amid.	4	d-rd...	own..		r-rd...	sprgs..	...	ext-r-w..	int-r-w	l...	own...	ctr..	mtl.	own...	White... 30
ceat.	own...	motor	1600	15	own..	vac..	w-p...	owa..	selec.	own..	motr .	4	d-rd ..	own..		r-rd...	sprgs.	..	ext-d-s..	int-r-w	l....	own...	ctr..	mtl.	own..	White... 40
ceat.	own..	motor	1600	15	own..	vac..	w-p...	owa...	selec..	owa..	motr..	4	d-rd...	own..		r-rd...	sprgs..		ext-d-s..	int-r-w	l..	own...	ctr..	mtl	own..	White... 45
					Stmbg.		coae..			Covert		3	worm.	Shel...								Ross..			own...	Wichita L
	Wau.				Stmbg.		cone..			Covert.		3	worm.	Shel...								Ross..			own..	Wichita M
	Wau.				Stmbg.		coae			Covert		3	worm.	Shel...								Ross..			own..	Wichita R
	Wau.				Stmbg.		coae.			B-Lipe.		4	worm.	Shel...								Ross..			own..	Wichita O
	Dplx.				Stmbg.		coae..			own..		4	d-rd...	own..								Ross..			owa..	Wichita S
ceat.	Pierce.	motor	1100	18	Stmbg.	grv..	d-d..	B-Lipe	selec...	B-Lipe	motr..	3	worm.	Wis...	7.75	sprgs..	sprgs..	Shel*..	iat-r-w	int-r-w	l..	Gem..	ctr..	mtl	Spicer..	Wilcox.. A-1
cent.	Pierce..	motor	1100	14	Wil-B..	grv..	cone..	own..	selec..	own..	amid.	4	worm.	Wis ..	8.25	sprgs..	sprgs..	Shel*..	int-r-w.	int-r-w	l..	own...	ctr..	mtl*	Hart*.	Wilcox.. B
cent.	Pierce..	motor	1100	13	Wil-B..	grv.	cone..	own..	selec.	own...	amid..	4	worm.	Wis ..	8 60	sprgs..	sprgs..	Shel*..	iat-r-w	int-r-w	l..	owa...	ctr..	mtl*.	Hart*..	Wilcox.. C
ceat.	Pierce.	motcr	1100	12	Wil-B..	grv..	coae.	owa..	selec.	own..	amid..	4	worm.	Shel...	11.75	sprgs..	sprgs..	Shel...	iat-r-w	iat-r-w	l..	own...	ctr..	mtl*.	Hart*..	Wi cox ..
ceat.	Wau.	motor	1000	12	Wil-B..	grv.	coae..	own..	selec.	own..	amid..	4	worm.	Shel...	10.25	r-rd...	sprgs..	Shel...	iat-r-w.	iat-r-w	l..	own..	ctr..	mtl	Hart*..	Wilcox W
ceat.	Mnrch	motor	1100	17	Marvl..	grv.	d-d..	B-Beek.	selec..	B-Lipe.	amid..	4	worm.	Timka.	6.00	sprgs..	sprgs..	S-P..	int-r-w	iat-r-w	l..	Ross..	ctr..	mtl*	Hart*.	Wilson.
cent.	Pieree.	motor	1150	15	Marvl..	grv.	d-d.	B-Beck.	selec..	B-Lipe.	amid..	4	worm.	Timko.	7 75	sprgs..	sprgs..	S-P..	iat-r-w..	int-r-w	l..	Ross..	ctr..	mtl*.	Hart*.	Wilson. 2½
cent.	Pierce.	motor	1150	14	Marvl..	grv..	d-d	B-Lipe	selee..	B-Lipe.	amid..	4	worm	Timkn.	8 75	sprgs..	sprgs..	S-P.	iot-r-w	int-r-w	l..	Ross..	ctr..	mtl*.	Hart*.	Wilson.
ceot.	Pierce..	mntor	1100	12	Marvl..	grv.	d-d..	B-Lipe.	selec..	B-Lipc.	amid..	4	worm.	Timko.	10.25	sprgs..	sprgs..	S-P.	int-r-w	int-r-w	l...	Ross..	ctr..	mtl*.	Hart*	Wilson. 5
noae.	none.	none..	1600	17	Stmbg.	grv..	d-d	Fuller..	selee.	Fuller..	motr..	3	iat-g-4	Kea...	9.00	sprgs..	sprgs..	Harv..	ext-d-s..	ext-d-s	l..	Lavn..	ctr..	mtl.	Arvac.	Winther-Marwin 430A
nonc	none.	noae.	1500	16	Stmbg.	grv.	d-d..	Fuller..	selec..	Fuller..	motr..	3	iat-g-4	Clrk...	10.50	sprgs..	sprgs..	Harv..	ext-r-w..	ext-d-s	l..	Lavn..	etr..	mtl.	Arvac.	Winther Marwin..459
none.	ooae.	none.	1400	15	Msst...	vac..	d-p..	B-Beck.	selec..	B-Lipe.	amid..	4	iat-g-4	Clrk..		sprgs..	sprgs..	Mtb..	ext-r-w..	iat-r-w	r..	Ross..	ctr..	mtl.	Blood.	Winther-Marwin 479
none.	none..	noae.	1400	20	Stmbg.	grv..	d-a..	Fuller..	selec.	Fuller..	motr..	3	int-g..	Ken...	7 00	sprgs..	sprgs..	Harv..	ext-d-s..	ext-d-s	l..	Lavn..	ctr..	mtl.	Arvac.	Winther... 39
noae.	none.	unae..	1400	18	Mast...	vac..	d-p..	B-Beck.	selee.	B-Lipe.	amid..	4	iat-g..	Clrk..	8.13	sprgs..	sprgs..	Mth..	ext-r-w..	int-r-w	r.	Ross..	ctr.	mtl	Blood.	Winther... .49A
noae.	none..	aoae..	1400	17	Mast...	vac..	d-p.	B-Beck.	selec..	B-Lipc	amid.	4	iat-g..	Clrk..	9.00	sprgs..	sprgs..	Mth.	ext-r-w..	int-r-w	r..	Ross..	ctr..	mtl.	Blood.	Winther... 69
aoae.	noae.	noae..	1400	25	Mast...	vac..	d-p..	B-Beck.	selec..	B-Lipe.	amid.	4	iot-g..	Clrk..	7.00	sprgs..	sprgs..	Mth..	ext-r-w..	int-r-w	r	Ross..	etr.	mtl	Blood.	Winther.. 979
cent.	Dplx...	motor	1295	14	Mast..	vac..	d-p	B-Beck.	selec..	B-Lipe	amid..	4	iat-g..	Clrk..		sprgs..	sprgs..	Mth..	iat-r-w	int-r-w	r...	Ross..	ctr..	mtl.	Blood..	Winther... 89
ceat.	Dplx...	motor	1100	12	Mast...	vac..	d-p	B-Beck.	selec..	B-Lipe.	amid.	4	iat-g..	Clrk		sprgs..	sprgs..	Mth..	int-r-w	iot-r-w	r	Ross..	ctr.	mtl.	Blood..	Winther... 109
cent.	Dplx...	motor	1016	11	Mast...	vac..	d-p..	B-Beck.	selec..	B-Lipe	amid..	4	iat-g..	Clrk		sprgs..	aprgs..	Mth..	iat-r-w..	int-r-w	r...	Ross..	etr..	mtl.	Blood.	Winther.... 129
cent.	Dplx...	motor	925	10	Mast...	vac..	d-p..	B-Beck.	selec.	B-Lipe.	amid..	4	iot-g.	Clrk.		sprgs..	sprgs..	Mth..	iat-r-w	iat-r-w	r ..	Ross..	ctr..	mtl.	Blood.	Winther 149
cent.	Pierce..	motor	1500	30	Zeoith.	grv..	d-d .	B-Lipe.	selec..	B-Lipe	motr..	3	worm.	Timkn.	6.75	sprgs..	sprgs..	Del..	iat-r-w	int-r-w	l..	Ross..	l...	mtl	Spicer.	Witt Will.. .N
cent.	Pierce..	motor	1500	30	Zenith.	grv...	d-d..	B-Lipe.	selec.	B-Lipe.	motr..	3	worm.	Timkn.	6.75	sprgs..	sprgs..	Del...	iat-r-w.	iat-r-w	l..	Ross..	l...	mtl	Spicer.	Witt Will N Special
cent.	Pierce.	motor	1500	25	Zenith.	grv..	d-d..	B-Lipe	selec.	B-Lipe.	motr..	3	worm	Timko	7 75	sprgs..	sprgs..	Del...	int-r-w	int-r-w	l..	Ross..	l..	mtl	Spicer.	Witt Will .... P
suct..	March.	motor	1350	17	Stmhg.	grv..	d-d.	Fuller..	selec..	Fuller..	motr..	3	iot-g.	Russl..	7 70	spri●	....	Tuth..	ext-r-w..	iat-r-w	l..	Gem..	ctr..	mtl.	Uav.	Wolverine.... C

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cent..	Wau.	motor	1400	35	John..	grv	w-d.	B-Lipe	selec	B-Lipe.	motr.	3	worm	own		spsgs..	sprgs.	Shel	int-r-w	int-r-w	l	Lavn..	ctr..	mtl.	M&E.	Watson

Steam Trucks

SYSTEM			ENGINE						TRANSMISSION					CONTROL					
Feed Pump Type	Feed Control	Location	No. of Cylinders	Cylinders Cas	Valve Location	Valve Action	Valve Stroke	Reverses By	Final Drive	Gear-Ratio	Axle Type	Propulsion Taken By	Torque Taken By	Throttle	Hook-up	Reverse	Steering Wheel Location	Brake Lever Location	Name and Mode
none.	auto	rear axle.	4	2	cyl-eads	Stokesbary	adjustable..	lever..	d-rd....	3 00-1	s-fltag	springs	...	lever.....			right*	center..	Steam-O-Truck.

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chopper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazoo
Kel—Kelsey Wheel Co.
Ken—Kenosha Wheel &
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Frdy.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Standard Malle-
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermoid
Tim'n—Timken
Torbn—Torbensen
Tuth—Tuthill
Univl—Universal Prdts
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

Technical Specifications of 22 Electric

Name and Model	Load Capacity in Pounds	PRICE OF CHASSIS		Wheel-Base in Inches	TIRES			Location	BATTERY					MILES PER CHARGE		MOTOR	
		With Battery	Without Battery		Kind	SIZES IN INCHES			Make and Type	No. Plates	No. Cells	No. Trays	Amp.-Hr. Capacity	Light	Loaded	Location and Number	Make
						Front	Rear										
Atlantic 1-C	2,000			103	solid	34x3½	36x4	amid-u	Hycap*	13*	44*		165*	80	60	unit-j-l	G. E.
Atlantic 2-C	4,000			115	solid	34x4	34x3d	amid-u	Hycap*	17*	44*		220*	65	50	unit-j-l	G. E.
Atlantic 3-C	7,000			135	solid	36x5	40x5d	amid-u	Hycap*	21*	44*		275*	57	45	unit-j-l	G. E.
Atlantic 5-C	10,000			144	solid	36x6	40x5d	amid-u	Hycap*	25*	44*		330*	50	40	unit-j-l	G. E.
Atlantic 6-C	13,000			156	solid	36x6	40x6d	amid-u	Ironclad*	25*	44*		378*	45	35	unit-j-l	G. E.
C. T. ½-Ton	1,000		$1,750	89¼	solid	36x3	36x3	amid-u	C.T. Thin Lead*	13*	42*	5*	153*		60*	unit-x-2	G. E.
C. T. 1-Ton	2,000		2,100	101	solid	36x3½	36x4	amid-u	C.T. Thin Lead*	17*	42*	5*	204*		60*	unit-x-2	G. E.
C. T. 2-Ton	4,000		2,500	116	solid	36x4	36x4d	amid-u	C.T. Thin Lead*	21*	42*	6*	255*		55*	unit-x-2	G. E.
C. T. 3½-Ton	7,000		3,650	122	solid	36x6	36x4d	amid-u	C.T. Thin Lead*	27*	42*	6*	331*		50*	unit-x-4*	G. E.
C. T. 5-Ton	10,000		4,150	132	solid	36x7	36x5d	amid-u	C.T. Thin Lead*	31*	42*	9*	382*		50*	unit-x*-4	G. E.
Couple-Gear H	7,000		4,750		solid	36x3½	36x4d	amid-u	optional							in wheel-4	own
Couple-Gear A	10,000		5,250		solid	36x4	36x5d	amid-u	optional							in wheel-4	own
Couple-Gear LD	14,000		5,900		solid	36x5d	36x5d	amid-u	optional							in wheel-4	own
Lansden M—1-Ton	2,000			106	solid	36x3	36x3½	amid-u	Edison*	A-6	60	12	225	60		unit-j-1	G. E.
Lansden M—2-Ton	4,000			120	solid	36x4	36x3d	amid-u	Edison*	A-8	60	12	300	50		unit-j-1	G. E.
Lansden M—3½-Ton	7,000			130	solid	36x5	36x4d	amid-u	Edison*	A-10	60	12	375	50		unit-j-1	G. E.
Lansden M—5-Ton	10,000			142	solid	36x6	36x5d	amid-u	Edison*	A-12	60	12	450	50		unit-j-1	G. E.
Walker M	1,000			93	solid	34x3	36x3½	amid-u	Edison*							unit-x-1	West
Walker K	2,000			96	solid	34x3½	36x4	amid-u	Edison*							unit-x-1	West
Walker L	4,000			112	solid	38x4	38x6	amid-u	Edison*							unit-x-1	West
Walker P	7,000			131	solid	36x5	38x5d	amid-u	Edison*							unit-x-1	West
Walker N	10,000			141	solid	36x6	38x6d	amid-u	Edison*							unit-x-1	West

INDUSTRIAL TRUCKS

Automatic—D Tractor 1	650			38	solid	16x3	16x3½	front-o	Edison-A-4*	9*	20*	2*	150*			amid-1	G. E.
Automatic—T-2 Tractor 2	800			36¾	solid	16x3½	16x3½	front-o	Edison-A-6*	13*	30*	4*	225*			in rear-1	own
Automatic—M. T. Trac. 1	850			38	solid	16x3	16x3½	front-o	Edison-A-4*	9*	40*	4*	150*			amid	G. E.
Automatic—M-S Trac. 5	1,100			38	solid	16x3½	16x3½	front-o	Edison-A-6*	13*	42*	6*	225*			amid-1	own
Automatic—M-6 Tractor 6	1,100			38	solid	16x3½	16x3½	front-o	Edison-A-6*	13*	42*	6*	225*			amid-1	own
Automatic—R Standard 1	2,000			36	solid	16x3	16x3	amid-u	Edison-A-4*	9*	20*	4*	150*			in front-1	own
Automatic—D Standard 1	4,000			38	solid	16x3	16x3½	rear-o	Edison-A-4*	9*	20*	2*	150*			amid-1	G. E.
Automatic—H-5 5	4,000			40¼	solid	9x5	20x3½	rear-o	Edison-A-6*	13*	21*	3*	225*			in rear-1	own
Automatic—L-Short T. 2	4,000			42¼	solid	9x5	16x3½	rear-o	Edison-A-6*	13*	21*		225*			in rear-1	G. E.
Automatic—H-4 4	4,000			44½	solid	9x5	20x3½	rear-o	Edison-A-6*	13*	21*	3*	225*			in rear-1	own
Automatic—L-6 6	4,000			44½	solid	9x5	20x3½	rear-o	Edison-A-6*	13*	21*	3	225*			in rear-2	own
Automatic—L-Standard 1	4,000			50½	solid	9x5	16x3½	rear-o	Edison-A-6*	13*	21*	3*	225*			in rear-2	G. E.
Automatic—H-Standard 1	4,000			50¼	solid	9x5	16x3½	rear-o	Edison-A-6*	13*	24*	3*	225*			in rear-1	G. E.
Automatic—H-Short 2	4,000			50¾	solid	9x5	16x3½	rear-o	Edison-A-6*	13*	21*		225*			in rear-1	G. E.
Automatic—E-Standard 1	4,000			52	solid	16x3	16x3½	rear-o	Edison-A-4*	9*	36*	3*	150*			amid-1	G. E.
Automatic—G 1	4,000			52	solid	16x3	16x3½	rear-o	Edison-A-4*	9*	36*	4*	150*			amid-1	G. E.
Automatic—L-5 5	4,000			54	solid	9x5	20x3½	rear-o	Edison-A-6*	13*	21*	3*	225*			in rear-1	own
Automatic—E-11 11	4,000			60	solid	16x3½*	16x3½*	amid-u	Edison-A-6*	13*	21*	4*	225*			in front-1	own
Automatic—E-12 12	4,000			60	solid	16x3½*	16x3½*	amid-u	Edison-A-6*	13*	21*	4*	225*			in front-1	own
Automatic—S-F-Bag.Tr. 1	4,000			96	solid	27x3½	27x3½	amid-u	Edison-A-6*	13*	21*	3*	225*			in rear-1	own
Automatic—D-F-Bag. Tr. 2	4,000			102	solid	27x3½	27x3½	front-u	Edison-A-6*	13*	21*	3*	225*			in rear-1	own
Buda A-2	4,000			44¼	solid	16x3½	16x3½	amid-u	Edison-A-6*		24*	4*	225*	70*	50*	in front-1	Diehl
Buda Tractor TW-2	8,000															unit-sf	
Crescent F	4,000		$1,500	58	solid	20x3½	20x3½	amid-u	Edison*	4*	36*	1*	150*	8*	6*	in front-1	Diehl
Crescent T	10,000		1,500	40	solid	16x3½	20x3½	rear-o	Edison*	6*	36*	1*	240*			in rear-1	Diehl
Electromobile A	3,000		1,380	43	solid	20x3½	20x3½	front-u	Thin Exide*	9*	15*		112*		21*	unit-j-1	Wagner
Electromobile B	3,000		1,400	52	solid	20x3½	20x3½	front-u	Thin Exide*	9*	24*		112*		29*	unit-j-1	Wagner
Electromobile C	4,000		1,500	48	solid	20x3½	20x3½	front-u	Thin Exide*	13*	12*		168*		25*	unit-j-1	Wagner
Electromobile CS	4,000		1,500		solid	20x3½	20x3½	front-u	Thin Exide*	17*	12*		224*		33*	unit-j-1	Wagner
Electromobile D	4,000		1,525	60½	solid	20x3½	20x3½	front-u	Thin Exide*	11*	24*		140*		32*	unit-j-1	Wagner
Electromobile DS	4,000		1,575	60½	solid	20x3½	20x3½	front-u	Thin Exide*	13*	24*		168*		39*	unit-j-1	Wagner
Electromobile EN	12,000		1,750	21½	solid	20x3¼	20x3½	rear-o	Thin Exide*	11*	20*		140*		35*	unit-j-1	Wagner
Electromobile E or EJ	15,000		1,600	30	solid	20x3½	20x3½	rear-o	Thin Exide*	13*	24*		168*		42*	unit-j-1	Wagner
Electromobile ES or EJS	20,000		1,625	43	solid	20x3½	20x3½	rear-o	Thin Exide*	21*	24*		280*		69*	unit-j-1	Wagner
Elwell-Parker TA	300				solid	15x3½	20x3½	rear-o								unit-x-1	own
Elwell-Parker TH	400				solid	20x3½	20x5	rear-o	Edison*	13*	42*	6*	225*			unit-x-1	own
Elwell-Parker CF	3,500				solid	25x3½	22x3½	rear-o	Edison*	13*	21*	3*	225*			unit-x-2	own
Elwell-Parker UB	4,000				solid	22x3½	15x3½	u-hood	Edison*	13*	21*	3*	225*			in front-1	own
Elwell-Parker DG	4,000				solid	27¼x3½	27¼x3½	front-u	Edison*	13*	21*	3*	225*			unit-x-1	own
Elwell-Parker IY	4,000				solid	20x3½	20x3½	amid-u	Edison*	13*	21*	6*	225*			in front-1	own
Elwell-Parker EG	4,000			58	solid	22x3½	10½x5	front-o	Edison*	13*	21*	3*	225*			unit-x-2	own
Elwell-Parker EH	4,000			58	solid	22x3½	15x3	front-o	Edison*	13*	21*	3*	225*			unit-x-2	own
Elwell-Parker FC	1,000				solid	22x3½	10½x5	u-hood	Edison*	13*	21*	3*	225*			in front-1	own
Elwell-Parker SE	4,000				solid	27¼x3½	27¼x3½	front-o	Edison*	13*	21*	3*	225*			unit-x-1	own
Elwell-Parker IX	4,000				solid	20x3½	20x3½	amid-u	Edison*	13*	21*	6*	225*			in front-1	own
Elwell-Parker IE					solid	15x3½	15x3½	front-o	Edison*		24*	9*	150*			unit-x-1	own
Hunt A-17 Crane	1,500			59	solid	20x3½*	20x3½*	amid	Exide*	15*	12*		220*	25*	20*	a-plat-1	G. E.
Hunt A-17 Truck	1,000			59	solid	20x3½*	20x3½*	amid	Exide*	15*	12*		220*	25*	20*	in rear-1	G. E.
Hunt TW-48	3,000			44	solid	20x3½	20x4½	front-o	Exide*	11*	12*	2*	158*	15*	10*	in wheel-1	C. G.
Hunt A-17	4,000			59	solid	20x3½*	20x3½*	amid	Exide*	15*	12*		220*	25*	20*	in rear-1	G. E.*
Hunt B-17	4,000			83	solid	22x3½*	22x3½*	amid	Exide*	15*	24*		220*	20*	15*	in rear-1	G. E.*
Hunt OF-60	4,000			52¾	solid	20x3½	10½x5	front-o	Exide*	15*	12*		220*	25*	20*	in front-2	C. G.
Hunt EP-60	4,000			55	solid	20x3½	10½x5	front-o	Exide*	15*	12*		220*	25*	20*	in front-2	C. G.
Hunt J	20,000			42	solid	20x3½*	20x3½*	amid-o	Exide*	15*	24*		220*	20*	15*	in rear-1	G. E.*
Karry Lode 1	4,000	$1,295		51	solid	20x3½	20x3½	amid-u	Exide Hycap*	17*	12*	1*	220*	30*		unit-x-1	G. E.*
Karry Lode 2	4,000	1,395		57	solid	20x3½	10½x5	front-o	Exide Hycap*	17*	12*	1*	220*	30*		unit-x-1	G. E.*
Karry Lode 3				40	solid	20x3½	20x3½	rear-o								unit-x-1	G. E.*

ABBREVIATIONS—Types of Construction and Parts Makers
*—with other options
amid—amidships
amid-o—amidships, over frame
amid-u—amidships, underslung below frame
a-plat—above platform
btw-seats—between seats
cent—center
d—dual
front-o—over frame at front
front-u—in front, under frame
Her-gear—Herringbone gears
l-plat—to left of platform
l-seat—to left of seat
lever-l—lever left
lever-r—lever right
l-vert—left vertical
pedal-l—pedal to left of operator
rad-rd—radius rods
rear-o—at rear, over frame

Motor Trucks Offered on the 1920 Market

MOTOR					CONTROLLER			DRIVE					SPRINGS		CONTROL		Name and Model
Winding	Horse-power	Voltage	SPEED IN MILES PER HOUR		Location	SPEEDS		GEARING		Total Gear-Ratio	Torque Taken By	Propulsion Taken By	Front	Rear	Steer	Controller Lever	
			Light	Loaded		Ahead	Reverse	First Reduction	Final Reduction								
series	3.3	60*	12	10	u-seat	4	2	s-chain	rol-chain	10.08-1		rad-rd	½-ell	½-ell	wheel-l	l-seat	Atlantic 1
series	4.5	60*	11	9	u-seat	4	2	s-chain	rol-chain	10.08-1	.	rad-rd	½-ell	½-ell	wheel-l	l-seat	Atlantic 2
series	5.7	60*	10	8	u-seat	4	2	s-chain	rol-chain	13.05-1		rad-rd	½-ell	½-ell	wheel-l	l-seat	Atlantic ..3
series	7 1	60*	9	7	u-seat	5	2	s-chain	rol-chain	..		rad-rd	½-ell	½-ell	wheel-l	l-seat	Atlantic 5
series	7.1	60*	8	6	u-seat	5	2	s-chain	rol-chain	15 60 1		rad-rd	½-ell	½-ell	wheel-l	l-seat	Atlantic 6
series	1.3	60*	14	13	st-col	4	2	spur-gear	spur-gear	10 01 1	springs	rad-rd	½-ell	½-ell	wheel-l	b-wheel	C. T. ½-T
series	1.8	60*	14	12	st-col	4	2	spur-gear	spur-gear	11 50-1	springs	rad-rd*	½-ell	½-ell	wheel-l	b-wheel	C. T. 1-T
series	2.5	60*	12	10	st-col	4	2	spur-gear	spur-gear	12 14-1	springs	rad-rd*	½-ell	½-ell	wheel-l	b-wheel	C. T. 2-T
series	1.8	60*	11	0	st-col	4	2	spur-gear	spur-gear	17.32-1	springs	rad-rd*	½-ell	½-ell	wheel-l	b-wheel	C. T. 3½-T
series	1.8	60*	10	8	st-col	4	2	spur-gear	spur-gear	20.14-1	springs	rad-rd*	½-ell	½-ell	wheel-l	b-wheel	C. T. 5-T
series	3.5	200	15	10	u-seat	5	5	bevel	bevel	25 00-1	tor-arm	rad-rd	½-ell	½-ell	wheel-r	u-seat	Couple-Gear
series	5 0	200	12	7	u-seat	5	5	..	...	25.00-1	tor-arm	rad-rd	½-ell	½-ell	wheel-r	u-seat	Couple-Gear
series	5.5	200	12	7	u-seat	5	5	...	.	25 00-1	tor-arm	rard-d	½-ell	½-ell	wheel-r	u-seat	Couple-Gear
series	4 0*	60	12	10	in dash	4	2	bevel	rol-chain	11 64-1	springs	rad-rd	½-ell	½-ell	wheel-l	u-wheel	Lansden M 1-T
series	5 0*	60	11	9	in dash	4	2	bevel	rol-chain	11.43-1	springs	rad-rd	½-ell	½-ell	wheel-l	u-wheel	Lansden M—2-T
series	6 0*	60	10	8	in dash	4	2	bevel	rol-chain	13 01-1	springs	rad-rd	½-ell	½-ell	wheel-l	u-wheel	Lansden M—3½-T
series	8 0*	60	9	7	in dash	4	2	bevel	rol-chain	14 62-1	springs	rad-rd	½-ell	½-ell	wheel-l	u-wheel	Lansden M—5-T
series	...	60	16	14	u-seat	5	5	direct	spur-gear	16 88-1	springs	springs	½-ell	½-ell	wheel-l	l-seat	Walker
series	...	60	14	12	u-seat	5	5	direct	spur-gear	16.88-1	springs	springs	½-ell	½-ell	wheel-l	l-seat	Walker
series	...	60	12	10	u-seat	5	5	direct	spur-gear	16.14-1	springs	springs	½-ell	½-ell	wheel-l	l-seat	Walker
series	...	60	12	9	u-seat	5	5	direct	spur-gear	15 59-1	springs	springs	½-ell	½-ell	wheel-l	l-seat	Walker
series		60	11	8	u-seat	5	5	direct	spur-gear	18 16-1	springs	springs	½-ell	½-ell	wheel-l	l-seat	Walker

INDUSTRIAL TRUCKS

series	2*	24	5½	4	in dash	3	3	s-chain	rol-chain	11.70-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—D Tractor
series	3.5	24	6	5	in dash	3	3	worm	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-c	...	Automatic—T-2 Tracto
series	2*	24	5½	4	l-seat	3	3	s-chain	rol-chain	15.30-1	sub-fr	sub-fr	coil	coil	wheel-c	l-seat	Automatic—M.T.Tr.
series	3.5	48	7	5	u-wheel	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	wheel-c	u-wheel	Automatic—M-S Trac.
series	3.5	48	7	5	amid	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	wheel-c	u-wheel	Automatic—M-6 Trac.
series	2*	24	6	5	in dash	2	2	...	worm & bl.	16.00-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—R-Std
series	2*	24	5½	4	in dash	3	3	s-chain	rol-chain	11.70-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—D-Std.
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-l	r-plat	Automatic—H-5
series	2*	24	6	5	in dash	3	3	spur gear	spur gear	9.90-1	sub-fr	sub-fr	...	...	lever-l	r-plat	Automatic—L Short
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	...	coil	lever-l	r-plat	Automatic—H-4
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	...	coil	lever-l	r-plat	Automatic—L-6
series	2*	24	6	5	in dash	3	3	spur gear	spur gear	9.90-1	sub-fr	sub-fr	...	...	lever-l	r-plat	Automatic—L Standard
series	2*	24	6	5	in dash	3	3	spur gear	spur gear	0.90-1	sub-fr	sub-fr	...	...	lever-l	r-plat	Automatic—HStandard.
series	2*	24	6	5	in dash	3	3	spur gear	spur gear	9.90-1	sub-fr	sub-fr	...	...	lever-l	r-plat	Automatic—HShort
series	2*	24	8	6	in dash	3	3	s-chain	rol-chain	15.30-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—E Standard
series	2*	24	8	6	in dash	3	3	s-chain	rol-chain	11.70-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—G
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	...	coil	lever-l	r-plat	Automatic—L-5
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—E-11
series	3.5	24	6	5	in dash	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-r	l-plat	Automatic—E-12
series	3.5	24	6	5	u-plat	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-l	r-plat	Automatic—S.F.Bag.Tr
series	3.5	24	6	5	u-plat	3	3	...	worm	17.50-1	sub-fr	sub-fr	coil	coil	lever-l	r-plat	Automatic—D.F. Bag. T
series	1.2	24	7	7	u-plat	3	3	worm	...	11.66-1	tor-arm	tor-arm	coil	coil	lever-r	left	Buda A
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Buda T-Tractor W
series	1.5	36	8	6	u-plat	3	3	spur gear	worm	*9.00-1	tor-arm	tor-arm	...	...	lever-l	l-plat	Crescent
series	1.5	36	6	4*	u-seat	3	3	spur gear	worm	*12 00-1	..	tor-arm	...	...	lever	btw-seats	Crescent
series	1	30	...	5	u-plat	4	4	s-chain	rol-chain	13 65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1	30	...	5	u-plat	4	4	s-chian	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	30	...	5	u-plat	4	4	s-chain	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	30	...	5	u-plat	4	4	s-chain	rol-chain	13.65-1	ror-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	30	...	7	u-plat	4	4	s-chain	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	30	...	7	u-plat	4	4	s-chain	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	39	10	8	u-plat	4	4	s-chian	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile
series	1.5	30	...	7	u-plat	4	4	s-chain	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile. E or
series	1.5	30	...	7	u-plat	4	4	s-chain	rol-chain	13.65-1	tor-arm	rad-rd	coil	coil	lever-r	left	Electromobile ES or E
series	...	32	7½	...	u-seat	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-l	l-seat	Elwell-Parker
series	...	...	5½	...	u-seat	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-l	l-seat	Elwell-Parker T
series	...	24	...	...	in dash	6	4	worm	...	...	tor-arm	tor-arm	coil	coil	lever-l	r-seat	Elwell-Parker
series	...	...	6	4	in dash	3	3	worm	...	...	...	...	...	...	lever-r	l-seat	Elwell-Parker
series	...	24	6	5	in dash	3	3	worm	worm	...	tor-arm	tor-arm	...	...	lever-r	l-seat	Elwell-Parker. D
series	...	...	...	...	in dash	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-r	...	Elwell-Parker
series	...	24	5½	4	in dash	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-r	left	Elwell-Parker. E
series	...	24	5½	4	in dash	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-r	left	Elwell-Parker. E
series	...	...	6	4	in dash	3	3	worm	...	...	...	...	...	...	lever-r	l-seat	Elwell-Parker
series	...	24	6	5	in dash	3	3	worm	worm	...	tor-arm	tor-arm	...	...	lever-r	l-seat	Elwell-Parker S
series	...	...	...	...	in dash	3	3	worm	...	...	tor-arm	tor-arm	...	...	lever-r	...	Elwell-Parker
series	...	24	6½	4½	in dash	3	3	worm	...	...	tor-arm	tor-arm	coil	coil	...	right	Elwell-Parker
series	½	24	6*	5*	u-plat	3	3	worm	worm	...	frame	frame	...	...	lever-r	left	Hunt A-17 Cra
series	2	24	6*	5*	u-plat	3	3	spur gear	spur gear	...	frame	frame	...	...	lever-r	left	Hunt A-17 Tru
series	2	24	5*	4*	in dash	2	2	bevel	bevel	...	frame	frame	...	...	lever-r	left	Hunt TW-
series	2	24*	6*	5*	u-plat	3	3	spur gear	spur gear	...	frame	frame	...	...	lever-r	left	Hunt A-
series	4	48*	6*	5*	u-plat	3	3	spur gear	spur gear	...	frame	frame	...	...	lever-r	left	Hunt B-
series	2	24*	6*	5*	in dash	2	2	bevel	bevel	...	frame	frame	...	...	lever-r	left	Hunt DF-
series	2	24*	6*	5*	in dash	2	2	bevel	beval	...	frame	frame	...	...	lever-r	left	Hunt EP-
series	4	48*	6*	4*	u-seat	3	3	spur gear	spur gear	...	frame	frame	...	...	wheel-c	r-seat	Hunt
series	3	24	7	6	on dash	3	3	bevel	spur gear	13.00-1	...	...	...	...	lever-r	l-plat	Karry Lode
series	3	24	7	6	on dash	3	3	bevel	spur gear	13.00-1	...	...	...	...	lever-r	l-plat	Karry Lode
series	3	24	6	5	u-seat	3	3	bevel	spur gear	17.00-1	...	...	...	...	lever-l	r-seat	Karry Lode

ABBREVIATIONS—Continued

r-seat—to right of seat
rol-chain—silent chain
st-col—on steering column
sub-fr—sub frame
tor-arm—torque arm
u-bat—under battery box
u-floor—under floor
u-hood—underr hood
unit-j—unit jackhaft
unit-sf—unit with sub frame
unit-w—unit with wheel
unit-x—unit with axle
u-lever—under lever
u-plat—under platform
u-wheel—under steering wheel
u-eat—under seat
½-ell—½ elliptic
¾-ell—¾ elliptic
wheel-c—wheel in center
wheel-l—wheel on left
wheel-r—wheel on right
C-G—Couple-Gear
G. E.—General Electric
West—Westinghouse

Special Details of Electric Industrial Trucks

Name and Model	Type	Track in Inches: Front	Track in Inches: Rear	Turning Circle in Feet	Load Platform Size in Inches: Length	Load Platform Size in Inches: Width	Load Platform Size in Inches: Height from Ground	Overall Length in Inches	Maximum Grade Negotiable in Per Cent	Driver's Position	Brake Control	Cut-out Control	Number of Wheels
Automatic 1	tractor	32½	32½	16				74		plat-r	pedal	pedal	4
Automatic 2	tractor		30	7¾				65¼		seat-f	pedal	pedal	3
Automatic Mill Type 1	tractor	33¾	33¾	21⅝				72		seat-plat	pedal	pedal	4
Automatic 5	tractor	30	30	19½				76¾		seat-r	pedal	pedal	4
Automatic 6	tractor	30	30	12				76¾		seat-r	pedal	pedal	4
Automatic 1	warehouse-platform	20½	22¾	10½	64¼	28½	20¼	83		plat-r	pedal	pedal	4
Automatic 1	warehouse-platform	32½	32½	16	61¼	36	20	91¾		plat-r	pedal	pedal	4
Automatic 5	warehouse-drop-plat	34	32	13½	52	41	12	92		plat-r	pedal	pedal	4
Automatic 2	elevating	9	30	11½	43	23¾	10¼	91		plat-r	pedal	pedal	4
Automatic 4	warehouse-drop-plat	34	32	14⅛	64	41	12	104		plat-r	pedal	pedal	4
Automatic 6	elevating	11	32	12½	43	24	10¼	97½		plat-r	pedal	pedal	4
Automatic 1	warehouse-platform	9	30	12½	55	23¾	10¼	103		plat-r	pedal	pedal	4
Automatic 1	warehouse-platform	34	30	16½	63	41	12	101½		plat-r	pedal	pedal	4
Automatic 2	warehouse-drop-plat	34	30	16½	52½	41	12	91		plat-r	pedal	pedal	4
Automatic 1	warehouse-platform	33¾	33¾	23½	78½	41	20	117		plat-r	pedal	pedal	4
Automatic 1	warehouse-platform	33¾	33¾	23½	72	36	20	117		plat-r	pedal	pedal	4
Automatic 5	elevating	11	32	14½	52¼	24	10¼	103		plat-r	pedal	pedal	4
Automatic 11	warehouse-platform	30	30	27⅘	98	41	22⅛	118		plat-r	pedal	pedal	4
Automatic 12	warehouse-platform	30	30	16	98	41	22⅛	118		plat-r	pedal	pedal	4
Automatic 1	baggage-platform	36½	36½	24 7/12	144	44	31½	168		plat-ends	pedal	pedal	4
Automatic 2	baggage-drop-plat	36½	36½	26	144	44	11¼	172½		plat-ends	pedal	pedal	4
Buda AZ	warehouse-platform	35	36½	20	82	43	21¾	97	10	plat-r	pedal	pedal	4
Buda TW-2	tractor		33	9½		40	21½	68¼	10	seat-plat	pedal		3
Crescent F	warehouse-platform	36	36	15	90	44	23	111	20–25	plat-f	pedal		4
Crescent T	tractor		32	10				67½	25	plat-f	pedal	pedal	3
Electromobile A		34	34	14	65¾*	41	22½	84*		plat-r	pedal	pedal	4
Electromobile B	warehouse-platform	34	34	14*	72*	41	22½	93*		plat-r	pedal	pedal	4
Electromobile C	warehouse-platform	34	34	15½	68*	41	22½	89*		plat-r	pedal	pedal	4
Electromobile CS	warehouse-platform	34	34	17	72*	41	22½	93*		plat-r	pedal	pedal	4
Electromobile D	warehouse-drop-plat	34	34	19½	81*	41	22½	102*		plat-r	pedal	pedal	4
Electromobile DS	warehouse-platform	34	34	19½*	81*	41		102*		plat-r	pedal	pedal	4
Electromobile EN		21½	21½	9½		34	22½	60		seat-r	pedal	pedal	4
Electromobile E or EJ	tractor	34	34	9½		41	22½	72		plat-r	pedal	pedal	4
Electromobile ES or EJS	tractor	34	34	9½		41	22½	84		seat-r	pedal	pedal	4
Elwell-Parker TA	tractor		30	10⅔				72		seat-f	pedal		3
Elwell-Parker TH	tractor	30	30	12				84¼		seat-f	pedal		4
Elwell-Parker CF	crane	30	28	20	93	40	17	120	10–20	plat-r	pedal		4
Elwell-Parker UB	warehouse-drop-plat	30	28	20	93	40		120	10–20	plat-f	pedal		4
Elwell-Parker DG	baggage-drop-plat	39½	39½	30	137	44	33	150	10–20	plat-f	pedal		4
Elwell-Parker IY	warehouse-platform	26	26	16	83	40	24	92	10–20	plat-f	pedal		4
Elwell-Parker EG	elevating	30	16	15	54	26	11	91	10–20	plat-f	pedal		4
Elwell-Parker EH	elevating	30	16	15	54	26	17	91	10–20	plat-f	pedal		4
Elwell-Parker FC	freight-car-low-plat	30	28	14	56	40		84	10–20	plat-f	pedal		4
Elwell-Parker SE	baggage-platform	39½	39½	30	137	44	33	150	10–20	plat-f	pedal		4
Elwell-Parker IX	warehouse-platform	26	26	16	83	40	24	92	10–20	plat-f	pedal		4
Elwell-Parker IE	warehouse-drop-plat	25	25	15½	48	30	20	78	10–20	plat-r	pedal		4
Hunt A-17 Crane	crane	40	40	14½	90	48	23*	110	15	plat-f	pedal	pedal	4
Hunt A-17 Truck		40	40	14½	90	48	23*	110	15	plat-f	pedal	pedal	4
Hunt TW-48	warehouse-platform*		30	14	48	37	8¾	82	10–15	plat-f	pedal	pedal	3
Hunt A-17	warehouse-platform	40	40	14½	90	48	23*	110	15	plat-f	pedal	pedal	4
Hunt B-17	baggage-drop-plat*	40	40	20	120	48	25	40	10–15	plat-f	pedal	pedal	4
Hunt DF-60	warehouse-drop-plat*	26⅜	24⅜	11½	60	37¾	11	106	10–15	plat-f	pedal	pedal	4
Hunt EP-60	elevating	26⅜	18½	11½	59	26	11	106	10–15	plat-f	pedal		4
Hunt J	tractor	40	40	14				80¾	5–10	seat-f	pedal	pedal	4
I. T. C	baggage-platform	30	21*	5¾	86*	46	25½	87*	20	plat-f	pedal	pedal	4
Karry-Lode 1	warehouse-platform	28½	28½	14	84	37	22¾	108	25	plat-f	pedal	pedal	4
Karry-Lode 2	warehouse-drop-plat	28½	28½	14	60	37	11	111	25	plat-f	pedal	pedal	4
Karry-Lode 3	tractor	28½	28½	10½				76	20	seat-f	pedal		4
Mercury	tractor	23½	29¾	11¼	68	39	45	68	16	eat-f	pedal	pedal	4

*with other options
drop-plat—dropped platform
low-plat—low platform
plat—hinged platform
plat-f—platform at front
plat-r—platform at rear
plat-ends—platform at both ends
seat-ends—seats at both ends
seat-f—seat in front
seat-plat—seat on top of platform.
seat-r—seat in back

The Most Complete Truck Specification Tables

THE foregoing specification tables of gasoline, gasoline-electric, electric, steam and industrial electric indoor trucks are the most complete of any ever published by this or any other magazine.

Presented for the ninth consecutive year by THE COMMERCIAL VEHICLE, they offer a ready and easy means of comparing the relative development of motor trucks with the designs of past years. They also may be used as a reference book by owners, manufacturers and dealers throughout the entire coming year.

For present truck owners and prospective purchasers the Buyers' Guide section of the gasoline tables offers an excellent means of comparing the different makes of trucks of the capacity under consideration. The average construction, including the price, wheelbase, engine, electric equipment, final drive, and other points of design of ½, ¾, 1, 1½, 2, 2½, 3½, and 5-ton trucks, shown elsewhere in this issue, gives the truck owner or prospective buyer an opportunity to determine whether the trucks he now has, or those he expects to buy, contain all the features of the average design.

The 1920 specification tables of THE COMMERCIAL VEHICLE are more complete than ever before. They contain not only the salient features of construction, as heretofore, but also the names of the makers of the principal component parts. Because of this completeness the tables are the standard technical reference of the motor-truck industry, and should be preserved for reference throughout the entire year.

Hired vs. Owned Trucks

in the Distribution of Wholesale Tobacco

At Plants Where Volume of Business is Sufficient to Keep Trucks Busy, Owned Vehicles Are Cheaper Than Hired Ones

THE American Tobacco Co. on July 1, 1919, began to install its own trucking equipment in its seventy-four factories located in forty-nine different cities throughout the United States. Before arriving at this decision, it had to answer four important questions for the different localities in which investigations had already been made and the company's fleet installed or partially installed. Moreover, the results arrived at indicated that in almost all the other cases not yet investigated, owned trucks would prove more economical than hired trucks, although in no case will a local fleet be installed until conditions generally in that locality have been fully investigated.

Can You Answer These 4 Questions?

1——Are hired trucks as economical as trucks owned and operated by the manufacturer?

2——Are hired trucks more economical in one case and owned trucks more economical in another, according to the class of goods handled, the distances to be covered and the amount of deliveries to be handled?

3——Supposing the class of goods and the amount of business to be handled would make owned trucks preferable, generally speaking, is it more economical to own a fleet large enough to handle the peak load business or merely large enough to handle the ordinary business and hire outside trucks for the peak load period?

4——What are the points to be considered in estimating the cost of owned trucks and how do these points vary with different conditions in different localities?

The General Comparison

Generally speaking, the American Tobacco Co. has found that in the long run it can buy, maintain and operate its own trucks at a very much lower figure per 100 lbs. of goods handled than it can employ outside trucks under contract. In arriving at this conclusion the first point to be considered is the lowest possible price per 100 lbs. at which goods can be handled under outside contract. All trucking contracts made by the company are made on the most economical basis at the present time. These contracts are entered into and passed upon either by the manager of the trucking department or by the company's local trucking representative, but in the latter case the manager of the trucking department at the main office in New York must pass upon the terms of the contract before it is signed. Where all the trucking for a factory is handled by outside trucking contractors at present, the company in no case hires trucks outright for a certain length of time.

Such contracts are always made on the basis of the actual tonnage hauled and the contractors' original quotation is based upon tonnage hauled. He quotes the company a price for the locality in question of so much per 100 lbs. hauled, or in certain cases, so much per hogshead hauled. This method is unquestionably more economical for the company whose goods are to be hauled than is the system of hiring trucks outright, because in the latter case the company will often be paying for idle trucks. Therefore a comparison of the cost of hauling under this form of contract with the cost of hauling by owned trucks is not unfair, generally speaking, to the method of hauling by outside trucks.

The second point to be considered is the lowest possible price at which goods can be hauled by trucks bought, maintained and operated by the company. The company has generally arrived at this figure in each case by indirectly comparing local conditions with conditions in some other locality where owned trucks are operated. But after the company has installed its own trucks, the trucking cost per 100 lbs. is arrived at by means of regular monthly reports on the entire cost of operating the trucks both singly and collectively. These records show the number of days worked; the mileage covered; the hours in service; the number of trips made and the poundage hauled both per day and for the entire month. Samples of these single and collective reports made out for the company's Richmond, Va., fleet for the month of September, 1919, are shown on page 281.

Estimating the Costs

In estimating the trucking costs for hired trucks to compare with the trucking costs for owned trucks it is very difficult to arrive at an average figure to quote in either case because the costs vary very widely acording to the distance to be covered, the class of goods handled and local trucking conditions, such as hilly or flat country, congested or roomy freight yard loading facilities, cost of labor, etc. But this does not affect the main comparison to any appreciable extent because these variations in costs affect the outside contractor's quotation quite as much as they affect the cost of hauling goods by means of the company's own equipment. However, a general comparison can be made which shows very clearly the economy of hauling goods in very large quantities by means of the company's own equipment rather than by outside trucks. The company makes this comparison as follows:

On an average, the trucking cost for large northern cities by outside trucks varies between 7 cents and 15 cents per 100 lbs. hauled, for all classes of goods handled. The average trucking cost for large northern cities by the company's equipment will probably vary between 6 cents and 8 cents per 100 lbs. hauled for all classes of goods handled.

In large southern cities, the cost by hired trucks varies from 9 cents to 10 cents and by owned trucks from 6 cents to 7 cents.

In small northern cities, the cost by hired trucks varies between 6 cents and 9 cents and by owned trucks between 2½ cents and 4 cents.

And in small southern cities, the cost by hired trucks averages from 6 cents to 8 or 9 cents and by owned trucks from 0.7 cents to 2, 3 or 4 cents per 100 lbs. hauled for all classes of goods handled.

The above costs merely show that owned trucks figure out at a lower average cost than do hired trucks, although the variation of the estimates are too great to be taken as indicating trucking costs in any one district.

Hiring Sometimes Profitable

In spite of the above figures, there are certain factories belonging to the company where the use of hired trucks is more economical than the use of the companys' own equipment. There are three reasons for this: First, the amount of actual haulage at present done for such a factory might be insufficient and in at least one case actually is insufficient to justify the overhead expense of buying, installing, maintaining and operating a truck to haul raw material to the factory and haul its manufactured goods away from the factory in view of local conditions and local outside contract trucking costs. Second, in certain localities the question of garaging a company-owned fleet presents so many difficulties in securing a location conveniently near the factory or would so increase the running expenses in a location far removed from the factory that hiring outside trucks to handle the factory's output would prove more convenient and economical in the long run. Third, in certain cases the low weight of the manufactured goods handled compared to its bulk makes it necessary to load trucks far below weight capacity. Moreover, the output of the factory may vary widely for different seasons and it may be impossible to employ idle drivers at other work in the factory because of local union conditions. In such a case, a reasonably low weight quotation from an outside trucking contractor would be less than the cost per 100 lbs. hauled at which the company could operate its own trucks.

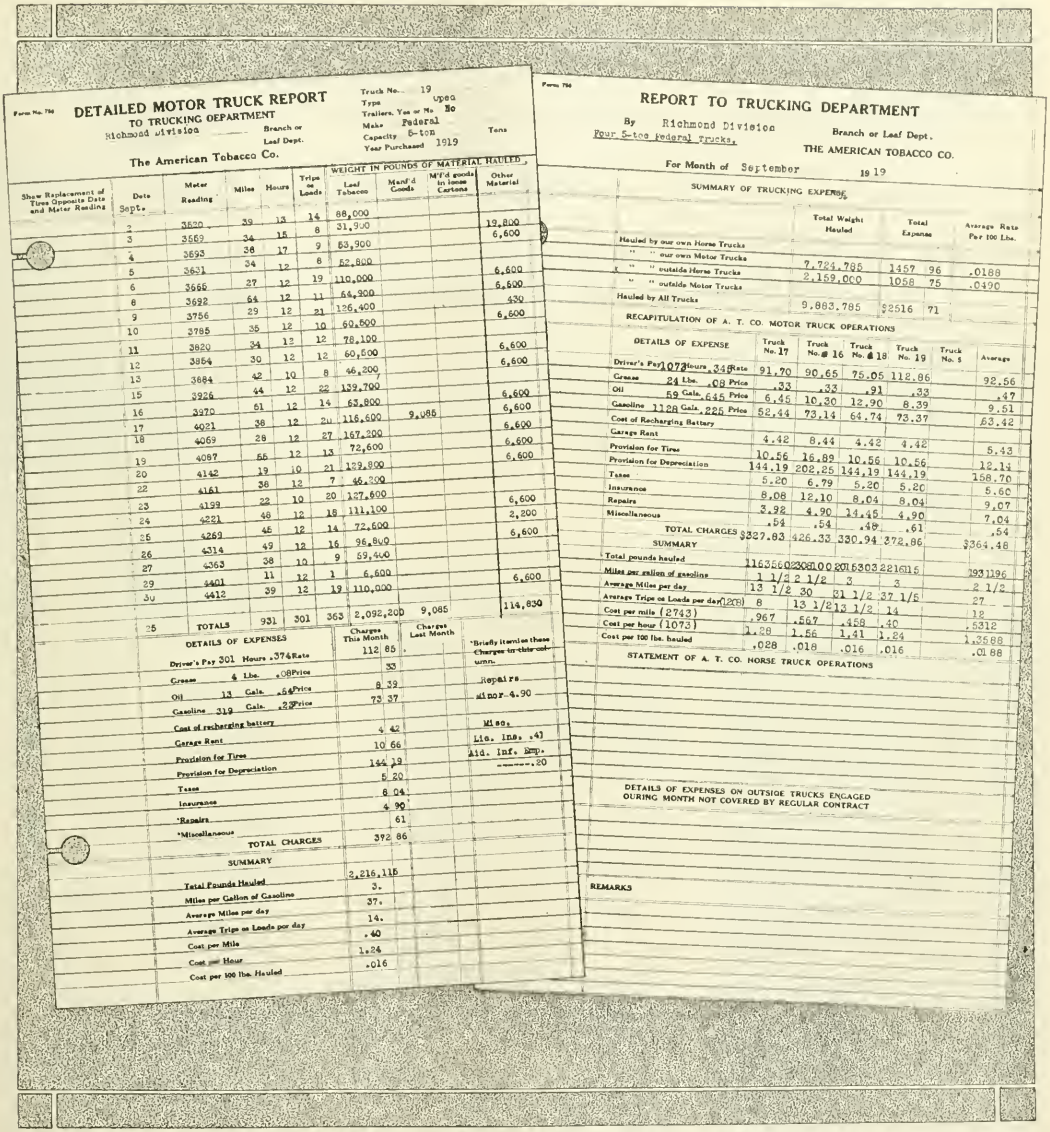
Aside from the question of entirely hired trucks or entirely owned equipment, there arises later the problem of whether the owned equipment when such an installation has been decided upon, shall be large enough to handle the peak load period of the individual factory's output, or merely large enough to handle the average general haulage to be done for that factory throughout the year. The American Tobacco Co. has also gone into this question in preparing to install its own equipment almost generally throughout the country, and has decided that it will prove more economical to install an equipment sufficient to handle the average output of the factory only, and to hire outside trucks to handle the very great surplus of business at the peak load period. This has been decided upon because at certain seasons of the year the output of factories manufacturing tobacco products and in consequence the quantity of material such as cardboard, tin and sugar and other materials used in the manufacture itself delivered to the factory are much greater than at other seasons. Therefore a fleet sufficient to handle this greatly increased output and the greatly increased incoming goods would be much larger than necessary to handle the ordinary receipts and the ordinary output of the factory. Consequently nearly half of such a fleet would be lying idle or working far below capacity for nearly two-thirds of the year. The American Tobacco Co. intends to maintain sufficient equipment to handle the average business only.

H. P. Hatfield, manager of the trucking department of the American Tobacco Co., at the head offices of the concern at New York City

In the tobacco business, outside trucking contractors also make quotations for haulage per hogshead as well as per 100 lbs. These hogsheads weigh anywhere from 1,000 to 1,500 lbs., although they occasionally weigh rather less than the lower figure because of the quality of leaf tobacco they contain or because of seepage of tobacco between the barrel staves. Contractors' quotations for trucking these hogsheads vary anywhere from $2.50 for long hauls including ferriage and through very congested districts down to 35 cents under more favorable conditions and on shorter runs. A good average quotation, however, is about 50 cents per hogshead. Let us take an example based on this quotation: It is possible under average conditions to transport ninety hogsheads per day in a single truck. For various reasons which will be dealt with in later issues of The Commercial Vehicle, not more than six hogsheads are carried per trip, which works out on the average at a 3-ton load. Handled by an outside truck making fifteen trips per day, the cost of transporting these ninety hogsheads is $45. But according to the detailed motor truck report shown on page 281, the cost per hour of maintaining one of the company's trucks in transporting hogsheads of leaf tobacco works out at $1.24. Taking from this report the average hours per day during which the truck works as twelve, we get $14.88 as the daily cost of maintaining a truck averaging ninety hogsheads a day.

Estimating Costs

These figures show a net economy of $30.12 per day for the owned truck. Taking the working days in the year as 300 we get a net yearly economy of $9,036. Of course, this does not include full average depreciation nor full average repairing costs, nor does it allow for the days in which the truck may be idle or partly idle and during which depreciation and maintainance must be charged against it just the same as on working days. But in no case will these idle or partly idle days, nor the average repair and depreciation items, reduce this $9,000 economy figure by more than 50 per cent and allowing for this full 50 per cent reduction, we still get a yearly economy of something like $4,500. In other words, a company-owned truck occupied in transporting hogsheads under average conditions will pay for itself in the first year, and the economy during the remaining 2 years before it is written off through the depreciation item, will be the net economy for this method.



Form No. 796

DETAILED MOTOR TRUCK REPORT
TO TRUCKING DEPARTMENT
Richmond Division Branch or Leaf Dept.
The American Tobacco Co.

Truck No. 19
Type Open
Trailers, Yes or No No
Make Federal
Capacity 5-ton Tons
Year Purchased 1919

Show Replacement of Tires Opposite Date and Meter Reading	Date Sept.	Meter Reading	Miles	Hours	Trips or Loads	WEIGHT IN POUNDS OF MATERIAL HAULED: Leaf Tobacco	Manf'd Goods	M'f'd goods in loose Cartons	Other Material
	2	3520	39	13	14	88,000			
	3	3569	34	15	8	31,900			19,800
	4	3593	36	17	9	53,900			6,600
	5	3631	34	12	8	52,800			
	6	3665	27	12	19	110,000			6,600
	8	3692	64	12	11	64,900			6,600
	9	3756	29	12	21	126,400			430
	10	3785	35	12	10	60,600			6,600
	11	3820	34	12	12	78,100			
	12	3854	30	12	12	60,500			6,600
	13	3884	42	10	8	46,200			6,600
	15	3926	44	12	22	139,700			
	16	3970	61	12	14	63,800			6,600
	17	4021	38	12	2u	116,600	9,085		6,600
	18	4069	28	12	27	167,200			6,600
	19	4087	55	12	13	72,600			6,600
	20	4142	19	10	21	129,800			6,600
	22	4161	38	12	7	46,200			
	23	4199	22	10	20	127,600			
	24	4221	48	12	18	111,100			6,600
	25	4269	45	12	14	72,600			2,200
	26	4314	49	12	16	96,800			6,600
	27	4363	38	10	9	59,400			
	29	4401	11	12	1	6,600			
	30	4412	39	12	19	110,000			6,600
	25	TOTALS	931	301	363	2,092,200	9,085		114,830

DETAILS OF EXPENSES	Charges This Month	Charges Last Month	*Briefly itemize these ~~Charges in this col-~~ umn.
Driver's Pay 301 Hours .374 Rate	112 85		
Grease 4 Lbs. .08 Price	33		Repairs
Oil 13 Gals. .64 Price	8 39		Minor-4.90
Gasoline 319 Gals. .23 Price	73 37		
Cost of recharging battery			Misc.
Garage Rent	4 42		Lia. Ins. .41
Provision for Tires	10 66		Aid. Inf. Emp.
Provision for Depreciation	144 19		-------.20
Taxes	5 20		
Insurance	8 04		
*Repairs	4 90		
*Miscellaneous	61		
TOTAL CHARGES	372 86		

SUMMARY	
Total Pounds Hauled	2,216,115
Miles per Gallon of Gasoline	3.
Average Miles per day	37.
Average Trips or Loads per day	14.
Cost per Mile	.40
Cost per Hour	1.24
Cost per 100 lbs. Hauled	.016

Form 796

REPORT TO TRUCKING DEPARTMENT

By Richmond Division Branch or Leaf Dept.
Four 5-ton Federal Trucks.
THE AMERICAN TOBACCO CO.
For Month of September 1919

SUMMARY OF TRUCKING EXPENSE

	Total Weight Hauled	Total Expense	Average Rate Per 100 Lbs.
Hauled by our own Horse Trucks			
" " our own Motor Trucks	7,724,785	1457 96	.0188
" " outside Horse Trucks	2,159,000	1058 75	.0490
" " outside Motor Trucks			
Hauled by All Trucks	9,883,785	$2516 71	

RECAPITULATION OF A. T. CO. MOTOR TRUCK OPERATIONS

DETAILS OF EXPENSE	Truck No. 17	Truck No. 16	Truck No. 18	Truck No. 19	Truck No.	Average
Driver's Pay 1073 Hours .345 Rate	91.70	90.65	75.05	112.86		92.56
Grease 24 Lbs. .08 Price	.33	.33	.91	.33		.47
Oil 59 Gals. .645 Price	6.45	10.30	12.90	8.39		9.51
Gasoline 1128 Gals. .225 Price	52.44	73.14	64.74	73.37		63.42
Cost of Recharging Battery						
Garage Rent	4.42	8.44	4.42	4.42		5.43
Provision for Tires	10.56	16.89	10.56	10.56		12.14
Provision for Depreciation	144.19	202.25	144.19	144.19		158.70
Taxes	5.20	6.79	5.20	5.20		5.60
Insurance	8.08	12.10	8.04	8.04		9.07
Repairs	3.92	4.90	14.45	4.90		7.04
Miscellaneous	.54	.54	.48	.61		.54
TOTAL CHARGES	$327.83	426.33	330.94	372.86		$364.48
SUMMARY						
Total pounds hauled	1163560	2308100	2016303	2216115		1931196
Miles per gallon of gasoline	1 1/2	2 1/2	3	3		2 1/2
Average Miles per day	13 1/2	30	31 1/2	37 1/5		27
Average Trips or Loads per day (1208)	8	13 1/2	13 1/2	14		12
Cost per mile (2743)	.967	.567	.458	.40		.5312
Cost per hour (1073)	1.28	1.56	1.41	1.24		1.3588
Cost per 100 lbs. hauled	.028	.018	.016	.016		.0188

STATEMENT OF A. T. CO. HORSE TRUCK OPERATIONS

DETAILS OF EXPENSES ON OUTSIDE TRUCKS ENGAGED DURING MONTH NOT COVERED BY REGULAR CONTRACT

REMARKS

Two of the cost form records as kept by the American Tobacco Co. The form at the left gives the daily record of a 5-ton Federal employed at the Richmond, Va., branch while the form at the right shows the monthly record of the fleet of four 5-ton Federals at the same branch. The figures are analyzed on the opposite page.

A glance at the Report to Trucking Department for the Richmond fleet, which is shown at the top of this page, will show that garage rent is charged off against three of the trucks at $4.42 and against the fourth at $8.44, or nearly twice as much. This apparent discrepancy is due to the fact that the fourth truck, No. 16, was bought new and involved an original outlay nearly double the original outlay of any one of the other three trucks purchased second-hand. Therefore although it only occupies the same floor space in the garage, its nominal and actual value is greater and the pro-rata rent charged against it is therefore greater. If a company keeps three Pierce-Arrows and a Ford car in a garage, it would not charge the same rent against the Ford as it charged against each of the other three trucks, although each of the four might ocupy the same floor space owing to the possible

(Continued on page 284)

Department Store

Eliminates Truck Maintenance

By Trading in Fords Every Year

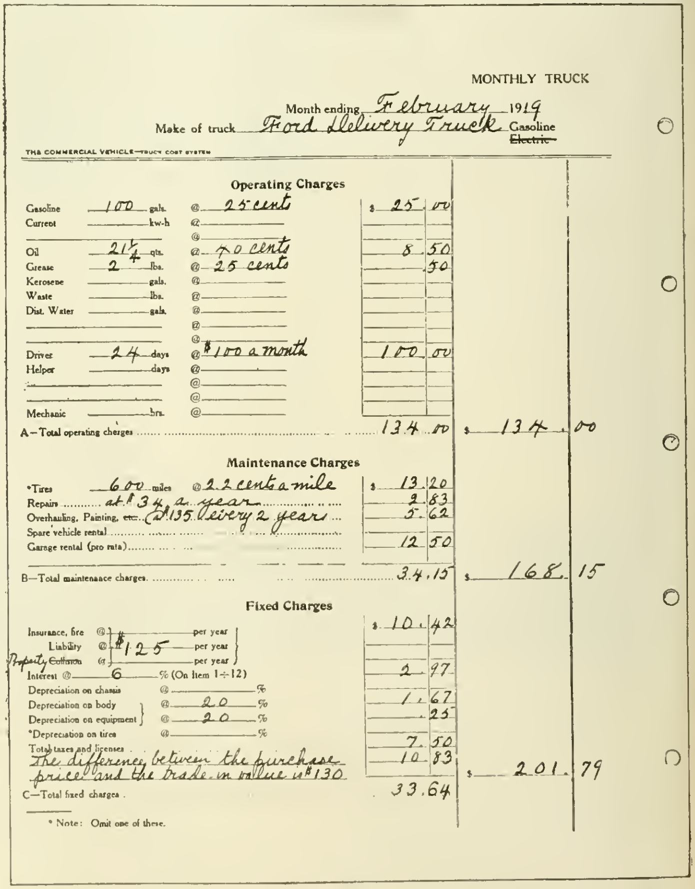
New Jersey Fleet Owner Gets New Fords Each Year for $130 Additional per Vehicle

THE Muir Department Store in East Orange, N. J., has eliminated all of the major maintenance work on its fleet of trucks by trading in each vehicle as soon as it is 1 year old. The Muir company operates a fleet of four Ford delivery cars of 750-lb. capacity. These are used to serve customers in the surrounding territory within a radius of 10 miles. By turning in its used Fords each year for new ones, it has abolished the yearly overhauling period and, as a result, has saved on minor repairs throughout the year by having practically new vehicles all the year round.

With the exception of the Christmas rush period, the company relies entirely on the four Fords for all its deliveries. One of these vehicles is held as a spare for emergency purposes, the normal business being taken care of by three remaining vehicles. The Muir company has arranged its delivery schedule so that East Orange customers will be served twice daily and the surrounding towns once daily. The surrounding territories include Orange, West Orange, South Orange, Glen Ridge, Montclair and Roseville.

In selecting Fords for the delivery of its goods, that company had in mind a delivery vehicle that was fast and that would enable it to keep its deliveries moving with the minimum of delays from breakdowns. Then, too, the size of the body had an important bearing on the selection of a vehicle of this size. In order to expedite deliveries, the driver had to be given every opportunity of quickly picking up the packages in the body. The Ford delivery body enabled him to locate his packages without the need of searching as he would have to were the packages placed in the center of a large body. In the smaller body, all packages in the center of the body are within reach both from the front seat and the rear. When it is considered that the Muir drivers deliver to fifty or more customers each trip, the importance of saving time in picking up a package is apparent.

In addition to the foregoing facts, the use of the Ford car has given that company an opportunity of saving much time when replacement of parts is necessary. When this hap-



MONTHLY TRUCK

Month ending February 1919

Make of truck Ford Delivery Truck Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Operating Charges

Gasoline	100 gals.	@ 25 cent	$ 25	00		
Current	kw-h	@				
Oil	21¼ qts.	@ 40 cents	8	50		
Grease	2 lbs.	@ 25 cents		50		
Kerosene	gals.	@				
Waste	lbs.	@				
Dist. Water	gals.	@				
Driver	24 days	@ $100 a month	100	00		
Helper	days	@				
Mechanic	hrs.	@				
A—Total operating charges			134	00	$ 134	00

Maintenance Charges

*Tires	600 miles	@ 2.2 cents a mile	$ 13	20		
Repairs		at $34 a year	2	83		
Overhauling, Painting, etc.		@ $135 every 2 years	5	62		
Spare vehicle rental						
Garage rental (pro rata)			12	50		
B—Total maintenance charges			34.15		$ 168	15

Fixed Charges

Insurance, fire	@ $125	per year	$ 10	42		
Liability	@	per year				
Property ~~Collision~~	@	per year				
Interest	@ 6	% (On Item 1÷12)	2	97		
Depreciation on chassis	@	%				
Depreciation on body	@ 20	%	1	67		
Depreciation on equipment	@ 20	%		25		
*Depreciation on tires	@	%				
Total taxes and licenses			7	50		
The difference between the purchase price and the trade in value is $130			10	83	$ 201	79
C—Total fixed charges			33.64			

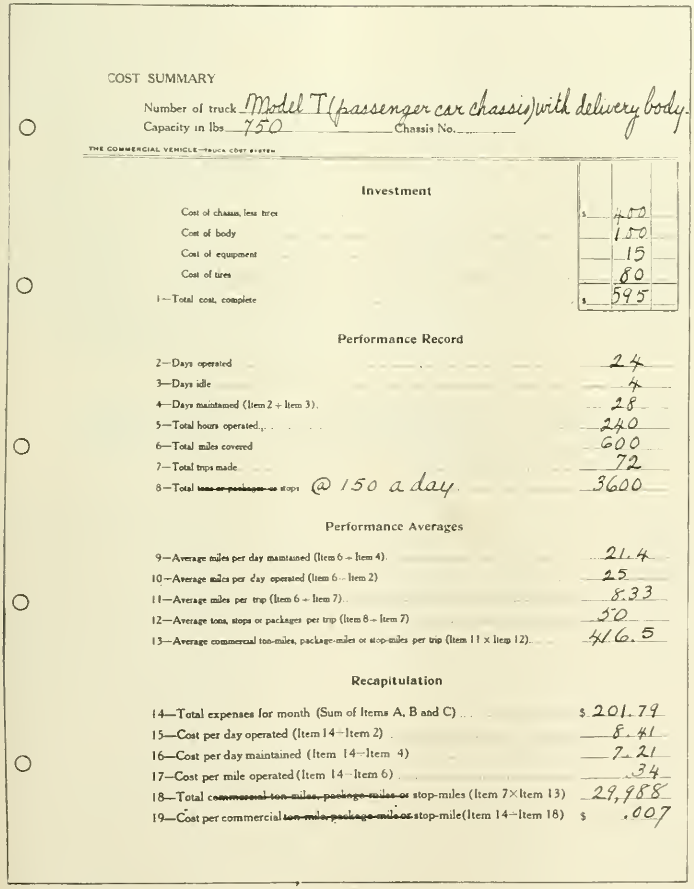
* Note: Omit one of these.

The cost of the Ford operation as obtained from figures furnished by the Muir department store. Note the total cost of $201.79 per monh and how a charge of $10.83 is made to prorate the $130 paid each year when the Ford is turned in for a new chassis pens, parts can be quickly procured and installed at the local Ford service station. However, with three new vehicles, that company is not bothered much with the usual small repair work. As each driver is capable of taking care of the small repairs, that company saves much each year on its maintenance.

One Spare Truck

Though three of the Fords are sufficient for taking care of the normal deliveries, the fourth one is necessary, not only for taking care of the peak loads, but enables each of the vehicles to be brought in each year for the painting and exchange of the bodies. In most cases the painting of the body takes from 3 to 4 weeks. This work is done during the slack periods of the year so that all of the vehicles are ready for continuous service during the rush season. As the drivers are not supplied with helpers, the company cannot rely on any one of the latter taking charge of the extra car when needed. As a result, that company is forced to hire an outside driver. This also happens when the regular drivers are on their vacations or sick. At Christmas, three extra trucks are rented for a week.

In the case where trucks are provided with helpers during the average season of the year, one of the best plans is to coach these helpers to become efficient drivers and to teach them how to operate trucks so that they can obtain drivers' licenses. When this is done the company always has a reserve force of potential drivers which it can use to replace the regular drivers when they are sick or on their vacations. Such a course also provides for the extra drivers required during the rush season. When the helpers are moved up to operate trucks during the holiday season, other helpers are hired to take their places. This method has proved very satisfactory, for it is much easier to hire helpers than to hire trained drivers who are well acquainted with the delivery conditions of any particular store. In the case of the Muir company, little time is lost in the morning loading hours because of the absence of a helper. The packages are made up the night before, segregated according to the districts to be covered, and are ready for loading the next morning. Loading takes about one-half hour. Though the Muir company is forced to resort to sidewalk loading, the size of the load to be placed in the vehicle does not overburden or delay the driver to any extent.



COST SUMMARY

Number of truck Model T (passenger car chassis) with delivery body.
Capacity in lbs 750 Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires	$ 400
Cost of body	150
Cost of equipment	15
Cost of tires	80
1—Total cost, complete	$ 595

Performance Record

2—Days operated	24
3—Days idle	4
4—Days maintained (Item 2 + Item 3).	28
5—Total hours operated	240
6—Total miles covered	600
7—Total trips made	72
8—Total ~~tons or packages or~~ stops @ 150 a day.	3600

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4).	21.4
10—Average miles per day operated (Item 6 ÷ Item 2)	25
11—Average miles per trip (Item 6 ÷ Item 7)	8.33
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	50
13—Average commercial ton-miles, package-miles or stop-miles per trip (Item 11 x Item 12)	416.5

Recapitulation

14—Total expenses for month (Sum of Items A, B and C)	$ 201.79
15—Cost per day operated (Item 14 ÷ Item 2)	8.41
16—Cost per day maintained (Item 14 ÷ Item 4)	7.21
17—Cost per mile operated (Item 14 ÷ Item 6)	.34
18—Total ~~commercial ton-miles, package-miles or~~ stop-miles (Item 7×Item 13)	29,988
19—Cost per commercial ~~ton-mile, package-mile or~~ stop-mile (Item 14 ÷ Item 18)	$ .007

The figures above and those shown in the opposite page are put down on the monthly summary sheet of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks. The cost per commercial stop-mile gives a good idea of the delivery cost when using Fords

Fords Traded in Yearly

By exchanging the old for the new Fords each year, the Muir department store is allowed a substantial resale value on its vehicles of $350, just $130 lower than the purchase price for the new vehicles. The bodies are retained. These are painted every second year and varnished in the intervening year. It has been figured that the bodies last about 5 years.

As a result of this economy in its truck operation, the Muir company is operating its Fords at a cost of $.007 per stop-mile.

Scanning the accompanying cost sheet, it is seen that such operating charges as a mechanic's and helper's time are missing because there are no repair charges when the vehicles are traded in every year. The total charges for running a Ford during the month of February was $201.79, including $134 for operating charges, $34.15 for maintenance, and $33.64 for fixed charges.

There are only four operating charges, namely: gasoline, oil, grease and the driver's wages. Of the four, the driver's item stands highest in point of expense. The extra expense of employing outside drivers has not been included in these cost figures. The gasoline expense is higher than usual. Figuring that the average daily mileage of the Ford is 25 miles, the total for the month of February, as shown in the accompanying cost sheet, is 600

The three Fords used by the Muir department store in East Orange, N. J. Each Ford is turned in at the end of the first year of use and a new chassis obtained at an extra cost of $130

miles. The consumption of 100 gals. of gasoline during that month gives a miles per gallon average of only 6. The reason for this low average is largely due to the large number of stops made per day, and the fact that the engine is left running all through the trip. As a large number of the packages are delivered C. O. D. the engines are kept running unproductively from 2 to 5 minutes on each of such stops. Delivery by C. O. D. is responsible for a doubling of the time ordinarily consumed when packages are merely signed for when received. Then too, conditions for department store deliveries in a suburban town are much different than those in the large cities. The driver must make a separate stop for each delivery or for each two or three deliveries, whereas in the cities the driver may make several deliveries in the same house with the truck stopping only once. As a result of these suburban store delivery conditions, it is natural then that there will be a big waste in gasoline consumption. These conditions seem to indicate that some form of self-starter would soon pay for itself in the reduced gasoline cost.

Maintenance charges consist of the purchase of new tires, painting of the bodies, small repairs, and garage rental. On account of the rough conditions of a majority of the dirt roads upon which the Muir Fords are run, the tire mileage has been cut down considerably. One set of tires has to be replaced every 6 months. This item therefore forms the largest maintenance expense. The cost of painting a body is $100, and of varnishing, $63. As the body is painted once every 2 years and varnished in the intervening year, the cost per year is brought down to $67.50, or $5.62 per month. By keeping the four vehicles in a public garage, the company is saved the expense of employing a washer, as the garage rental of $12.50 per vehicle per month, includes that service.

Fixed charges each month amount to $33.64, including $10.42 for insurance; $2.97 for interest on the investment for 1 month; $1.67 or 20 per cent depreciation on the body; 25 cents or 20 per cent depreciation on the equipment; $7.50 license fee, and $10.83 representing the difference between the purchase price of the new car and the trade-in value of the old car.

Hired vs. Owned Tobacco Trucks

(*Continued from page 281*)

necessity of parking each of the cars between two pillars. In the same way, The American Tobacco Co. pro-rates the rents charged against its trucks acording to their value and not according to the floor space they occupy, even though, as in this case they are all of the same tonnage.

On the detailed summary at the bottom of the American Tobacco Co.'s Detailed Motor Truck Report is shown the total poundage hauled during September by Truck No. 19, namely 2,216,115 lbs. The number of trips made by this truck during the month, as shown at the bottom of the fifth column above, was 353 trips which works out at 6,278 lbs. or about 3 tons per trip. It would appear at first glance that employing a 5-ton truck to carry an average load of 3 tons would be very poor economy for the company. But just here other trucking factors enter into the problem. In the first place, not more than six hogsheads are carried on a truck per trip because not more than six can be carried without tiering them. This question of tiering hogsheads has been gone into by the company and it has found that tiering does not pay.

Tonnage per Trip

The reasons for this are several and will be explained in a subsequent article. But the fact is that it does not pay; and if it does not pay the company to tier hogsheads—in fact, in most cases it is practically impossible to tier them—the same applies to the outside trucking contractor's trucks. Therefore, he cannot load his trucks when transporting hogsheads to any greater weight capacity than the company can load its own trucks and on this particular item outside trucking would be no more economical.

Moreover, while in certain cases of manufactured goods the truck cannot be loaded to its full bulk capacity because of the great weight of the products, in other cases the body cannot be large enough to hold anything like the truck's weight capacity. These other goods to be hauled by the company's trucks would not therefore alter greatly the amount of tonnage to be carried conveniently on one truck on one trip. For instance, considering only the bulk capacity of a 5-ton truck with a fixed top, it is possible to load something like 9 tons dead weight of plug tobacco into such a truck. On the other hand, it could not carry more than about 4 tons of cigarettes packed in the most compact form.

COLD-WEATHER HINTS *In Truck Operation*

Methods That Will Save the Fleet Owner Much Worry, Time and Money

No. 4—CARE OF KELLY-SPRINGFIELD TRUCKS

IF proper attention is not given to the water circulating system and to the lubrication of trucks in cold weather, costly repairs are likely to result. These include the replacement of cylinder blocks, radiator tanks and tubes and bearings and gears. Above all other things, the water and lubricating systems of a truck must be carefully attended to in freezing weather.

These two topics form the principal points brought out in a circular letter sent out by the Kelly-Springfield Motor Truck Co., Springfield. Ohio, to all Kelly-Springfield truck owners in advance of freezing weather in the particular locality in which the trucks are working. The letter points out that if some form of anti-freeze solution is not used, the trucks should be stored in a warm garage if this is at all possible When such a garage is not available, the utmost care must be given to draining the water circulating system when the truck is left in a garage during freezing weather. This is best done by opening two petcocks. Care should be taken to see that these petcocks are not clogged up so as to prevent the entire emptying of both the radiator and the cylinder waterjacket.

Each Kelly-Springfield truck has a petcock on the left side of the lower tank of the radiator which is mounted on the dash. The opening of this cock will completely drain the radiator. On the Models K-31 and K-35 Kelly-Springfield trucks of 1-½ and 2½-ton capacity, the water may be drained from the cylinder jackets by opening a petcock situated at the front portion of the cylinder jacket of the cylinder just back of the oil filler tube. On the engines fitted on the Model K-40 and K-45. 3½- and 4-ton trucks, the cylinder petcocks are situated at the lowest point of the waterjacket between the two cylinder blocks. In addition, the water may be drained out of the pump line by opening the petcock on the water pump, which is accessible through the engine mud pan.

When the Rayfield carbureter with a hot waterjacket bowl is employed, it is also fitted with a petcock at the lower portion to drain all the water from the carbureter jacket and the pipes leading thereto. In the Kelly-Springfield trucks fitted with Rayfield carbureters there are four petcocks which should be opened to completely drain off the water. These are located at the following points: 1, at the radiator; 2, on the engine cylinder block; 3, on the water pump and 4, on the carbureter.

THIS is the fourth of a series of articles pointing out some of the best methods which fleet owners have followed in the maintenance and operation of their trucks in freezing weather. Some of the methods apply particularly to Kelly - Springfield models, while others apply equally well to all makes of trucks. The fifth article, in the next issue, will give cold-weather hints for Garford trucks.

After all the water has been drained out of the cooling system, the engine should be started and allowed to run for a few minutes to remove any moisture which might still remain in the pipes and their connections.

In case the truck owner wishes to save the time otherwise consumed in draining and refilling the radiator each night, he may employ an anti-freezing solution recommended by the Kelly-Springfield company, to be made as follows:

Wood alcohol	15 per cent
Glycerin	15 per cent
Water	70 per cent
Total	100 per cent

The foregoing solution will not freeze at temperatures over 5 degrees below zero. For temperatures not lower than 15 degrees below zero, the following solution is recommended:

Glycerin	17 per cent
Wood alcohol	17 per cent
Water	66 per cent
Total	100 per cent

Glycerin is the most expensive of the ingredients of the two solutions mentioned above. It will not evaporate, so that it need not be replaced from time to time, as is necessary with the alcohol, which evaporates at low temperatures. Neither solution is injurious. The ingredients of any anti-freeze solution should be the first consideration before it is put into the truck cooling system. The addition of calcium chloride or any other alkaline solution is injurious and should not be employed.

How to Dilute Oil

If the oil used in the gearset and differential is not diluted in cold weather it becomes very heavy and sluggish and packs against the walls of the cases, and as a result the bearings are not properly lubricated. When this occurs, bearing wear is naturally rapid. To prevent such wear it is a good plan to dilute each gallon of heavy gearset lubricating oil with 1 pint of kerosene.

Although storage batteries are not furnished as standard equipment on Kelly-Springfield trucks, great care should be taken to see that they are fully charged when they have been added. Unless batteries are charged to their full capacity in cold weather they will freeze at zero temperature and crack the jars.

Do Your Truck Mechanics Waste Time This Way?

A Picture Story of the Quick and Slow Ways of Inserting Engine Piston Rings

WHEN it comes to making truck repairs, there are always the right and wrong way of doing a job. The reproduction of the poster on this page shows the right and the wrong way of putting new piston rings in the cylinders of an F. W. D. truck. What applies in this instance to the F. W. D. truck also applies to practically all other makes of trucks fitted with standard engines.

By taking the engine completely out of the chassis and mounting it on an engine stand and then removing the cylinder blocks to uncover the pistons, the job of fitting new piston rings took 2 days. During those 2 days, the truck was, of course, out of service and not earning an income for its owner.

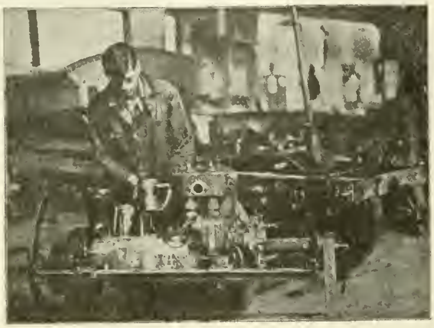
The same work could have been done in 2 hours or 4 hours at the most, if the engine oilpan had been removed and the pistons uncovered from below.

The two pictures reproduced on this page were originally printed in a poster sent out by the Four Wheel Drive Auto Co., Clintonville, Wis., to the owners of its trucks. The idea is so good and the contrast of the pictures so convincing that the entire poster has been reproduced herewith. It has a moral for all F. W. D. owners and for all other fleet owners as well.

The poster is a picture story of one way in which upkeep and repair costs of truck operation may be reduced. Of course, it is not the only way but savings made in small repairs grow into big savings when added together over a period of a year or more.

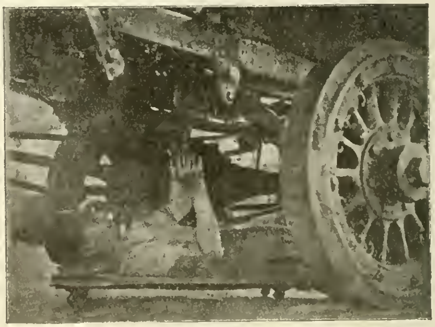
There are many other methods which can be used to cut down the cost of making various truck repairs and these will be treated of in short, one-page articles in succeeding issues of THE COMMERCIAL VEHICLE.

This Truck was Put Out of Commission FOR TWO DAYS --because



BOOSTING UP-KEEP COSTS

--he took the engine entirely out to put in new Piston Rings --when it could have been done in Two Hours --by



LOWERING UP-KEEP COSTS

removing the oil pan and taking the pistons out from below

FWD BETTER SERVICE BULLETIN FWD
Four Wheel Drive Auto Co., CLINTONVILLE WIS.

HANG THIS UP IN YOUR GARAGE

2 Big Problems of Florists Using Trucks

1—Perishability of Product

2—Exact Times of Delivery

How One Florist with a Fleet of Trucks Solved These Problems Is Told in This Article, Which Is the First of a Series Pointing Out New Ideas in Truck Operation by Florists

THE delicate and highly perishable nature of the commodity handled and the necessity of making deliveries at a certain fixed time and *neither before nor after that time,* are the two outstanding problems of truck operation peculiar to the florist business.

The first of these problems, the delicate and perishable nature of plants and cut flowers, presents two smaller problems: 1—The best method of dispositing the commodity in the truck body and 2—The best method of protecting the commodity while in transit.

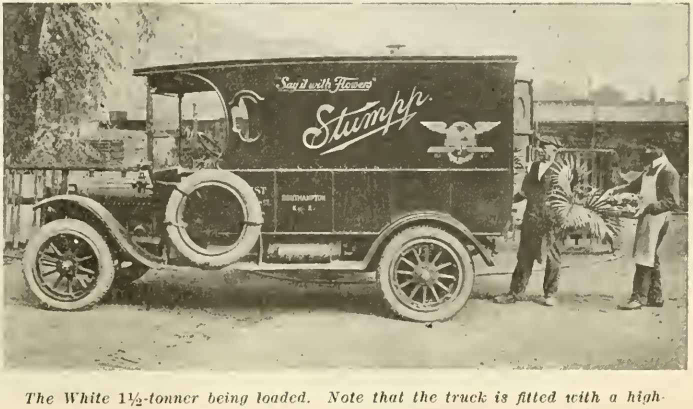
G. E. M. Stumpp, one of the largest of the New York florists both in retailing plants and cut flowers and in landscape gardening, has a fleet consisting of two 3-ton Pierce-Arrows; two Ford 1-ton trucks; one Studebaker 1-ton truck and one White 1½-tonner. The question of the use of this fleet in the various activities of the business and how Mr. Stumpp replaced his horses with his present fleet of motor trucks will be dealt with in later issues of THE COMMERCAL VEHICLE, but for the purpose of this article it will be necessary to deal with only the White 1½-ton truck and the two Ford 1-tonners as only these trucks are used for the more perishable retail store deliveries.

Necessarily the disposal of the plants and flowers in the bodies of the trucks depends upon the interior make-up of these bodies. Both the White and the two Fords in Mr. Stumpp's fleet are fitted with panel bodies. In the interior layout of these bodies, it has been found most convenient to equip the trucks with long shelves 3 ft. from the floor of the truck and running throughout its entire length and breadth. A high plant in a small pot with a comparatively small bottom surface is easily upset: and such plants, of which the firm delivers a great numbere, are always loaded in the lower part of the truck—that is on the floor of the truck itself. This is done because a truck always sways slightly from side to side when in motion and this oscillation is naturally less on the floor of the truck than is the case higher up, on the shelves. On these shelves, where the lateral oscillation is greater are placed boxes of cut flowers, small low plants in wide-bottomed pots and small plants in very small pots. These are packed side by side in a flat-bottomed box of their own and are not easily upset. Mr. Stumpp has also considered the effect upon the chassis of carrying heavy plants high up in the body of the truck. This method of loading would put an increasing lateral strain upon the chassis of the truck and this strain has been avoided by the methods of loading outlined above. One or both of the shelves themselves can be readily removed when it is necessary to carry very high plants or palms which could not be loaded in an upright position into the lower part of truck when the shelves were in place. The illustration of Mr. Stumpp's 1½-ton White truck on page 288 shows the method of loading and the position of the shelves when in place in the body of the truck.

Protecting Plants in Transit

In addition to the best method of fitting the interior of his trucks and the best method of loading them, the New York florist and the northern florist generally is faced with the problem of how best to protect his commodity while in transit. Every florist operating in a northern climate knows the fatal effect of even a moment's touch of frost upon either plants or cut flowers. Moreover, this problem is most pressing at the busiest time of the year, for just before Christmas, Mr. Stumpp's business is estimated to be actually fifteen times as great as it is during the summer months.

Therefore, in the winter months not only are cut flowers carefully



The White 1½-tonner being loaded. Note that the truck is fitted with a high-class panel body and is mounted on pneumatics all around

View of the White 1½-tonner from the rear, showing how the small plants are loaded on the shelf and the larger and heavier plants on the floor of the body to prevent tipping over. Two spare tires are carried on the left runningboard

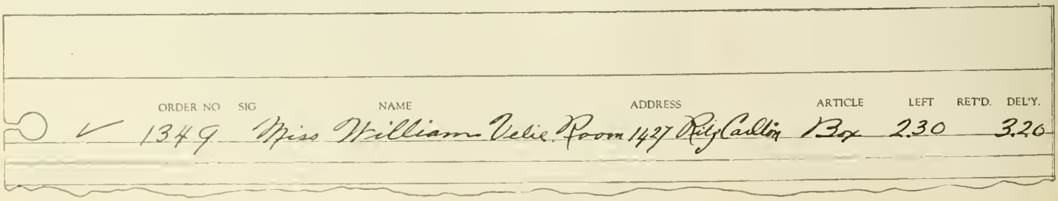
packed with tissue paper about them, but the plants, whatever their size, are entirely enveloped in large sheets of paper and in special cases large sheets of cotton batting are used as an additional precaution. A certain amount of heat is inherent in the plant and in the soil and pot when the plant leaves the greenhouse. Provided a plant is securely and entirely enveloped in this way it will not freeze for some time, no matter how low may be the temperature of the outside air. To make assurance doubly sure, however, the firm's 2-ton White truck and the two Ford 1-ton trucks are fitted with sliding doors between the driver's cab and the body of the truck, above the level of the driver's seat. The driver's cab can be entirely inclosed, because the cabs are fitted with side doors and leather curtains which can be let down from the permanent top at the sides to meet the tops of the doors and fasten there. In winter then, the driver's cab is kept entirely inclosed and the sliding panels connecting it with the body of the truck are opened to their full extent. When this is done, the heat from the engine passes up through the driver's cab and circulates through the body of the truck. While the amount of heat thus circulated would not seem very great, the firm has found that in all cases it has been sufficient to keep the temperature in the driver's cab and in the body of the truck above the freezing point, provided the engine is running and the cab and truck body are kept fully closed.

Deliveries on Schedule

This method also avoids the danger to the plants of the old-fashioned system of heating the trucks by means of a large hot stone, which is likely to give off a certain amount of gas and kill or injure the plants, as well as the expense of installing a heating system using hot air taken from around the exhaust pipe.

The second delivery problem which the large florist has to face is the necessity for making his deliveries exactly when required and neither earlier nor later than that time. For example, a customer telephones or calls at the store at 1 p. m. to order a wreath for a funeral which is to take place that afternoon at 3 o'clock. Although the florist may not have a delivery truck available at the store so late in the day, the wreath must of course be delivered in time for the funeral. To take another case: One of the store's customers may be giving a dinner party on Wednesday evening at 7 o'clock. Accordingly, she calls up the store Monday morning and instructs the florist to send her certain cut flowers with which to decorate the table. But she does not want the flowers delivered at once, nor does she want them delivered any time between Monday morning and Wednesday evening. They must be delivered not earlier than 5 o'clock Wednesday evening so that they will be absolutely fresh, and not later than 6 o'clock Wednesday evening to allow sufficient time for them to be arranged on the dinner table. Moreover, if the delivery is not made within the hour of grace allowed the florist the chances are that the customer will order her flowers somewhere else in future, where, as she puts it to herself, they are more considerate of her wishes.

In his business, Mr. Stumpp and his manager overcome these difficulties of delivery in two ways. First when a hurry call is received for a wreath or a box of flowers which must be delivered at once, the firm does not as a rule attempt to make the delivery by truck. One of the two or three boys available at the store are sent out to make the delivery by hand. There are two reasons for this: 1—Because an attempt to locate and send out a truck on the hurry call at once would throw out of schedule all the other deliveries to be made by that truck at that time. 2—Because to use a truck for a single delivery would be very poor economy of gasoline, driver's time and wear and tear on the truck.



	ORDER NO	SIG	NAME	ADDRESS	ARTICLE	LEFT	RET'D.	DEL'Y.
✓	1349		Miss William Velie	Room 1427 Ritz Carlton	Box	2.30		3.20

Portion of the record sheet kept to check up the time of actual delivery with the promised time of delivery. Each order is numbered for easy reference

TWO WAYS

to Protect Pipes on Garage Columns

Important to Prevent Damage to Steam, Water and Sprinkler Pipes Through Collisions with Trucks

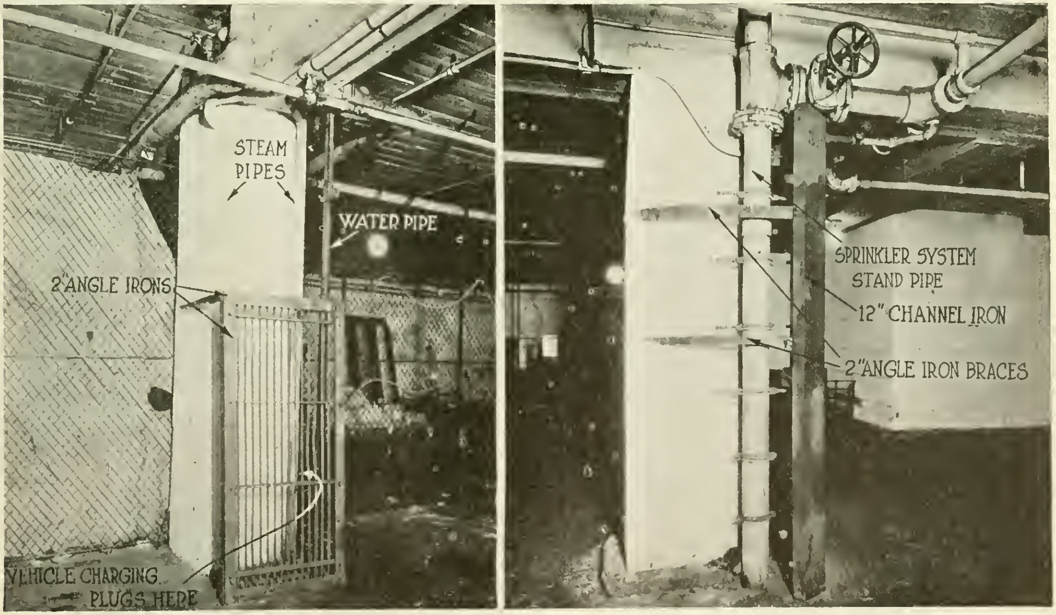
IN motor truck garages having columns alongside of which are run the water, steam or sprinkler pipes from the floors above or below, care should be taken to prevent these pipes from being damaged or broken through collisions with the trucks maneuvering on the floor. This is of greatest importance when the floor area is comparatively small in relation to the number of trucks garaged and when the columns are placed fairly close together.

Some such pipes, especially those used for the sprinkler system, and having steps in the form of bands bolted to them, should be provided with some form of protection to prevent the ends of the steps from scratching expensive bodies of the panel type such as are used in the department store industry.

Then again, when electric trucks are employed, the charging plugs are sometimes placed on the columns where they are liable to be sideswiped if the maneuvering space between the columns is small.

The Boston Store, one of the large department stores in Chicago, found that it paid to take every precaution to protect the water, steam and sprinkler pipes run alongside the columns from the basement garage and sorting rooms to the floor above. Just how that company protected these columns is shown in the two accompanying illustrations. These two pictures are almost self-explanatory. In cases where the pipes are placed close up to the flat sides of the columns, two iron grid devices, one for each side and joined at a corner of the column, are employed. These rectangular grid frameworks do not collect dust and dirt and yet protect the pipes from being damaged by accidentally backing the trucks up against them.

When the pipe, such as the sprinkler standpipe shown in the view at the right, is placed at the corner of the column with no other pipes along the sides, a grid device is not so applicable. Instead a 12-in. channel, set up on its end, and held vertically by two angle-iron braces on each side, was found to serve the purpose at a comparatively low cost.



Two Ideas for Protecting Pipes on Garage Columns

When pipes are placed along the flat sides of a column, the grill idea shown at the left may be used to good advantage. When the pipe is placed at the corner of the column, the channel brace shown at the right may be employed economically. Both devices shown may be made at small cost

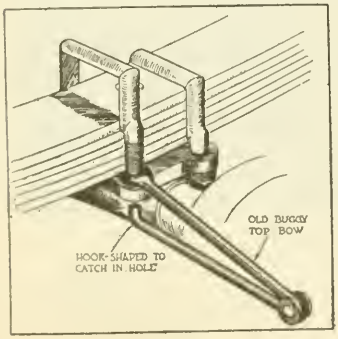
Better Truck Repair and Maintenance

No. 29—Simple Tool for Inserting Spring Clips

WHEN spring clips spread so that it is difficult to force the threaded lower ends into the holes in the spring pads, the tool shown in the accompanying illustration can be used to good advantage. The tool is made from an old buggy top bow. One end is rounded off into a semi-circular shape and the other end bent up at right angles to it. When the bent-up end is placed inside the hole in the spring pad from the bottom and the semi-circular end pressed against the threads of the clip, an upward motion given to the tool forces the threaded end into the hole. It can then be driven down with a hammer.—Motor World, R. FOREST, Syracuse, N. Y.

No. 30—Bar to Remove Battery Connections

A PIECE of ⅜ in. gas pipe flattened out at one end with the edge filed down until it is about ⅛ in. thick, can be used to good advantage in removing the connecting straps between the adjacent cells of a storage battery. The thin end is inserted under the connecting strap and the bar used as a pry or lever to loosen it. The device can also be used to push in the strips of wood around the jar to loosen it so that the compound can be poured into place.—Motor World, K. CLICK, Fostoria, Ohio.



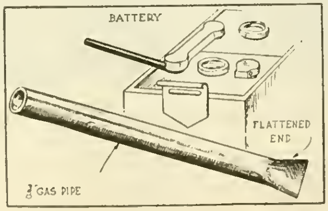
No. 29

TO help motor truck owers and operators to save money in the maintenance and repair of their trucks, The Commercial Vehicle prints on these pages better methods of maintaining trucks and the latest ideas in making quick repars.

THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 31—Easy Way to Remove a Rusty Nut

WHEN a mechanic has to remove a nut which has become rusted to the stud of bolt on which it is fitted, one simple method to remove it is simply to make two cuts through the nut alongside the thread of the stud by using an ordinary hacksaw. A very light tap with a hammer will then start the nut, for there is then little left to bind it to the stud. While this method, of course, spoils the nut, it does not mutilate other parts during the process of removal.—Motor Age, Chicago.



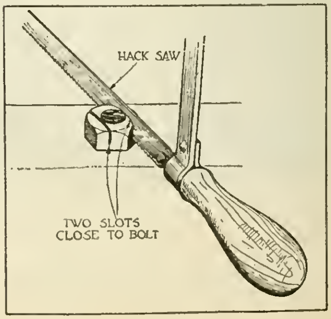
No. 30

No. 32—One Man Rig for Hand-Drilling Jobs

WHEN it is necessary to drill holes in a truck frame by means of a hand drill, the speed of drilling can be increased by increasing the pressure on the drill yoke or top. One easy method of doing this is to employ a piece of wood bolted to a U-shaped metal clamp inserted under the lower flange of the frame. This holds the stick parallel to the frame at one end. Around the other end a piece of rope made into a loop is twisted by means of a short piece of round iron or wood. By twisting up the piece of rope, any desired pressure can be brought against the top of the drill.—Motor World, C. H. WILLEY, Concord, N. H.

No. 33—Rubber Strip to Hold Tire Gauge

IN truck garages in which pneumatic tired vehicles are stored, the tire gage very often becomes mislaid when the tires are being inflated, with the result that some tires receive too much air and others, not enough. Trouble of this kind can be avoided by a strip of rubber cut from an old inner tube and using it to hang the air gage to a ring in the ceiling or in the wall a short height above the floor. A flat metal strip is bent around the outside of the gage itself to serve as the point of attachment to the rubber strip. In



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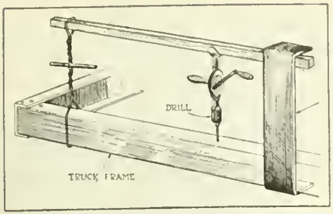


No. 32

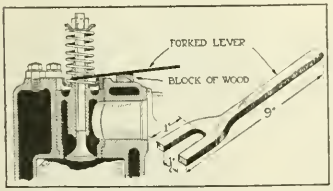
use. the gage is pulled down to fit over the valve stem. As soon as the workman is through with the gage, it is automatically pulled out of the way by the elasticity of the rubber.—Motor World, W. J. **Oldfield**, St. Marys, W. Va.

No. 34—Lever to Remove Overhead Valve Cages

WHEN trouble is experienced in removing overhead valve pockets which are dropped into the cylinder head and secured by locking, this difficulty may be overcome by placing a forked lever underneath the spring and using a block as a fulcrum. By applying the pressure gently and tapping the stem all around with a light hammer, even a very obstinate case will respond to this treatment. The rod is made of ½ in. round 9 in. long and is forked at one end to give an opening of ½ in. wide and 1 in. deep.—Motor World, D. G. **Cochrane**, Hamilton, New Zealand.

No. 35—Using String to Hold Blowout Patch

A BLOWOUT patch placed in a pneumatic tire casing may be held at the proper position by using a small piece of wire or string around the outside of the tread and fastening the ends through holes cut in the patch on each side of the tire. The accompanying sketch shows how the string looks when in place.—Motor World, E. **Ream**, Belle Vernon, Pa.



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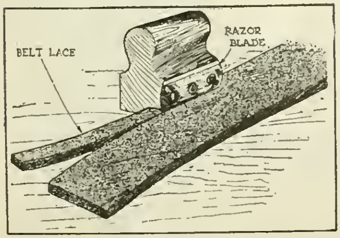

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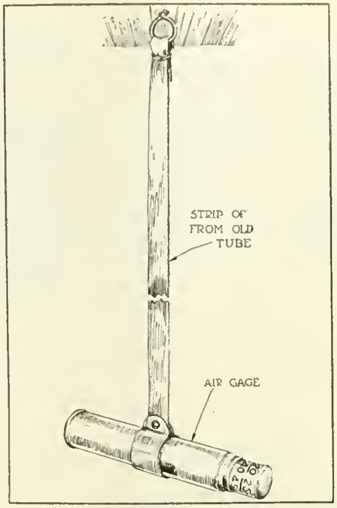
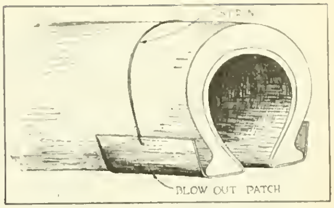


No. 33

No. 36—A Leather Cutter From a Razor Blade

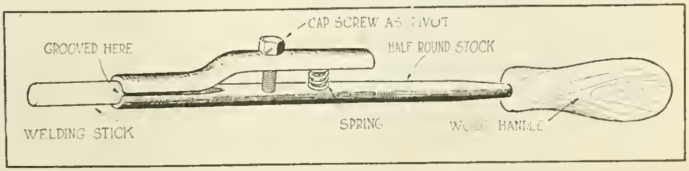
AN excellent tool for cutting rawhide belt lacings may easily be made from a discarded safety razor blade and a block of wood. The block of wood should be curved to fit the fingers as shown in the accompanying sketch and one side flattened off at the bottom so that the razor blade may be fastened to it by two or three roundheaded screws. A notch is cut in the bottom of the wood along the edge to which the blade is attached. This serves as a guide against one side of the belt, so that the edge of the razor is always parallel to the edge of the belt. This gives a lacing of the same width throughout its length. —Motor World, C .H. **Willey**, Concord, N. H.

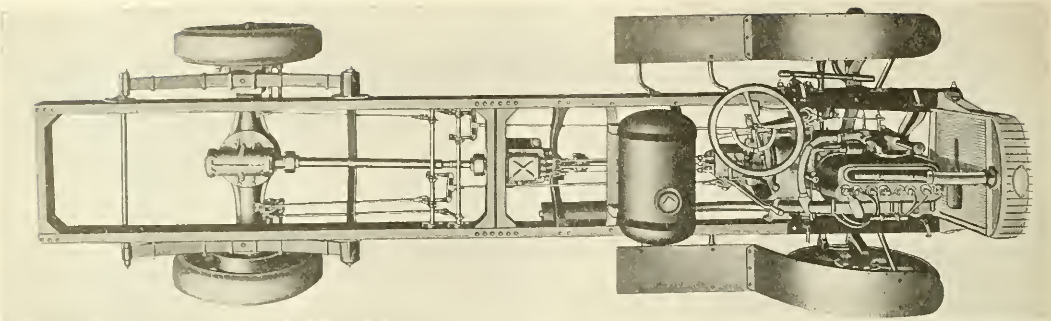


No. 35

No. 37—Simple Holder for Welding Stick

IN some garages short ends of welding sticks have to be thrown away because the operator cannot hold them in his hand during the welding operation without getting his fingers burnt. This trouble may be easily overcome by the use of a holding device, as shown in the accompanying illustration. The device consists of two pieces of half round iron. One piece is about 14 in. long. It is filed out at one end into a grooved form of approximately the same diameter as the welding stick. The other end is filed off to a point and inserted into a wood handle. The other piece of half round is about 8 in. long. It is bent in the middle to give a slight offset, the two ends being parallel. One end is grooved to form the second jaw to completely enclose the small welding stick. The second piece of half round is attached to the first by means of a cap screw which acts as a pivot about which the smaller piece of half round may be moved up and down to release or hold the welding stick as desired. A small coil spring is interposed between the long and short piece of half round bars so that the jaws close automatically around the welding stick except when the pressure of the thumb is exerted on the end of the second bar nearest the wood handle. The wood handle prevents the operator from having his fingers burnt even though the iron portion of the holder becomes hot from the heated welding stick.—Motor World, J. N. **Bagley**, Hastings, Neb.





The new Atco 2-ton worm-driven model for transfer work and long distance hauling, as well as to meet the transportation requirements of concerns in the largest number of industries in which that capacity load is maximum under average everyday operating conditions

Atco 2-Tonner Designed for Long Distance Haulage

ATCO SPECIFICATIONS

Capacity, tons	2
Price	$2,875
Wheelbase, in.	150
Tires, front	36x4
Tires, rear	36x7
Bore, in.	4.25
Stroke, in.	5.5
N. A. C. C. hp.	29
Speed, r.p.m.	1,500
Speed, m.p.h.	......
Gear ratio in high gear	7.75 to 1
Final drive	Worm

THE American Truck & Trailer Corp,, Kankakee, Ill., a newcomer in the truck field, has entered the market with a 2-ton worm-driven model, called the Atco. This new model was designed with the purpose of getting a truck that would represent a balance between a light, fast truck and a heavy one, the thought uppermost in the minds of the designers being that the former will not stand the abuse of the drivers and that the latter wastes much of its power in carrying its own load. The 2-tonner was also built with the purpose of meeting the transportation requirements of concerns in the largest number of industries in which that capacity load is maximum under average conditions, such as fleet owners doing a transfer business, long distance hauling, etc. There is 12 ft. of loading space in back of the driver's seat.

The Atco 2-tonner is made up of standard units, such as a Buda engine, Parish & Bingham frame, Stromberg carbureter, Bosch ignition, Chicago radiator, Smith metal wheels, Fuller clutch and gearset, Sheldon front and Wisconsin rear

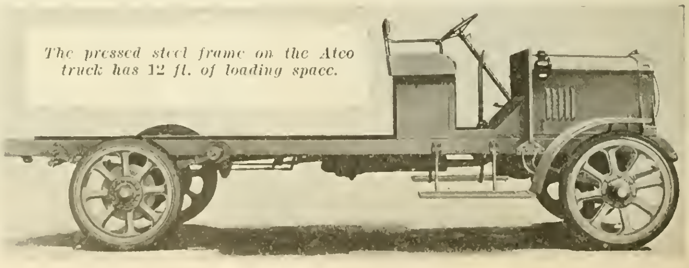
The 4-cylinder engine is mounted under the hood, the cylinders being cast in block with valves placed on the right. Lubrication is by means of a full force-feed type of oil system, designed for heavy duty trucks. The pump, which is of the geared type, is located in the base of the oil reservoir, entirely submerged in oil. It is driven by a vertical shaft in connection with the camshaft, and is easily detached from the outside for cleaning or inspection, from the bottom of the oil pan, by removing six cap screws. The oil is drawn from the lower oil reservoir through a fine mesh screen and discharged by a steel distributing tube located horizontally the full length of the crankcase into connecting passages which carry the oil directly to each camshaft bearing and main crankshaft bearings. From the crankshaft main bearings the oil is forced through the drilled crankshaft to each connecting rod bearing. From the connecting rod bearings the oil axles, Sheldon springs, Ross steering gear, Hartford universal joints. is forced through the drilled crankshaft to each connecting rod bearing. From the connecting rod bearing the oil is forced through a small tube up the connecting rods to the piston pins. Cylinder walls, cams and pistons are lubricated by oil thrown from the lower ends of the connecting rods, caught by the piston and carried up into the cylinder.

Water is circulated by means of a centrifugal pump through a vertical finned tube type of radiator, whose ribbed case is cast iron and detachable. Protection is given the radiator by means of heavy grating bars attached to the exposed face.

Fuel is fed to the caburetor by vacuum from a 22-gal. tank, located under the driver's seat. The Pierce governor is of the centrifugal type, driven from the engine. Ignition is by means of single high tension magneto, controlled by hand.

The clutch is the dry-disk type. The selective four-speed gearset is located amidships. Drive is taken from the engine through a tubular driveshaft to the gearset and from there through a second tubular driveshaft to the rear axle and the wheels. Driving torque and populsion are taken through the half-elliptic springs.

Both the foot and hand brakes are of the internal-expanding type.



The pressed steel frame on the Atco truck has 12 ft. of loading space.

Jackson Motors Enters Field with Four-Wheel-Driven Truck

JACKSON SPECIFICATIONS

Capacity, tons	3½
Price	$4,250
Wheelbase, in.	150
Tires, front	36x7
Tires, rear	36x7
Bore, in.	4.5
Stroke, in.	5.5
N. A. C. C. hp.	32.40
Speed, m.p.h.	12
Speed, r.p.m.	1050
Gear ratio in high gear	9.2 to 1
Final drive	Bevel

THE first model of the Jackson Motors Corp., Jackson, Mich., has been put on the market. This new 3½ ton truck, which is four-wheel driven, has been designed for heavy work in road building, delivering coal, and for all heavy hauling under extremely unfavorable conditions. It can go into the gravel pits, take on capacity loads, come out under its own power over soft ground and dump where material is wanted, saving a large amount of extra labor. The comfort of the driver has also been considered in the new Jackson truck, a coupe cab being furnished on each truck as part of the standard equipment.

The enclosed cab is equipped with an upholstered spring cushion and back, giving the same driving position as a passenger car. The cab is electric lighted and glass enclosed. The windows can be raised, lowered or removed to suit the weather. The cab is also equipped with a bill rack and an extension light of ample size and with sufficient cord to allow inspection of the load at night.

In order that its truck may be used to advantage in hauling oil, gravel, lumber, and bulky loads, the Jackson company is offering special features in equipment at extra cost. When used in the oil fields, hauling casings, heavy derricks and other material for oil drilling, winches for handling the heavy materials are supplied. When used for delivering coal, gravel for road building, a power hoist in combination with a metal dump body is supplied. Cross bolsters are furnished for carrying logs in the lumber region. Bulky loads are taken care of by a platform stake body. Though the standard wheel-base is 150 in., the buyer has the option of a 130-in. wheelbase when a dump body is used.

Equipment includes electric lighting and starting, the electric auxiliaries including an Eisemann magneto-generator, Exide battery, and a Dyneto starting motor. Other equipment includes license holders, electric horn, complete kit of tools and wrenches, fitted into a special tool box, an oil can and holder, valve cap tool, 5-ton jack and an odometer.

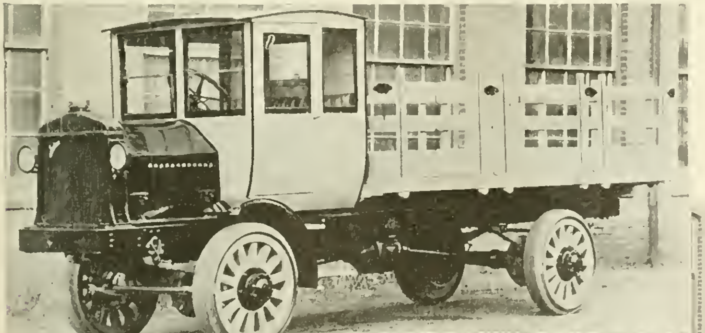
The driver has been saved the usual trouble of lifting the front seat each time the fuel supply is replenished. This has been accomplished my means of a filler conveniently placed inside the cab. The tank, which is placed under the driver's seat, holds 30 gallons.

The Jackson truck is made up of standard units consisting of a Continental engine, Long radiator, Castle frame, Standard wood wheels, Pierce governor, Stromberg carbureter, Borg & Beck clutch, Standard Parts springs, Ross steering gear, and Thermoid universal joints from the clutch to the transmission and Spicer joints from the transmission to the axles.

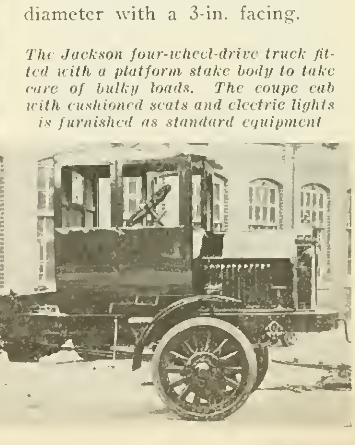
The cylinders of the four-cylinder engine are cast in pairs with the valves placed at the left. Water is circulated by a centrifugal pump through a vertical finned tube radiator. The case of the latter is cast iron and finned. Fuel is fed to the carburetor by vacuum. Lubrication is by means of a combination pressure feed and splash constant circulating system. The main bearings are fed by pressure while the connecting rods, camshaft, cylinders and valve lifters, are lubricated by splash. Drive is taken from the engine through the clutch to the selective, four-speed gearset, located amidships. From there a single tubular driveshaft takes the drive to the rear axle and wheels, the front wheels being likewise driven from a tubular shaft. Final drive is direct bevel.

Both the propulsion and driving torque are taken through the half-elliptic springs on the Hotchkiss drive plan.

The pressed steel frame is of semi-flexible construction. The side rails are 7 in. deep and the flange 2½ in. wide. The service brakes are internal expanding on the rear wheels. Their diameter is 20 in. and the facing is 3½ in. The hand brakes are of the external, contracting type, and mounted on the driveshaft, thus allowing an emergency brake on all four wheels. These brakes are 10 in. diameter with a 3-in. facing.



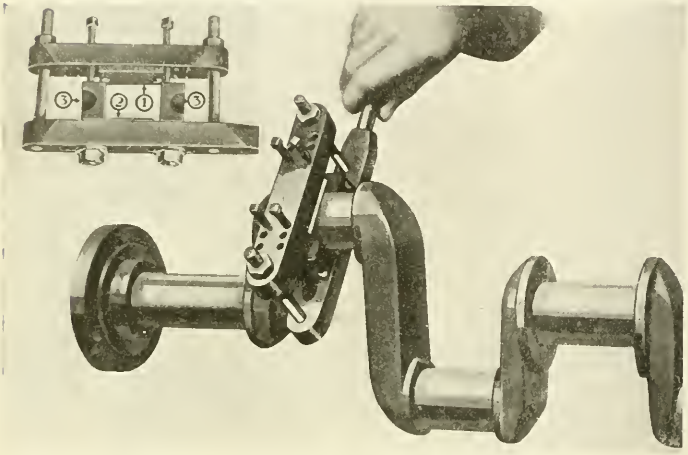
The 3½-ton Jackson truck, fitted with cross bolsters for carrying logs in the lumber region



The Jackson four-wheel-drive truck fitted with a platform stake body to take care of bulky loads. The coupe cab with cushioned seats and electric lights is furnished as standard equipment

Crankshaft Grinding with Atlas Tool Saves Time and Money

Detroit Weatherproof Cab—Automatic Tire Regulator—HB Lighting Set—Dayton Wheel—Auto Distributing Primer



The Atlas abrasive tool for crankshaft grinding being operated. No lathe or other equipment is required

Atlas Abrasive Tool

FLEET owners who wish to save money during the overhauling period, may do so through the use of a hand tool for grinding crankshafts, instead of doing that work on a lathe or other equipment required. The hand tool for crankshaft grinding eliminates the lathe or grinder, the cost of experienced operators, and may be used upon a crankshaft without removing the latter from the engine.

The working parts of the Atlas abrasive tool for grinding crankshafts are as follows:

1—A hardened steel cutter which cuts in one direction only.

2—A bronze track bearing, opposite the cutter. This bearing cannot cut a ring in a pin like hard steel, nor freeze against a pin from excess friction like soft steel.

3—Adjustable abutment blocks which slip easily up against the face of the crankpin and hold the cutter and track in their proper working place.

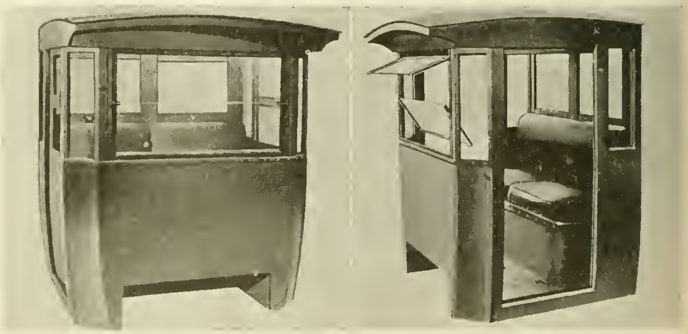
Its work is accurate to .001 in., better than any machine shop will guarantee with a lathe. It works quickly. Within an hour it completes an entire crankshaft.

It is adjustable to fit any crankshaft up to 2½ in. diameter. The price is $10 complete, postpaid. Extra cutters, one used at a time, are 30 cents each. Each cutter will true up from ten to twenty pins or bearings, according to condition. The device is made by the Atlas Mfg. Co., Pittsburgh, Pa.

Weatherproof Truck Cab

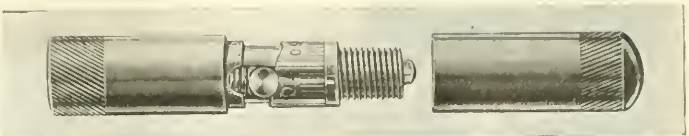
COMPLETE protection from the rain, snow, and cold winter winds, and bodily comfort for the truck driver, are vital factors that enter into the efficient handling of a truck while on the road. A driver's disposition, which is affected by these adverse conditions, will reflect the efficiency of his work. With these facts in mind, a body builder has put on the market all-weather cabs, made for Ford, Packard, Paige, Hall and Denby trucks. The price of the Ford cab is $120. The Packard cab costs $150, and that for the Paige, Hall, and Denby is $140.

This body builder, which is the Detroit Weatherproof Body Co., Pontiac, Mich., has designed a new model cab of the bay window entype. The combination of wood and gage metal used in this cab makes it strong enough to prevent any drumming or rattling. The outside four corners are braced with angle iron. The inside corners are braced with metal angles, which make for greater flexibility. This cab is equipped with new patented doors, with spring steel frames and pyroline windows, which slide into the top through metal channels. The same accessibility applies to the windows. They slide down into the body of the cab when ventilation is



A truck driver is completely protected during inclement weather with one of the cabs being built by the Detroit Weatherproof Co., Detroit

Resistance coils in the primer, made by the Auto Distributing Co., heats gasoline until it vaporizes



The automatic tire regulator whistles a warning to the truck driver that his tire has enough air in it when inflating it

desired. This is a distinct feature for the driver in signaling traffic, as it permits a clear view in any direction.

Dividing the windshield into two sections, permits the desired opening by simply raising or lowering the vision part, while the other remains closed. The cab is roomy enough to seat three passengers and is also equipped with cushions and a lazy back, thus insuring bodily comfort.

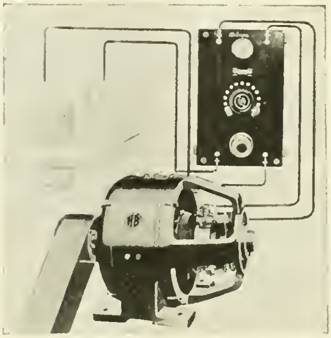
HB Lighting and Battery Charging Set

WHERE it is impossible for a fleet owner to get electric current in his garage from any public plant, or where he is desirous of doing his own battery charging, these facilities may be had by the installation of a lighting and battery charging set. These sets, as furnished by a number of electrical equipment manufacturers, are furnished complete in every respect ready to belt to the shop engine and operate. A set, such as the HB, made by Hobart Brothers, Troy, Ohio, includes a generator, base tracks, field rheostat, charging panel, and pulley with a 6-in. diameter and 4-in. face. No switchboard is necessary.

The HB generator is a specially wound machine of 110 volts, direct current, with a speed of 1,800 r.p.m. The weight is 300 lbs. It operates from a line shaft or engine, requiring 4 hp. at full load. It supplies ample capacity for brilliant lights at low cost, and will recharge at one time from one to six 6-volt batteries. The price of this set varies according to the capacity of the generator To light 100 lamps, a 2 kw. generator is used, the price being $160. A 3 kw. generator is used for 150 lamps and costs $178. To light 250 lamps, a generator of 5 kw. capacity costing $250 is used.

Automatic Tire Regulator

A TIRE pressure device that whistles a warning to the truck driver when his tire has enough air in it, will prove of interest to fleet owners whose trucks are equipped with pneumatics. All the driver has to do is set this regulator at the desired air pressure needed for a particular tire, attach the air hose in the usual manner, and then go about other duties until he hears the warning whistle from the regulator. When the whistle blows, the driver knows that no more air is going into the tire, the surplus air being emitted through a hole in the side of the regulator.



The HB lighting and charging outfit for use in fleet owners' garages

The device is called the Automatic pressure regulator and is made by the Automatic Safety Tire Valve Corp., New York City.

New Electric Primer

FLEET owners having trouble starting their engines in cold weather will be interested in a primer which heats gasoline in a small chamber until it vaporizes. It then throws the vapors into the intake manifold through a small tube with two holes in it. Gasoline is drawn into the device by a small pump, and the heating is done by resistance coils inside the chamber, through which current from the storage battery passes.

The primer uses 15 amperes at the beginning and as the unit heats, the amperage drops to 5. It is attached by boring a hole in the intake manifold and threading it and then screwing the primer in. Connections are made from the fuel line to the couplings on the primer. The manufacturer of this device is the Auto Distributing Co., Plainfield, N. J. The price is $15 in brass and $16 in nickel.

THE rapid increase in the use of the pneumatic truck tire by fleet owners has been responsible for much concerted effort on the part of the wheel companies to design a wheel that will be entirely suited for pneumatic truck tires. One of these companies has brought out a steel wheel that enables quick replacement of the heavy pneumatic tires. This is accomplished by means of a slot extending from the outer edge of the wheel to the center of the rim and admitting the valve stem of the inner tube. Instead of lifting the tire, it is pushed on in place.

Volume production of this wheel, which is made by the Dayton Steel Foundry Co., Dayton, Ohio, has just been attained. With some slight modifications, this wheel for pneumatics is practically the same as that for solids. Though it is much lighter, it is of the same general design. It is made of electric furnace steel, with the hub cast integral. The spokes and rim are hollow, features that add to the lightness of the wheel. There is also a fine arching of the spokes that has helped to eliminate all danger of wheel fracture.

The Dayton steel wheel enables quick replacement of the heavy pneumatic truck tires, which are pushed on instead of lifted

The Owner's Interest in Truck Balance

A CLOSE study of the specifications of all makes of trucks to be offered on the market during the coming year will show that the great majority of the models are what are termed the assembled or partially assembled type in which the various component parts are purchased from outside manufacturers.

While this policy has really been responsible for the great growth of the motor truck industry in this country and made the United States the most highly truck-motorized nation in the world, the wise truck purchaser must decide for himself whether the one truck he has tentatively selected from among the total of such models is properly balanced.

In making this decision, the truck buyer has certain principles to guide him. Stating these briefly, the first unit to be considered is the engine. If the engine installed is larger than necessary, it means that it will simply run light most of the time, which should lengthen its life, although it might and probably will lower its fuel economy. If too light, it cannot give any more power than it is capable of producing and if the bearings and other vital parts are proportioned for heavy duty, they cannot be injured by being run more or less continually under full load.

It is when the engine is oversize that the clutch, gearset and rear axle must take the loads which the engine is capable of delivering, and when these parts are too light, trouble is sure to follow. Of these parts, the axle is likely to suffer most, for axles are generally made with a low factor of safety. If made with a large safety factor, the axle tends to increase the truck weight, make the truck sluggish and increase tire wear.

Until the present year, axle manufacturers have generally used the engine horsepower and the weight to be supported as the factors in axle design, assuming low gear reduction and rear axle ratio as practically constant for any given size of truck. But many of the trucks are now furnished with a much greater low gear reduction as a result of design of the Class B war truck. As an axle with a greater low gear ratio will have to withstand greater stresses than one with a smaller gear ratio, the same engine being used in each case, it is important for truck buyers to take the low gear reduction into account in selecting a truck and to find out what precaution has been taken by the manufacturer to meet the added stresses by strengthening the rear axle.

Equipping the Truck Machine Shop

FLEET owners should realize at the outset that they cannot expect to maintain their own trucks in a satisfactory manner unless they install adequate machine shop equipment. If this is not done, it would be far better to have the repairwork done at a reliable service station, even though the cost of the work includes the profit to which the service station management is entitled.

Too often adequate equipment is purchased and then laid out in a manner which cannot possibly result in low maintenance costs. This happens when no account is taken of routing the different jobs through the shop. In laying out a new truck repairshop, it would be well for the garage superintendent to make out a routing diagram in order to insure that the various parts included in the repairwork most often done are not criss-crossing each other and doubling back on themselves several times from the beginning of the job to the end.

Then again, there are scores of useful machines, many of which are used but a few times a year. If too many such machines are installed, their investment is a poor one. They overcrowd the shop and make it impossible to introduce real labor-saving machines that are used continually throughout the year.

The Fleet Owners' Forum

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Blowing Grain From Truck to Freight Car

To the Editor, Commercial Vehicle:

Will you please advise us if you have any records of motor trucks equipped with a blowing attachment for loading grain from a motor truck body into a freight car, thus eliminating shoveling by hand.

Will you please also give us the names and addresses of the manufacturers of any such equipment.—H. R. B. Lima, Ohio.

After considerable investigation we have not been able to locate any motor truck equipped with a pneumatic device for blowing grain from a motor truck body into a freight car.

However, we believe the pneumatic conveying principle as developed by the Ash Removals, Inc., 505 Fifth Avenue, New York City, for the removal of ashes from cellars direct into a motor truck body could be adapted for the use which you mention.

That system is entirely pneumatic and attains a velocity of 3 miles a minute in the conveyor line. At this velocity, the apparatus is capable of lifting powdered granite of a density of 180 pounds per cubic feet. Ashes weigh from 25 to 65 pounds per cubic foot.

According to Mr. J. F. Linton of the Ash Removals, Inc., the apparatus can handle any material up to a weight of 200 pounds per cubic foot and of sizes not greater than 6 inchese in diameter. Mr. Linton is also of the opinion that the ash removal system would prove economical in the handling of all grain as arrangements could be made to clean the grain at the same time the grain is being conveyed. He states that the cost of cleaning a bushel of wheat is in the neighborhood of ½ cent a bushel. Cleaning and conveying the wheat in one operation would be of considerable advantage to any one shipping wheat in large quantities, as it would save paying the freight on dirt to the market.

We would suggest that perhaps the best method of becoming more fully acquainted with the system of the Ash Removals, Inc., would be to communicate with Mr. J. F. Linton, Ash Removals, Inc., 505 Fifth Avenue, New York City.

Specification Data on 1914 Motor Trucks

To the Editor, Commercial Vehicle:

Will you please advise the writer in your Fleet Owners' Forum Department if you can supply the names, specifications and prices of motor trucks offered on the market in 1914. I desire to compare the pre-war specifications and prices of trucks with those of today.—J. P. Nichols, Jr., Griffin, Ga.

The complete specifications of motor trucks offered on the 1914 market were published on pages 34 to 43 of The Commercial Vehicle for January 1, 1914.

Of course, the January 1, 1914 issue of The Commercial Vehicle is long since out of print, but you may have access to a bound volume of The Commercial Vehicle in the public library at Atlanta, Ga.

Basis of Rates for Truck Freight Lines

To the Editor, Commercial Vehicle:

Will you please give us the answers to the following three questions regarding the operation of a motor truck freight line:

1—What is the best method of freight handling? Is it better to pick up deliveries direct or use a central sorting depot?

2—Should freight be delivered to a depot or to the store door of the consignee?

3—What are the rates charged for freight handled by trucks and upon what basis are the rates determined?—Peter M. Andriot & Son, Louisville, Ky.

1—When the trucks operate between cities, it is advantageous to employ a receiving and distributing station in each city. These permit the heavy capacity trucks to operate exclusively between cities, leaving the pick up work to smaller trucks and to the vehicles of the shippers themselves.

2—With large shipments it is customary to deliver the goods direct to the door of the consignee provided the place of business is located within the business zone of the city. It is really just as economical to make this delivery as it is to unload at the depot and then reload them on smaller trucks. When the shipments are small, it is customary to make an extra charge for store-door delivery or to require the consignee to call and get his goods.

3—Speaking generally, the truck rate is based on 100 pounds of goods and is generally figured at 1 cent a mile per 100 pounds. For a 5-ton truck, this gives a charge of $1 a mile or $100 for a trip of 100 miles with a 5-ton truck. As a rule, the rates for delivering goods from the railroad station to points within the mercantile district average approximately 10 cents per 100 pounds. When the material carried weighs less than 20 pounds per cubic foot, a special cubic foot rate is charged. Between New York and Philadelphia this rate per cubic foot is 20 cents. A third rate is charged on machinery. On pieces weighing 500 pounds or over, the rate is $1.50 per 100 pounds.

The most important factor in figuring the cost of operation of a motor freight line is that of overhead. More failures in motor truck operation have been due to not figuring the cost of overhead in the rates than perhaps any other one cause. As told on page 19 of the September 1, 1918 issue of The Commecial Vehicle, referring to 6-ton Packard trucks operated between Ashtabula and Cleveland, Ohio, by the Highways Motor Transport Co., the overhead has been found to be between 100 and 125 per cent of the total cost of truck operation. In other words, after the cost of truck operation has been estimated, it should be doubled to determine the rate which will allow for contingencies not usually calculated by the average truck owner. Ashtabula and Cleveland are 55 miles apart and the rate is 55 cents per 100 pounds. The income is $66 for a full 6-ton load one way. While the cost of truck operation at 40 cents a mile is $22, overhead, including salaries, rent, business solicitation, etc., amounts to 100 per cent of the cost of operation so that the total cost for 55 miles is twice $22 or $44. This leaves a blance of $22 for a clear profit with a full load carried. When business is first started up, it is generally found that the ratio of actual to possible maximum capacity varies somewhere between 60 and 80 per cent.

On July 1 the Nebraska State Railway Commission put into effect standardized rates based upon a charge of 1½ cents per mile for 100 pounds, plus a fixed charge of 15 cents per 100 pounds to include both the handling at the point of receipt and for distribution at the destination. Thus the rate for first class goods per 100 pounds moved a distance of one mile is 16½ cents and for 100 miles, $1.65. An analysis of the rates, with a table showing each rate from 1 to 100 miles, are shown on pages 58 and 59 of THE COMMERCIAL VEHICLE for August 15, 1919.

Data on Trucks Used in Overland Haulage

To the Editor, COMMERCIAL VEHICLE:

As a subscriber of THE COMMERCIAL VEHICLE, we should like to have you supply us with all the data that you have available pertaining to the operation and maintenance of a motor truck freight line. Please include data on the following topics:

1—Number of trucks operated.
2—Size of trucks operated.
3—Style of body used.
4—Cost of operation per commercial ton-mile.
5—Number of miles covered per truck per day.—PETER M. ANDIOT & SON, Louisville, Ky.

Your questions cannot be answered in a general way because operating conditions vary to such a great extent in the different localities that each installation must be considered separately.

We have published a great deal of information on the subject of motor truck lines dealing with individual installations. Recent articles of this nature are as follows:

Freight Being Hauled Successfully Between New York and Philadelphia by Trucks, pages 5 to 9, January 15, 1918. This article gives a good deal of information regarding the size of trucks, the rates charged, the route followed and the method of operation.

Akron to Boston, 740 Miles by Truck, pages 5 to 11, February 15, 1918. This article tells of the fleet of pneumatic-tired trucks operated by the Goodyear company between Akron and Boston and Goodyear, Conn. It gives the route followed and other information concerning the experience gained by the Goodyear company during its operation of the trucks since April, 1917. The second part of this same article appeared in the March 15, 1918, issue of THE COMMERCIAL VEHICLE and contains more detailed information regarding the truck equipment and type of body furnished.

Akron to Cleveland by Truck, pages 24 and 25, March 1, 1918. This article deals with the development of motor trucking between the two centers mentioned and gives some examples of the price charged for the work with different classes of goods.

Twice A Week Truck Service from Boston to New York, pages 15 and 16, March 15, 1918. This article tells of the service installed by one company operating two trucks each week from each end of the route between Boston and New York. It gives the rates charged and the methods of operation.

Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton, pages 5 to 9, April 1, 1918. This article tells how the Ohio Freight Delivery Co., Cleveland, Ohio, serves Sandusky, Akron and Canton. A cost estimate for one of the 3½-ton trucks in operation is given, together with the rate chart of the company.

How to Organize A Motor Truck Company for Overland Haulage, pages 5 to 7, April 15, 1918. This article recommends a complete plan which may be followed in the organization of a company for hauling overland.

Some Actual Mileage, Average Speed and Oil and Gasoline Consumption Figures on Goodyear Overland Trucks, page 9, April 15, 1918. This article tells of some of the results of trips made by the Goodyear trucks.

Route Cards for Drivers of Trucks in Overland Hauls Save Delays on the Way, page 11, April 15, 1918. This article describes the route cards introduced by the Highway Transport Committee for driving army trucks overland.

Day Rates for Overland Haul Trucks in Buffalo, page 25, April 15, 1918. This article tells a little of what Buffalo did to help relieve railroad congestion by introducing trucks. It also gives some rates per hour for hauling material as given by the J. F. Kulp & Sons Co., Buffalo, N. Y.

Trucks Give Express Service Between Cleveland and Akron, pages 5 to 9, July 1, 1918. This article tells how the Knutsen Motor Trucking Co., Cleveland, Ohio, has found it more practical to haul by truck between Cleveland and Akron. That company operates mostly on a contract basis.

Return Loads Responsible for Success of Hartford Trucking Company, pages 5 to 9, July 15, 1918, tells how the Hartford Despatch & Trucking Co. grew in the past five years through the efficient operation of its trucks. These trucks run between Hartford and Springfield, Mass.

Reliability and Quick Delivery Insure Success of Kansas City Truck Transfer Co., pages 25 to 27, August 15, 1918. The Suburban Motor Transfer Co., Kansas City, Mo., operates its trucks daily to points within a 25-mile radius, delivering milk, livestock, etc.

Trucks Assist Railroads Hanling Goods Between Cleveland and Akron, pages 5 to 9, August 15, 1919. This article tells the story of the Cleveland, Akron & Canton Transfer Co., Akron, Ohio, and how it operates its trucks on regular schedule between Cleveland, Akron and Canton.

Seven Trucks Replace Seventeen Horses Hauling Express Matter from Newark to New York, pages 23 to 25, September 1, 1918. Lueddeke's Newark and New York Express Co., Newark, N. J., operates trucks on an hourly schedule daily up to 12 a. m., between Newark and New York, a 12-mile stretch.

Cleveland Truck Company Delivers Steel, Meat and Groceries When Railroads Fail, pages 16 to 19, September 1, 1918. This article tells of the service which the Highways Motor Transport Co., Cleveland, Ohio, is giving between Conneaut, 65 miles distant on the east and Sandusky, 55 miles west of Cleveland and intermediate points on both routes.

Detroit Truck Owned Finds Success by Developing Motor Line in Poorly Served Territory, pages 47 and 49, November 1, 1918. This story gives an estimated daily cost of operation of a 3½-ton Acason.

Reo Company Operates an Overland Haulage Line to Get Incoming Goods from Detroit, pages 21 to 23, March 1, 1919. This article gives the daily costs of a Reo 2-ton truck.

Trucks Haul Hogs from Fort Worth Stockyards to Farm for Fattening and Resale, pages 19 to 21, April 1, 1919. This is a story of how underweight hogs were hauled to and from the stockyards and how the food on which they were fed was hauled from nearby camps by means of motor trucks.

Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections, pages 16 to 19, April 1, 1919. This article points out the advantages of hauling livestock by truck and tells of the experiences of several overland trucking companies.

Trucks Plus Good Roads Move Crops Both Quickly and Economically, pages 5 to 9, May 15, 1919. A story on how grain was moved in the Sacramento Valley by motor trucks.

Livestock Haulage to Omaha Shows How Fleets of Trucks May Be Used Economically, pages 21 to 24, June 15, 1919. As the title suggests, this is a story on the Omaha stockyards and how the trucks are used to bring the livestock into the yards.

Farmers Get Benefits of Fleet-Owners Service Through Co-Operative Truck Line, pages 5 to 9, June 15, 1919. Advantages of co-operative rural motor truck express are pointed out in this article.

Detroit Public Haulage Men Increase Profits By Giving Surplus Work to Asso-

ciates, pages 12 to 14, July 1, 1919. The story of the work of the Detroit Transportation Assn. is told in this article.

Taking up the principles involved in your questions, the following information may prove of value to you as answers to the questions in the order given:

1—It has been found the best plan to begin the operation of a motor freight line with only sufficient trucks to handle the business which has been pledged before the line is started and to add trucks to the fleet as the volume of business increases. It is considered more advisable to start on a small scale and then expand, than to obtain and put into service a large fleet of trucks carrying partial loads.

2—Wherever possible, motor truck freight lines should be operated over improved highways. As soon as the trucks get off the main line roads, they are liable to get into all sorts of difficulties with the result that the schedules are delayed and customers become dissatisfied. On account of the fact that the goods can be moved more economically per unit in large capacity trucks than in small ones, the 5-ton truck has proved most popular in motor truck line work. Smaller trucks may be used when the roads are not passable for 5-tonners.

3—Some form of closed body has been found most desirable for overland haulage work. While stake bodies are used in some instances and tarpaulins employed to cover the goods in inclement weather, the consensus of opinion among operators of such lines is for a body with a permanent top. As large a body as possible should be fitted according to the size of truck, so that when a bulky load is carried the weight of the load may be as near the truck capacity as possible. Rates for bulky goods are determined on the cubic foot instead of the 100-lb. basis.

4—The cost per commercial ton-mile varies according to different installations and no figure can be given which will cover all cases. The cost per ton-mile may vary from 10 cents to 70 cents depending upon the size of the truck, the mileage covered, the tonnage handled and the ratio of the tonnage handled to the maximum tonnage which could be moved if full loads were carried in both directions of every trip. The method and reasons for figuring commercial ton-mileage were very clearly explained and illustrated on pages 20 to 23 of The Commercial Vehicle for August 1, 1919, and again on pages 44 and 45 of the August 15, 1919 issue.

5—The number of miles covered per truck per day also depends on the particular installation. The articles above referred to show the operation of motor trucks on routes from 30 miles long to 250 miles long one way. The average speed with 5-ton trucks over improved roads varies from 10 to 12 miles an hour.

Coal Bodies Which Are Raised Vertically

To the Editor, Commercial Vehicle:

On page 22 of The Commercial Vehicle for July 15, 1919, we noticed an illustration of a dumping body mounted on a coal truck. We are looking for another type of coal body which may be described somewhat as follows:

The body must go under an 8 ft. tipple; it must raise up high enough in the air so that a chute can be placed directly in the center of the body of the bed and coal sent through the opening into cellars. In other words, such a chute arrangement requires that the body be made something like a gondola car with a drop bottom.

Will you please tell us what concerns make such a type of body and give us the names of any concerns now employing such bodies on their motor trucks.—L. B. Brockett, Youngstown, Ohio.

Such a body as you inquired about was illustrated in the advertisement of the Acme Motor Truck Co. on page 64 of The Commercial Vehicle for July 15, 1919. The truck is operated by the Edison Lamp Works of the General Electric Co. at Harrison, N. J. The body shown was manufactured by the Thomas Wright Co., Jersey City, N. J.

The Myers Machine Co., Sheboygan, Wis., maker of the Wisconsin line of motor trucks, now offers a somewhat similar type of elevating body for use on its 5-ton chassis. The Myers' body and its method of operation were described and illustrated on page 26 of The Commercial Vehicle for September 1, 1917.

Suggested Service Tests Before Buying Trucks

To the Editor, Commercial Vehicle:

Will you kindly answer in your Fleet Owners' Forum Department the following inquiry: "A is about to purchase two 3½ ton trucks with dump bodies. What do you consider is a fair test to which these trucks should be put before they are finally accepted? I should think that these trucks should be put through as severe a test as possible in order to subject every part."—W. A. C. O. W., Winnipeg, Canada.

We might outline two tests to which the trucks might be subjected, these tests varying according to whether the trucks are new or are to be bought second hand.

If the trucks are new there is a certain amount of study which should be put upon their specifications even before a decision to purchase is made. The average construction including price, horsepower, fuel feed, clutch type, gearset type, final drive, wheelbase, frame, tires, radiator core and case design, water circulation, ignition, spark advance and electric system of all 3½-ton trucks offered on the 1919 market were given on page 9 of The Commercial Vehicle for November 1, 1918. The average price at that time of all 3½-ton trucks offered on the 1919 market was $3,904.

You should check the specifications of the truck in mind with those average figures and find out in what respects they differ. If the price of the truck considered is much in excess of the average price, we would suggest a study of the specifications to determine the reason for the higher price. The next step would be to look over the actual chassis very carefully in order to determine whether the various units installed appear to be well balanced. The next step is to determine the ease with which spare parts for replacements can be obtained. After this thorough analysis on paper and on the chassis as an inanimate object, an actual operating test might be carried out.

In this it would seem that a good plan would be to load the truck to its full capacity and then make it negotiate the hardest route over which it will be called upon to run in actual service. If it apparently performs the test to the entire satisfaction of the driver, it would seem that the trucks should be purchased. Then the work is only started because the real success in truck operation depends not so much upon the truck initially selected as upon the operating and maintenance methods employed after it has been put into service. As told in the series of articles giving the eight big items in motor truck operation as appearing in The Commercial Vehicle from April 15, 1919, to August 15, 1919, the average yearly cost of operation and maintenance is approximately equal to the initial cost of the truck. When this is considered it is seen that the initial price paid does not have such a large influence over the life of the truck as at first might seem apparent.

If the trucks are to be bought second-hand an entirely different course should be followed to insure against buying a truck which will later on prove a white elephant on the hands of the purchaser.

Engine bearings of used trucks should be inspected carefully by opening up the crankcase handholes. Then the clutch should be tested, followed by the gearset with taking off the cover of the gearset housing and finally inspecting the rear axle if the truck has an inclosed form of drive. Many second-hand dealers wishing to dispose of trucks with worn axle parts resort to the practice of filling the axle housing with a combination of grease and ground cork which makes the operation of the axle parts noiseless until the cork particles become caked, at which time the buyer finds that he has to renew many of the axle parts. All spring bolts and shackles, steering gear bushings and the like should be examined for wear and practically every part should be gone over in so far as practicable.

Portland Mechanics May Go on Strike

State License Examination to Blame for Formation of Union and Unrest

Portland, Ore., Oct. 24.—Mechanics in the local automotive field have formed a union and have presented a proposed agreement to the truck owners and others hiring mechanics calling for the closed shop; a new wage scale; a 44-hr. week with half holiday on Saturday and no Sunday work under any circumstances, and the division of all mechanics into four general classes.

Behind their demands looms the $5 examination fee for mechanics imposed by the last legislature in the law creating a state board of mechanics' examiners, and requiring that any mechanic working for hire on a truck must first have passed an examination and received a certificate that he is a qualified mechanic. The mechanics object strenuously to this fee. The real objection appears to be more against any examination at all and the accompanying possibility of being reduced in expert rating, than against the fee. At present, the law is tied up by injunction proceedings brought in the courts by a mechanic.

David M. Ellis, business agent for the new union, claims 700 members and that it will soon be statewide in scope. In substance, the agreement presented by the union provides that 8 hrs. shall constitute a day's work in 9 consecutive hrs., except on Saturday, when work shall stop at noon, making a 44-hr. week; overtime to be paid at time and one-half for the first 2 hrs. and double time thereafter, except on Saturday, when overtime shall be paid at double time. Double time is to be paid on all holidays, but no work may be done on Sunday or Labor Day.

New men are to have 2 weeks to familiarize themselves with new trucks, and if at the end of that time their work is satisfactory, they shall be paid the scale. The union would absolutely control employment of new men through the provision that all help shall be hired through the office of the local, except where it cannot furnish such help, and that all help hired otherwise must be signed with the union within 48 hrs.

The wage scale does not differ greatly from wages now generally paid, some shops even paying above the proposed scale, which is: Machinists, $1 per hr.; journeymen mechanics, 87½ cents per hr.; helpers, 50 cents per hr. This classification once accepted, it is claimed, would offset any other classification which might be made as a result of examinations under the mechanics' law.

Oneida to Build Electric Truck

GREEN BAY, WIS., Oct. 26—The Oneida Motor Truck Co. will add an electric truck to its line of gasoline trucks. At present, the Oneida line includes five different models of gasoline trucks, ranging from 1¾- to 5-ton capacity. It was felt, however, that in order to give the prospective truck buyer the widest possible selection of motor truck types, that the electric-driven truck would give the best answer to the short-haul demands, and so it was added.

Want Owners' Co-operation

CHICAGO, Oct. 20—A proposed plan for the exchange of information between truck engineers and fleet owners was perfected at the annual dinner of the Motor Truck Owners' Assn., held recently. The next meeting will be held the latter part of November and every 2 months thereafter. Different units of the trucks will be discussed at each meeting, the first being the truck engine.

The plan provides for getting the truck engineers and fleet operators together in joint meetings. The fleet owners know a great deal about the shortcomings of the present truck and wherein it could be improved. They possess comprehensive data of a broad character which would be of great value to designing engineers, as ordinarily the latter have not the opportunity to observe the performance of large fleets under different operating conditions. The engineers, in addition, could give advice that would do away with much of the trouble that fleet operators have had. The latter may be directing their efforts in the wrong path, not knowing the requirements for certain kinds of operation.

New officers of the association for the ensuing year are: President, O. W. Lehmann;; vice-president, G. W. Whittle; second vice-president, A. H. Hollander; secretary, P. H. Theurer; and treasurer, H. Paulman.

N.J. and Pa. Clash on Reciprocity

15-Day Period Does Not Apply to Motor Trucks in Pa.—New Jersey Retaliates

Trenton, N. J., Oct. 27.—New Jersey and Pennsylvania have clashed again and are deadlocked over the reciprocity features of the motor vehicle laws of the two states, especially as they concern owners and drivers of motor trucks. It has always been the custom to include in the reciprocity privileges, motor vehicles of all classes, the 15-day period being allowed in both states. Recently the Pennsylvania Legislature enacted a law providing that motor vehicle reciprocity shall no longer apply to commercial vehicles owned by foreign corporations or individuals and used in the State of Pennsylvania more frequently than one round trip in any one week, nor to the operator thereof.

Motor Vehicle Commissioner W. L. Dill has had his attention called to the matter by an increasing volume of complaints from New Jersey owners of trucks that their vehicles were being held up in Pennsylvania and their drivers fined and compelled to take out a Pennsylvania registration and license card, though they were operating well within the 15 days' reciprocity privilege that was generally supposed to be in force.

As a result, Mr. Dill has resolved to treat Pennsylvania-owned trucks visiting New Jersey the same as the New Jersey trucks are treated in Pennsylvania. This will be accomplished by an active campaign, which is already under way, against all Pennsylvania-owned trucks that come into New Jersey at any point on the dividing line between the two states. The drivers will be given an opportunity to comply with the order without subjecting them to arrest, and only upon their refusal to comply with the law will the latter course be taken.

Dyer Theft Bill a Law

WASHINGTON, Oct. 27—The Dyer bill, which provides severe penalties for the transportation of stolen trucks from one state to another, became a law Oct. 24. The bill was presented to the President Oct. 14, and without his signature automatically went into effect Oct. 24.

Oregon Apples Hauled by Trucks

Horse Wagons a Minor Factor in Fruit Shipments to Loading Stations

Portland, Ore., Oct. 25.—The motor truck has revolutionized methods of transporting apples in the famous Hood River Valley of Oregon, whose apples are known the world over. Of the 2,000,000 boxes of commercially picked fruit harvested this season, not more than 100,000 boxes were hauled from packing houses to shipping station by the old method of horse wagons. Motor trucks have made short work of apple hauling.

It is rare nowadays for a grower with large acreage not to have his own motor trucks. Truck sales in the town of Hood River to apple growers in the past season fell just short of 100 trucks. And besides this, many orchardists, buying new passenger cars, instead of trading in their old cars, have converted them into serviceable trucks. In a single line at the receiving station of the Apple Growers' Assn. the other day were nineteen different makes of trucks, ranging from a Ford to a Mack.

Motor truck transportation not only is the most convenient and quickest way of moving the valley's apple crop but orchardists declare emphatically it is also the safest. The trucks have good springs and no bruised fruit results from the journey into town. In former years, shippers included in their harvest instructions specifications for springs to be used under wagon racks. The horse-drawn wagon, however, is so little used at present that the paragraph of instructions pertaining to springs has become obsolete and has been dropped.

Motor trucks equipped with dump bodies are a big aid in the marketing of cull and canning apples. With boxes short and difficult to obtain, the delivery of the cull stock in the loose state helps with the box shortage. With boxes and burlap bags selling at a high price, dump bodies on trucks work a big economy for the apple growers.

Truck Makers Allotted Space

NEW YORK CITY, Oct. 15—The following makes of trucks will be exhibited at the New York City and Chicago shows, to be held respectively Jan. 3-10 in the 8th Coast Artillery Armory in the Bronx and Jan. 24-31 in the International Amphitheatre, near the stockyards:

At New York City

Pierce-Arrow; Packard; Dodge Brothers; I. H. C.; Federal; Garford; Kelly-Springfield; Reo; Maxwell; Bethlehem; Autocar; Paige; Velie; Denby; Stewart; Oldsmobile; Diamond-T; Commerce; Vim; Selden; Acme; Clyde; Kissel; Overland; Schlacht; Brockway; Atterbury; Maccar; Sanford, Dorris; Ward; Rainier; Koehler; Defiance; Fulton; Nelson; Union; Indiana; Acason, Ace, and C. T.

At Chicago

Pierce-Arrow; Packard; Nash; Dodge Brothers; I. H. C.; Federal; Garford; Reo; Maxwell; Bethlehem; Autocar; Paige; Denby; Stewart; Oldsmobile; Service; Diamond-T; Commerce; Vim; Selden; Acme; Clyde; Kissel; Overland; Atterbury; Maccar; Schacht; Dorris; Gramm-Bernstein; Armleder; Kalamazoo; Defiance; Fulton; Union; Gary; Acason; Ace; Dependable, and Indiana.

Good Road Approvals Are Increased

Approvals Up to Aug. 31 Cover 15,124 Miles of Roads—1636 Miles in Aug.

Washington, Oct. 24.—Up to and including Aug. 31, the Bureau of Public Roads has approved 1,583 road building projects, of which 826 have been executed. The approvals cover 15,124 miles of roads, whose estimated cost is $172,248,635, and the Federal aid allowance is $70,800,791. The agreements executed cover 6908.34 miles for which Federal aid was allowed to the amount of $32,069,204.81, on an estimated cost of $75,314,016.37.

Two hundred and twenty-six Federal Aid road projects and agreements were asked by the various states of the Union in July, involving 1636.3 miles, and costing $26,849,264.51, of which $9,814,599.31 will be paid by the Government under the Federal Aid Road Act. Two hundred and thirty-four projects were approved in August, involving 1944.4 miles, costing a total of $30,397,337.96, of which $12,362,585.99 will be paid by the Government.

Few Army Trucks to Be Sold

Not More Than 6000 Will Be Available If Congress Passes Pending Laws

Washington, Oct. 26. Not more than 6,000 motor trucks will be available as surplus if Congress passes the legislation now pending, which authorizes the transfer of War Department trucks to other Government bureaus. The United States army is now operating 20,908 motor trucks throughout the United States. Including these it has on hand 46,909 trucks, of which 2,827 are undesirables and non-standard and are to be disposed of; 8,668 are in dead storage and 14,506 form a declared surplus not yet disposed of. A total of 14,671 trucks has been turned over to other Government departments. According to tables of organization formulated Jan. 15, 1919, an army of 500,000 men such as contemplated by the general staff will require 23,026 trucks, including a 10 per cent reserve.

This means that the War Department has on hand, not including the unserviceable and non-standard trucks, 23,000, of which 3,000 will be needed by the Army; 14,000 will be turned over to Government departments if the legislation is passed, and 6,000 will remain as surplus unless they, too, are requisitioned by other Government bureaus.

Commerce Prices Increased

DETROIT, Oct. 23—All models of Commerce trucks will be increased in price starting Nov. 1. The 1- to 1½-ton model with solid tires is increased $90. The 1- to 1½-ton model with pneumatic tires is increased $100 and the 2-ton model with pneumatics is increased $70. The chassis prices, old and new, are as follows:

Tons Cap.		Old Price	New Price
1-1½	solid tires	$1,500	$1,590
1-1½	35x5 cord tires	1,625	1,725
1½-2	36x6 cord tires	1,895	1,965

There has been no advance in the list price of any of the various types of bodies marketed by the Commerce company, the increases being only those as noted on the chassis. These chassis increases, however, apply no matter what type or body is used. On and after Nov. 1, the 1919 cab tops furnished by the Commerce company will be sold at a list price of $65.

Getting Rid of Horses in the Grocery Business

(*Continued from page 243*)

semi-trailer, a driver does not have to wait for this loading, as it can be done while he is out on another delivery. A good example of the use of semi-trailers may be shown in the experience of the Atlantic & Pacific Tea Co. That company uses thirty-seven semi-trailers with twenty tractors. Its loading time has been cut down from 2 hrs. to 8 min. Trucks proved a failure because they were held idle 2 hrs. in loading Semi-trailers, loaded in advance, and coupled onto the tractors in 8 minutes have solved the problem. From eight to ten of these semi-trailers are usually in process of being loaded during the day, awaiting the return of the tractors from their first trips.

Unloading Conditions

6 Efficient unloading of the groceries is contingent upon placing the different orders in the truck body and also upon the proper unloading facilities at the point of delivery. The packages must be placed so that they may be unloaded in regular order, thus obviating the need of moving other packages in order to get at those desired. When a truck arrives at a store, there should be a hand truck on which to place the packages, thus eliminating extra trips back and forth between the truck and the store.

7 The design and location of the garage must next be considered in the installation of a fleet of trucks. With three to four trucks, such a fleet owner may house his trucks in some neighboring garage. Thought must be given, however, to cutting down the wasted mileage to and from the garage. This also applies to those who are planning the erection of their own garage. This should adjoin the warehouse, if possible, or form a part of it. In the conversion of a horse-driven fleet into a motor truck fleet, the grocer can often convert his horse stables into a garage. Attention should be paid to the lighting conditions and the elimination of the excessive number of roof columns frequently found in stables. A well designed garage should eliminate any waste of time in the morning when the trucks go out on their deliveries. There should be no maneuvering on account of columns, etc.

Some Maintenance Hints

8 Maintenance of trucks is dependent on the size of the fleet. The establishment of a service station is the result of a process of development in the size of the fleet. An example of this is shown by the experience of the American Food Co. All repairs on its two Packard trucks have been taken care of by the local service station. Next year, when its fleet will have been increased to six or seven, this repair work will be taken over by that company's own mechanics. A garage and machine shop is now being built for handling this work. From an economical point of view, an owner of three or four trucks may not find it worth while to maintain his own trucks. There might not be enough work to keep a mechanic or two busy all of the time. In a case of that kind, it would be better for him to have this work done in a local repair shop or service station. On the other hand, as the fleet grows to eight or ten trucks, he must consider taking care of such work as engine repairs, tire changes, etc. With a well equipped machine shop, the trucks can receive a yearly overhauling. This overhauling is practically a rebuilding, every part being inspected and new ones fitted if necessary. Though this overhauling takes from 2 to 3 weeks and keeps the truck out of service for that period of time, it is economical in the long run because it has been found that the trucks when in good repair very seldom break down during the rush periods, while a truck out of commission often disarranges the entire delivery scheme.

9 The best drivers of motor trucks in the grocery field are men who formerly drove the horse vehicles. Outside drivers, in most cases, prove a failure because they are not familiar with the conditions peculiar to grocery delivery. The first essential quality needed is that he be accustomed to the hard work and be familiar with the peculiarities of the grocery field.

Needs in Supervision

10 Truck supervision is governed according to the size of the fleet. Where a big fleet is split up into smaller ones located in widely separated cities, it is necessary to centralize the supervision so that a record may be kept of the cost of the operation and maintenance. An example of how this has been worked out may be shown in the experience of the Atlantic & Pacific Tea Co. That company operates 108 trucks in ten cities, located in territory extending from Chicago to Boston and from that city down to Baltimore. This centralization of supervision has been accomplished by the establishment of three main departments: (1) Transportation; (2) Truck Operation, and (3) Truck Maintenance. The first department supervises the purchasing of the trucks; the allocation of the trucks; cost records, and operation. The second department routes the trucks; schedules loads, and reduces loading time. The third department is in charge of the overhauling of the trucks; makes inspection of the trucks, and centralizes the repair work.

On the other hand, where the scope of a concern is centered in territory that will enable it to keep all of its trucks near the main headquarters, as in the case of the American Food Co., keeping track of the trucks is then a matter of personal supervision on the part of a traffic manager or a garage foreman.

Pa. Truck Users Must Carry Insurance

New Code of Rules and Regulations Demands Financial Responsibility

Harrisburg, Pa., Oct. 23.—Fleet owners engaged in public haulage in the State of Pennsylvania are affected by a new code of rules and regulations issued by the Public Service Commission and governing their operation. Truck owners must post rates for their vehicles. Schedules, rates and charges must be filed with the commission and all applicants and holders of certificates of public convenience must show their financial responsibility, or protection by liability and indemnity insurance fixed in each case by the commission.

Inspectors will be placed in Philadelphia and Pittsburgh, where they will be available for general service under the bureau of accidents and the bureau of public convenience.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

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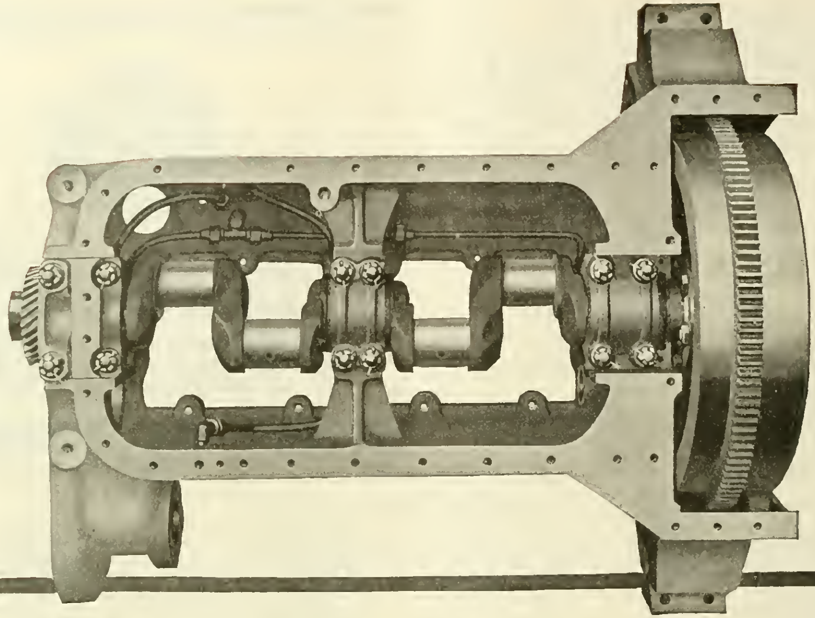

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This illustration tells its own story of simple, clean design.

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The
COMMERCIAL VEHICLE
Read by Fleet Owners
Vol. XXI Nov. 15, 1919 No. 8

Centralized Authority *and* Decentralized Supervision

Required for Nationwide Truck Operation

Truck Problems of the Wholesale Tobacco Industry and Their Solution

THERE are five big problems in national use of motor trucks in the tobacco industry. These five problems are told in the box on this page. How one large company in the industry, the American Tobacco Co., has solved them is told in this article. That company owns or controls seventy-four factories located in forty-nine cities throughout the United States. Practically every one of these factories is served by trucks. In most cases, the raw material is delivered to the factory by truck and similarly, the manufactured goods leave the factories in trucks on the first step of their journey to the consumer.

In any business organization there are two outstanding requirements which must be satisfied if that organization is to answer its purpose successfully. The first of these requirements is *efficiency,* and the second is *economy.* The five problems, as set down in the box on this page, must be solved satisfactorily if efficiency and economy in trade operation is to be obtained.

1—Organization of central and local staff to handle trucking operation and maintenance.
2—Centralization and decentralization of main trucking authority.
3—Organization of system of reports from local operators to local trucking representative and from latter to central truck authority.
4—Comparison of costs, in different cities, for contract work and owned equipment.
5—Centralization of trucking operations in each city.

It is the purpose of this article to illustrate of what those problems consisted and how they were solved by The American Tobacco Co. in a manner which should ensure the highest possible efficiency with the greatest possible economy.

The organization of the trucking department of the American Tobacco Co. rested first of all upon the centralization of authority. The work of organization was placed under the supervision of the traffic manager at the main office in New York. But because of the size and importance of the work involved, it was found necessary to allocate to it an efficient manager also, who should be in control of truck operation and maintenance and nothing else.

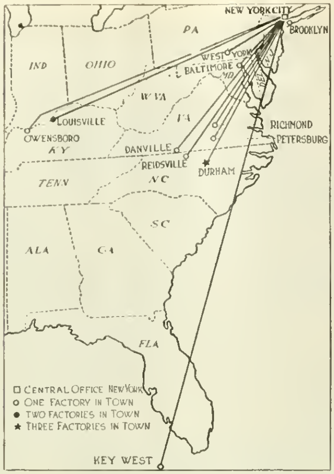
While working more or less under

the supervision of the traffic manager, the manager of the trucking department has sole charge of all trucking operations throughout the country. Upon him devolved the duty of appointing a local trucking representative in each city where the company's factories are located. This local trucking representative was then charged with the task of supplying the necessary trucks to handle the goods delivered to and shipped from each factory. It was his duty to arrange for the most economical contract which could be made with a local contractor under local trucking conditions. Having done so, he drew up the contract and submitted it to the manager of the trucking department at the main office for the latter's approval. Under this arrangement it was necessary for the manager of the trucking department to keep himself in close touch with conditions in each city where a factory was located. Through his knowledge of these conditions he was able to suggest, advise and keep a close check on the activities of all the local trucking representatives under his supervision.

On July 1st, 1919, the company decided to install its own trucks in each city where the local conditions and the size and output of the factory justified it. This work could only be done gradually because all contracts with local trucking contractors were on a yearly basis and many of these would not expire for some months. But where it could be done almost immediately, it was first necessary to install a local staff to handle the operation, maintenance and repair of the new fleet. The organization of this staff was handed over to the local trucking representative who was on the spot, but this work also came under the direct supervision of the manager of the trucking department.

Distribution of Authority

The local staff consists of one dispatcher or foreman, one mechanic and one overseer or runner for each factory fleet. The local trucking representative hires the necessary number of drivers and helpers and extra labor when required. In addition to this the local trucking representative suggests and assists in the selection and purchase of trucks for the company's fleet. But here again the final decision as to the ultimate purchase rests with the main New York office.



Map showing the cities and towns in which the American Tobacco Co. either operates its own fleets of trucks or has its haulage done by outside contractors. In either case, the truck operation is controlled from the main office in New York by means of the method told of in the accompanying article

Once the system had been organized in the manner outlined above, it became necessary first of all to centralize the authority for the general operation of the fleets, both hired and owned, into the hands of one man. This centralization of authority followed exactly the lines of the original organization. The authority for all trucking operations was placed in the hands of the manager of the trucking department but under the supervision of the traffic manager.

It next became necessary to decentralize the authority in a manner which would ensure a clear understanding of each man's duties and a direct and personal supervision of each detail of trucking operation and maintainance, while retaining the general supervision of the whole system. The system of decentralization of authority which was finally evolved and which is in force in the American Tobacco Co. at present, is as follows: The local trucking representatives in the different cities where factories were located are placed directly under the control of the manager of the trucking department at the main office.

During and after the installation of a new fleet, the local trucking representative was placed in charge of all trucking operation and maintenance for that fleet. Under his orders were, first, the dispatcher, or foreman, in charge of loading and routing the trucks; second, the mechanic in charge of the repair of the trucks and third, the overseer, or runner, whose duties take him onto the street to keep a general supervision over the trucks, wherever they may be working. The drivers and helpers are under the joint authority of the dispatcher, the overseer and the mechanic, acording to whether the trucks are at the factory, on the street or at the garage. The chart shown at the bottom of page 305 illustrates his method of delegation of authority.

The Report System

As long as the trucking for the American Tobacco Co. was handled by outside trucking contractors, a detailed and exhaustive system of reports was unnecessary. All contracts with outside contractors were made on a yearly basis in the first place. In the second, the system of charges for trucking was based on the number of hogsheads of leaf tobacco, or the actual number of 100 lbs. weight of manufactured tobacco or other material carried. Quotations were made per hogshead and per 100 lbs. and the company was charged by the contractor for the actual number of hogsheads or 100 lbs. weight of goods carried by the contractor's trucks. In no case were trucks hired outright, regardless of the amount of work they did. Therefore, once a contractor's terms were accepted and the contract signed for a year, it was merely necessary for the company to keep a careful check on the number of hogsheads received or dispatched and on the net weight of other goods received or dispatched. These figures were sufficent to enable it to check the contractor's charges. Where the company's trucking is still done by outside contractors, this system remains in vogue.

However, with the installation of company-owned fleets, it became necessary for the company to keep a careful check on the operation of those fleets, both from the point of view of efficiency and in order to insure the utmost economy in the operation and maintenance of each fleet. The simplest, most complete and most satisfactory method of insuring these ends is undoubtedly the report system. The American Tobacco Co. had a wide organization to supervise and the details to be supervised required certain modifications to suit the special requirements of the operations involved.

But the report system which the company finally organized and installed, covered each detail with sufficient minuteness ,and covered them all.

The basis of the report system is the driver's daily report. This is kept on a day card which is turned in each night by the driver of the truck concerned. On it the driver indicates the number of trips he has made during the day; the number of miles he covered; the number of hogsheads he carried; the net weight of each load of other material with the total of these; the gasoline his truck consumed; his hours in service and the time taken for each trip. This report is turned in to the dispatcher and checked up and O. K.d by him. It is then turned in to the local trucking representative. Another report is drawn up, showing the overhead garage expense and the amount chargeable to each truck.

Central Reports

From the data embodied in the above three classes of reports, the local trucking representative draws up his own monthly reports. The first of these is called the Detailed Motor Truck Report. It embodies on one sheet a daily report of one particular truck for the month, giving for each working day the odometer reading; the miles covered; the hours in service; the trips made or loads handled, and the weight in pounds of the material hauled. This last item is subdivided into leaf tobacco (hogsheads), manufactured goods, loose cartons of manufactured goods, and other material. All these columns are then totalled.

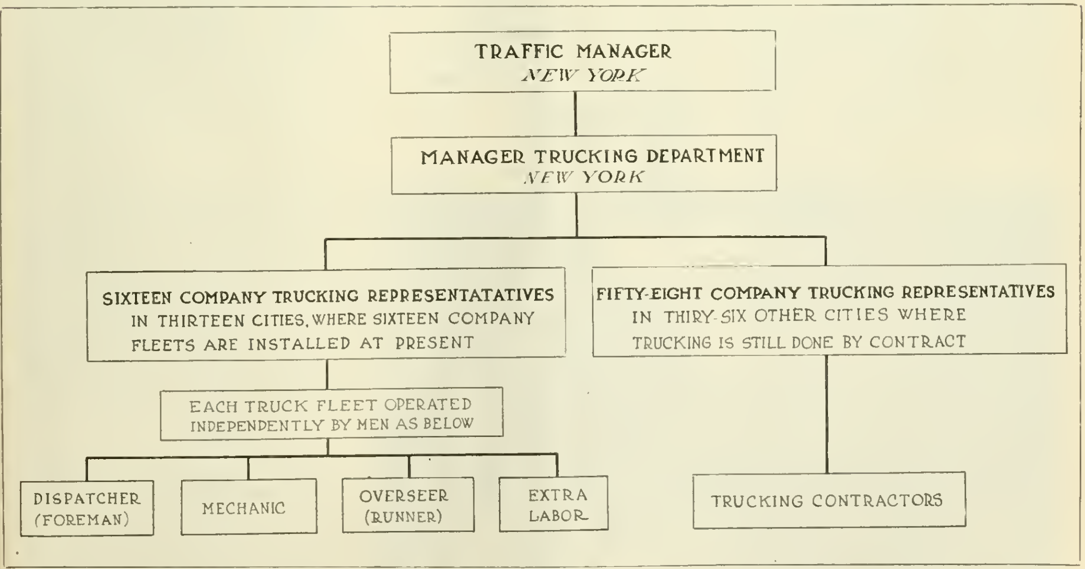
Local Reports

Next on the sheet appears a detailed expense report, stating the driver's daily pay and for the month, the grease, oil and gasoline used, and all other expense items directly chargeable to the truck, such as garage rent, depreciation, tires, insurance and so forth. Last appears a summary of that truck's operations for the month. In this are shown the total pounds hauled including all classes of goods; the miles per gallon of gasoline, the average miles covered per day; the average trips or loads per day; the average cost per mile; the average cost per hour and finally the exact average cost per 100 lbs. hauled. One of these reports is drawn up for each truck in the fleet and from these the local trucking representative makes up his final fleet report to the trucking department at the main office This last embodies all the items covered on the individual truck report except the daily items. But it includes the entire local fleet instead of only one truck.

The local trucking representative forwards these monthly reports on each truck and on the fleet to the manager of the trucking department at the main office in New York. The reports are turned in each month and filled in a large, loose-leaf binder at the main office. Through his knowledge of local conditions, the manager of the trucking department can then put his finger on any total cost which is too high. Then, through the detailed nature of the report, he can trace the increase back to the original item which caused it. Moreover, by comparing each report with that for the previous month, or for the same month in the previous year, he can keep a close check on the increased or decreased efficiency of a truck, of an employe, or of the entire fleet. He can also, in his turn, estimate the average costs, the comparative costs and the entire costs of all fleets under the company's control. Such an estimate is invaluable for the purpose of a final report to the heads of the firm, or to establish the advisability of installing additional company equipment in other cities.

Cutting costs—reducing operating and overhead expenses and charges—is the ever-present problem facing

(Continued on page 335)


TRAFFIC MANAGER
NEW YORK
MANAGER TRUCKING DEPARTMENT
NEW YORK
SIXTEEN COMPANY TRUCKING REPRESENTATATIVES IN THIRTEEN CITIES, WHERE SIXTEEN COMPANY FLEETS ARE INSTALLED AT PRESENT
FIFTY-EIGHT COMPANY TRUCKING REPRESENTATIVES IN THIRY-SIX OTHER CITIES WHERE TRUCKING IS STILL DONE BY CONTRACT
EACH TRUCK FLEET OPERATED INDEPENDENTLY BY MEN AS BELOW
DISPATCHER (FOREMAN)
MECHANIC
OVERSEER (RUNNER)
EXTRA LABOR
TRUCKING CONTRACTORS

The organization chart for the supervision of more than sixty trucks operated in forty-nine different cities by the American Tobacco Co. The weak point in the organization is that where there is more than one factory in a city a separate and independent fleet is operated from each plant instead of one local centralized authority. The American Tobacco Co. is, however, now working to centralize all trucking operations in any one city under one responsible head, as told in greater detail in the accompanying article

Every Fleet Owner Using Trucks With Timken Axles Should Read This Article.

METHODS OF ADJUSTMENT ON

Timken Worm Axles

When and How to Lubricate Same Axles on 1 to 3½-Ton Trucks Also Told by Charts

RUCK mechanics who have charge of vehicles fitted with Timken worm-driven axles should understand the proper lubrication and adjustment of the bearings in order to keep this important unit of truck construction in perfect running condition. This short article and the accompanying illustrations tell how these adjustments should be made on Timken axles Nos. 6456, 6551, 6552, 6550 and 6552, which are respectively fitted on 1-, 1½-, 2-, 3- and 3½-ton trucks.

The function of the bearings is of course to protect the moving parts, so that long and severe service takes its toll from the rollers. When this occurs a slight adjustment of the cups and cones brings the parts into the same relative position as when originally assembled.

The bearings mounted on either end of the worm shaft are set to allow a slight end play which is taken up by the expansion of the worm due to the heat generated while the truck is in operation. If this end play should become too great and cause excessive wear on the bearings, it may be overcome by means of adjusting the cup A at the front end of the worm as shown in Figure 1. This adjustment must be done in one particular way. First, the bolts marked C and D must be loosened. The next step is to remove the locking member marked D, and then turn the adjusting cup A towards the left (as the driver sits in the truck) until the end play is approximately .015 in

To adjust the differential bearings, the carrier must be removed from the housing. When this is done the cup bolt, marked F in Figures 2 and 3, and the lock G should be loosened. The adjusting ring E should then be turned until the proper adjustment is secured. It is important that any adjustment thus made should be done on the left hand bearing only. The right hand differential bearing should not be touched, as this would disturb the proper meshing of the worm and its gear.

It is also important that the rear wheel bearings be adjusted so that when the rim of the wheel is grasped at the top and bottom in a perpendicular line, a barely perceptible shake can be felt. It is also good practise to examine the wheel bearings in the hubs at least once every 5,000 miles and to see that they are properly adjusted and lubricated.

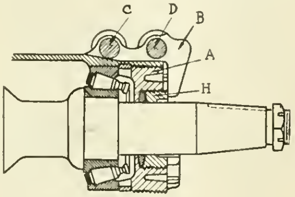


Figure 1

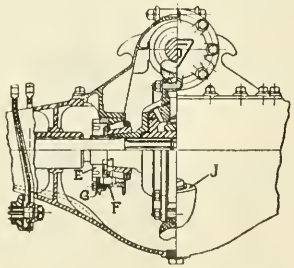


Figure 2

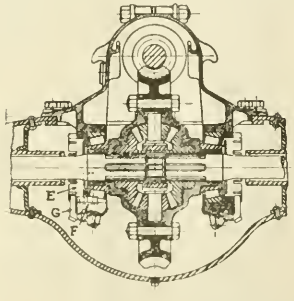


Figure 3

Lubrication of the axle parts is just as important as the proper adjustment of such parts. Wheel bearings in the hubs may be best lubricated by filling the hub full with a light grease free from acid and grit.

Occasionally an axle will leak oil at the forward end of the worm shaft. If this occurs, the leak may be stopped by tightening up on the packing gland marked H in Figure 1.

To lubricate the worm and the worm gear or wheel, the filler cap marked J in Figure 2 should be removed and lubricant poured into the housing until it reaches the level of the opening. Nothing except a good, high-grade oil, free from acid and grit and one that will stand a cold test of zero or below, should be employed. Any good oil which fulfils these conditions will prove satisfactory. It is a good plan occasionally to remove the drain plugs at the bottom of the housing and draw off the oil. During the first 2,000 miles of service, either with a new truck or after overhauling, the oil in the rear axle housing should be drained and a fresh supply put in every 1,000 miles. After 2,000 miles of service, it is only necessary to renew the oil at 5,000-mile intervals. Whenever this is done, the gearing should be thoroughly cleansed by running kerosene through the housing and over the gears to remove any heavy oil that does not readily drain off. In using kerosene for this cleaning operation, it is important that the kerosene be permitted to drain out entirely before the new supply of oil is admitted.

How to Make a WATERPROOF TRUCK BODY

Pictures on This Page Show Exactly How Wholesale Bottled Milk Concern Made Body Leakproof to Prevent Spring Breakage and Consequent Delays

NEEDING a leak-proof type of floor for its larger motor trucks used in transporting cases of iced bottled milk from its loading platform, 18 miles from Philadelphia, to that city, the Wawa Dairy Farms, wholesaler and retailer, has relied, with good results, on the ingenuity of its boss mechanic, William Brugman, to construct it. So successful has the experiment been, that this type of flooring has been placed in the bodies of three trucks and plans are under way to extend it to others.

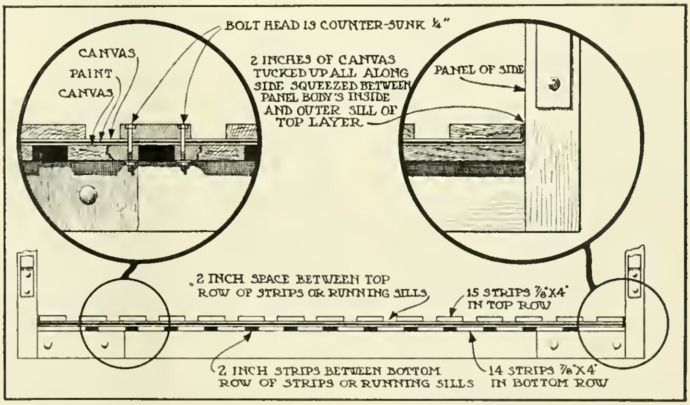
The need for the device was found in the constant dripping of icewater through the old type of flooring upon the center of the steel springs, causing them to break in a short time, with consequent delays and expensive replacements. It was a problem that demanded quick attention. While there was no salt from the seepage, as salt is not used in packing ice around cased milk, and no consequent corrosion of the springs, the continuous icewater baths, besides causing rust, made the metal exceedingly brittle.

The first truck experimented on was a 6-ton Packard. It was decided to rebuild the body to make it a panel type, 44 in. high, and enclosed on three sides only, the rear being left open. The body is 13 ft. long. Brugman took the chassis and placed eight new cross-sills on it, to insure strength, as the former ones, of course, had been in use. These cross-sills were like the original ones in every way, except that they were new.

Then, as the foundation of the actual floor of the new body, he laid lengthwise fourteen running sills, or strips, so that the two outer ones were tight against the sides of the panel body. These running-sills are ⅞ in. thick and 4 in. wide and are laid on 6 in. centers or with 2-inch spaces between.

Next, he put down a single layer of canvas, not too coarse in texture. This first layer he painted with a mixture of white lead of good quality, of the kind used to paint ship decks, and linseed oil, saturating the canvas thoroughly with it. Directly over this first layer of canvas, he laid another, similar layer, also coating this heavily, as in the first instance, with the same mixture. Altogether he used in the painting operation on this floor 25 lbs. of white lead and 8 qts. of linseed oil, rubbing

(Continued on page 341)


BOLT HEAD IS COUNTER-SUNK ¼"
CANVAS
PAINT
CANVAS
2 INCHES OF CANVAS TUCKED UP ALL ALONG SIDE SQUEEZED BETWEEN PANEL BODY'S INSIDE AND OUTER SILL OF TOP LAYER
PANEL OF SIDE
2 INCH SPACE BETWEEN TOP ROW OF STRIPS OR RUNNING SILLS
15 STRIPS ⅞"X4" IN TOP ROW
2 INCH STRIPS BETWEEN BOTTOM ROW OF STRIPS OR RUNNING SILLS
14 STRIPS ⅞"X4" IN BOTTOM ROW

Cross-secional view of the waterproof body, showing its exact construction, together with the sizes of the longitudinal strips and the method of staggering the top and bottom rows. Note the layer of canvas

End view of the waterproof body floor, as used by the Wawa dairy and showing the method of laying the top strips on top of the layer of canvas

Grease Cups Painted White Compel Driver's Attention

Ice Cream Manufacturer Finds Method Results in Better Truck Lubrication

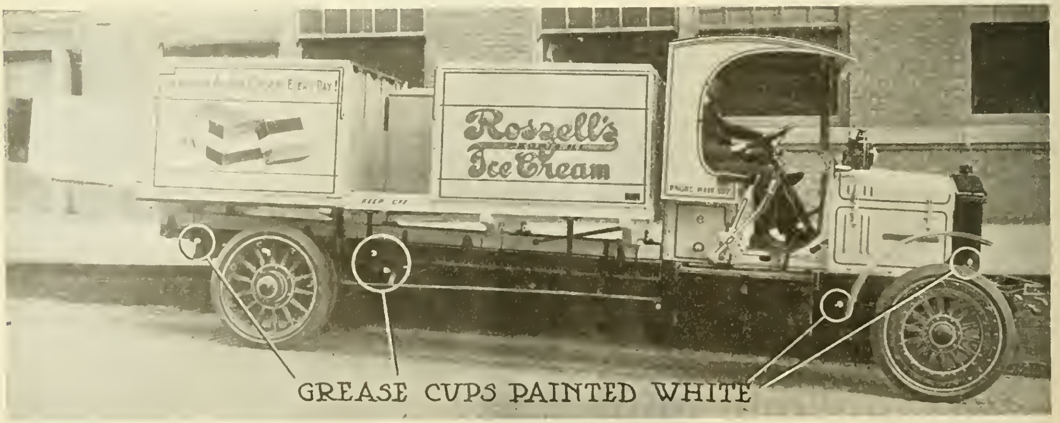
GREASE cups painted white have provided a good spring bolt and spring shackle lubrication for H. L. Roszell, superintendent in charge of seventeen trucks operated by the Roszell Ice Cream Co., Peoria, Ill. The Roszell company is one of the largest of its kind in Illinois, with the possible exception of concerns in Chicago. On account of the drippings of salty ice water from the ice used to keep the cans of ice cream cold, Mr. Roszell experienced a great deal of trouble with spring bolts and shackles. He finally hit upon the scheme of painting all of the spring grease cups white and this has proven very satisfactory. The white cups attract the attention of the driver and the shop mechanic, so that they are now turned up regularly, while in the past much of the trouble was due to the fact that the grease was allowed to get hard or the cups were not turned up often enough. The position of the cups on the front and rear springs of a Pierce-Arrow 2-tonner are shown in the illustration at the bottom of this page.

The prevention of drippings onto the truck chassis parts from the body when cans of ice cream are carried is another of the problems which every truck owner in the ice cream industry must solve. Mr. Roszell eliminated this corrosion of the metal parts by adopting a patent anti-rust design of body manufactured by the Myer Wagon Co., Buffalo, N. Y. That body is covered on the inside by thin copper sheeting which makes it water tight and prevents the drip from any of the buckets reaching any of the metal parts.

Helpers Reduce Delays

While the maintenance of the Roszell trucks will be treated of in a subsequent issue of THE COMMERCIAL VEHICLE, there are certain factors which affect the successful use of trucks in the ice cream industry that may be mentioned here. One of the first of these is the use of helpers on the trucks of 2-ton capacity and over. The fleet of the Roszell company at the present time is made up of five 2- and 3-ton Packards; one 2-ton Pierce-Arrow; three 1-ton Fords; three Ford roadsters for salesmen; one ¾-ton Reo, and one converted Hupmobile. All of the 2-ton trucks are fitted with the Myers type of body shown on this page. The body is made up into rectangular boxes with a transverse aisle between them. Each of the boxes is covered to help keep the ice from melting. As the cans of ice cream are lifted out of either compartment, they are set down on the floor of the aisle. If the bucket holding the can requires more ice, it is taken from a special compartment in the forward body box. With two or more helpers furnished on each truck, the driver or the head helper stands in the aisle, ices the buckets when necessary, and then hands them to the other helpers for the final delivery to the stores. Thus the head helper is able to get the orders ready while the driver is running his truck to the next stop. This eliminates more than half of the idle standing time of the truck and enables it to cover between 30 and 50 miles daily.

While each driver is held responsible for the condition and good appearance of his truck, he is not allowed to make any minor repairs or adjustments except in cases of emergency.



All the grease cups on this Pierce-Arrow are painted white so that they become so prominent that they are not forgotten by the driver when it comes time to turn them down to provide proper lubrication

How to Take Care of

Valves and Swash Plates on Gasoline Tank Trucks

SWASH plates and emergency valves are two of the most important parts of motor truck tank bodies requiring the careful supervision of the man in charge of truck maintenance because flaws or a disarrangement of either of these parts will greatly lessen the efficiency of the trucks. Moreover, both of these parts are peculiarly subject to the development of flaws.

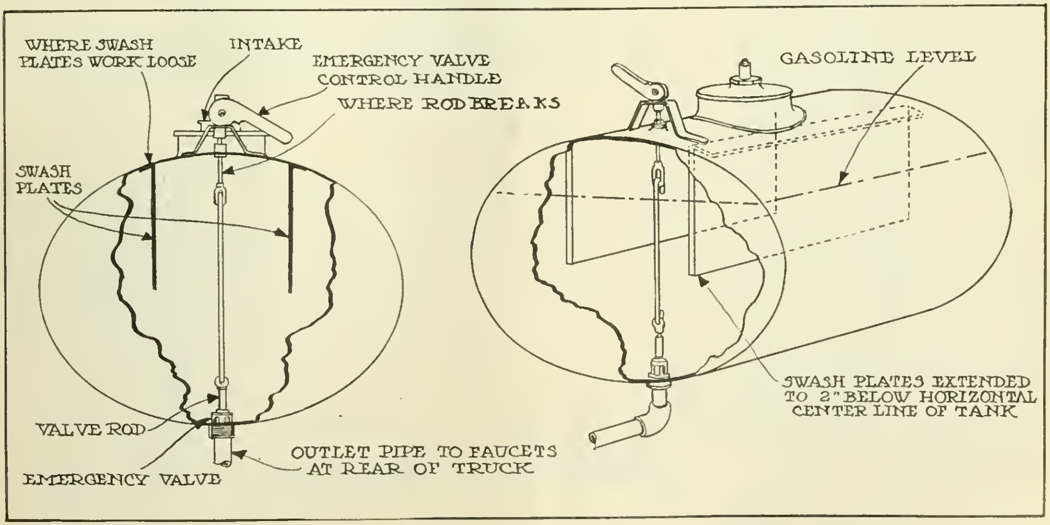
The Texas Co., one of the largest petroleum products distributing companies in the world, employs a number of tank trucks of various capacities for distributing gasoline and kerosene in bulk. The tanks on these trucks are elliptical in shape with the longer diameter horizontal. This arrangement lowers the center of gravity and reduces the lateral strain on the chassis caused by swaying while in transit. But this shape also tends to increase the side-to-side sweep of the liquid contents of the tank caused by the motion of the truck. Several tons of gasoline sweeping from side to side of a tank causes doubly destructive stresses, because intermittent, and so strains on the bands which encircle the tank and hold it in place and also on the chassis itself. These stresses and strains must be avoided as far as possible.

Therefore, in the interior of the tank itself, two parallel vertical plates running fore and aft are fastened to the upper interior surface of the tank so that they extend downward into the liquid contents. The gasoline or kerosene in its sweep from side to side comes up against first one and then the other of these plates and in each case the force of its sweep, is largely arrested.

Keeping Plates Tight

As a certain amount of intermittent strain is taken up by the swash plates, however, they tend to work loose. Once they are loose, not only do they cease to perform their function but their own lateral motion further strains their junction with the wall of the tank and tends to strain the latter itself. Therefore, these plates must be inspected and tested frequently through the intake manhole at the top. Whenever they are found even slightly loose, they must be tightened again immediately in order to avoid the rapid further loosening and resultant strain which will otherwise follow.

In addition to the faucets controlling the flow of oil on a tank truck, each compartment is fitted with an emergency valve in the outlet at the bottom. This valve is controlled by a rod running up through the tank and operated by the driver. The valves themselves are metal in metal seatings. Oil faucets tend to leak and drip even when self locking and the emergency valves have been installed as an additional safeguard against loss of the product in transit. The Texas Co. has found them highly efficient in answering the purpose for which they were designed. But the valves are subject to occasional breakage due to careless handling. Sometimes, too, the valve or seating will develop a flaw. Therefore these valves must also receive frequent and careful attention. If a breakage or flaw is discovered, the company immediately replaces the imperfect part, however slight the flaw may be, because the leakage saved will more than pay for the new part.


WHERE SWASH PLATES WORK LOOSE
INTAKE
EMERGENCY VALVE CONTROL HANDLE
WHERE ROD BREAKS
SWASH PLATES
VALVE ROD
EMERGENCY VALVE
OUTLET PIPE TO FAUCETS AT REAR OF TRUCK
GASOLINE LEVEL
SWASH PLATES EXTENDED TO 2" BELOW HORIZONTAL CENTER LINE OF TANK

At the left is an end view of a tank, showing the position of the swash plates. The emergency valve which controls the flow of oil from the tank is also shown. The valve rod connects the valve with the valve control above on the outside of the tank. Note the flexible nature of this connection. The view on the right shows the interior in perspective and illustrates the position of the swash plates in relation to the level of gasoline in the tank

Another Big Department Store Eliminates Sidewalk Loading

Narrow Annex to Main Store Gives Covered Loading Space—Gasoline Trucks Loaded on Street Level—Elevators Take Electric Trucks Down Three Floors to Combination Garage and Loading Platform

ANOTHER big New York department store has driven a nail into the coffin of sidewalk loading. The old fashioned method of loading trucks at the curb was entirely eliminated by Lord & Taylor in constructing their new building, and now Gimbel Bros. have practically completed their new annex for indoor loading. By November 15, 1919, the new installation will be in working order and sidewalk loading definitely and permanently eliminated from the system of that store.

The advantages of indoor loading are many. In the first place, there is a very considerable saving of time. Under the indoor system it is not necessary to transport roller boxes, or hand trucks and flat trucks, from the dispatching room to the street level and the curb, and therefore the time consumed in this journey and the not inconsiderable time wasted in waiting for elevators, is eliminated. A number of trucks may be waiting at the curb to be loaded, but the hand trucks down in the basement must wait for their turn at the elevators and this state of affairs leads to congestion, confusion, loss of time, and very often profanity and ill feeling among the employes.

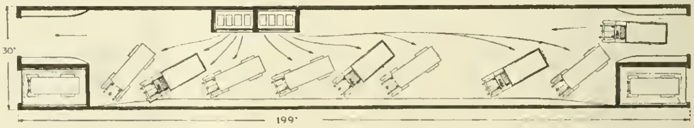
Much Labor Saved

Moreover, drivers and helpers occupied in loading their trucks indoors are working in quiet and orderly surroundings, instead of in a bedlam of honking horns, shouting drivers of other vehicles and a continual stream of pushing and protesting pedestrians. The human machine is a delicate mechanism and easily thrown out of gear momentarily, and no driver can work at his highest speed and highest efficiency under such conditions.

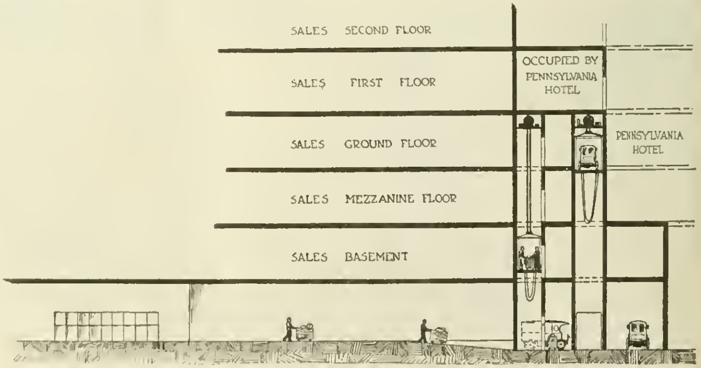
Secondly, the indoor system saves much of the labor necessary to load the trucks under outside loading conditions. Many men, or many trips of the same men, are required to transport the parcels to the trucks. But only one man is needed to transport the truck to the parcels, where the loading is done practically in the dispatching room.

In the third place indoor loading greatly decreases breakage, because under this system, the parcels are not carried so far; they are not handled so often and they are loaded under orderly conditions. Moreover, they are entirely protected from inclement weather; and the danger of theft—ever present and to be guarded against in sidewalk loading — is entirely eliminated.

Fourth and last, there is to be considered the psychological effect of sidewalk loading upon the store's customers. There can be no question that the customers of a big store are annoyed by having to wade through piles of parcels, dodge hurrying loaders and run the risk of being bumped into by loaded hand-trucks on approaching or leaving the store. After such an experience a customer is apt to enter the store prepared to find fault with everything in sight, or go away from the store with the firm determination to shop somewhere else in future and where she will not be subjected to such inconveniences. In addition to this, the observant customer



Plan view of the street level annex floor, showing the elevators at opposite ends for taking the electric trucks to and from the subbasement three floors below; the hamper elevators in the center and the manner in which the gasoline trucks are placed at an angle to the wall to provide a clear runway



Sectional view through the store and the annex, showing the sub-basement delivery room and the long runway along which the loaded hampers are pushed to the annex for direct loading into the electric trucks and to the elevators for loading into the gasoline trucks on the street level. The hamper and electric elevators are separate notices packages lying about in hand trucks, exposed to the weather and to possible theft. The psychological effect of this, often unconscious, is to plant in the customer's mind the apparent low valuation which the store itself seems to place on the goods it handles. It also inclines the customer to look for and complain about even the slightest damage which her own purchases, delivered by the store, may have received in course of transit.

Several Methods Used

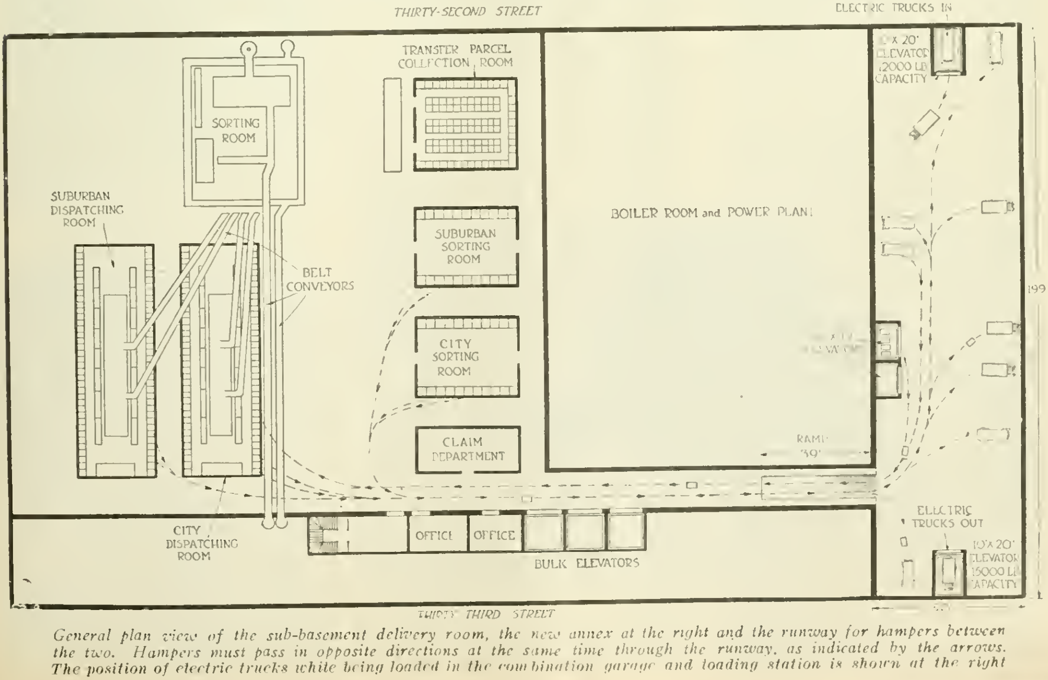
It would be amazing to consider the apparent reluctance of many department stores to install indoor loading if it were not for the difficulties which they have to face in finding floor space for the installation of the necessary equipment, loading platforms and ramps or elevators. Many of our big department stores were built in the old days of leisurely, 10-miles a day horse delivery, when the wagon was loaded once in the morning, in the street outside the store, and then disappeared for the day. In these establishments it is next to impossible, architecturally, to adapt the store to modern motor truck loading conditions. In some cases, such as in the Kaufmann and Rosenbaum stores in Pittsburgh, some of the disadvantages of sidewalk loading are eliminated because the loading is done in an alley adjacent to the store. In other cases, where department stores have been unable either to find space in their own establishments or to add an extension or annex, it has been found worth while to rent or buy a building some distance from the store, preferably where rents are lower. Here the indoor loading system is installed and to this building the entire sorting and dispatching system is transported. This method concentrates the entire delivery system in one building, but necessitates transporting all the parcels from the main store in the first place. The J. L. Hudson Co., Detroit, is a case in point.

In the case of Gimbel Bros., however, the indoor loading system has been installed at the main New York store itself and the problem of indoor loading solved in a manner which presents many interesting features and advantages. If it also presents one or two disadvantages, these could not be entirely overcome because of the nature of the building itself.

On and after November 15, all loading at Gimbel Bros.' New York store will be performed indoors in a new annex between the store and the Pennsylvania hotel just west of it. The new annex has been in course of construction for 3 years. This length of time has been partly due to strikes and to scarcity of labor during the war, and partly to the determination of the management to include every useful or time-saving feature possible in the completed loading floors. The annex is a three story building with three more stories below the street level. Of these six floors the upper two are occupied by the Pennsylvania Hotel, while the remaining four are to be occupied by Gimbel Bros. Of these remaining four, the uppermost, or ground floor, will be used for the indoor loading of the gasoline delivery trucks and night transfer trucks.

Gasoline Trucks Segregated

This floor runs straight through from Thirty-second Street to Thirty-third Street in one long narrow room, 198 ft. 10 in. long by 30 ft. wide. At the Thirty-second Street end there are two entrances, one leading directly into the elevator for electrics, as shown in one of the accompanying diagrams and the other leading straight into the loading floor itself and to be used by gaso-



General plan view of the sub-basement delivery room, the new annex at the right and the runway for hampers between the two. Hampers must pass in opposite directions at the same time through the runway, as indicated by the arrows. The position of electric trucks while being loaded in the combination garage and loading station is shown at the right line delivery trucks and night transfers. Owing to the narrowness of this floor the gasoline trucks will drive in and park against the left or western wall at an acute angle, so as to take up less room laterally. Half-way down the room on the eastern side nearest the store, two parcel elevators will bring up the parcels from the dispatching rooms three floors below in the sub-basement. These elevators are 12 ft. wide by 6 ft. deep and will accommodate four handtrucks side by side, four drivers and an operator. On arrival at the ground floor, the drivers will push the handtrucks to the tailboards of their respective delivery trucks and the parcels will be sorted for delivery during the loading process. After they have been loaded, the gasoline trucks will pass out into the street via the exit at the Thirty-third Street end of this floor, or at the opposite end from which they entered. Here also is an exit into the street from the elevator which is to bring up the electrics from below. The sketch of the ground floor on page 310 illustrates the layout of this loading room and indicates the exit and entrance for the gasoline trucks and the method of loading them.

The next floor below the ground floor in the annex connects with the store's mezzanine floor, which is also below the street level, and will be used for sales space. It has the same dimensions as the ground floor of the annex.

Below this again in the annex is another floor on the same level as the store's basement and connecting with it. This floor extends an additional 20 feet beneath the Pennsylvania Hotel and will be used either for sales space or for a bulky parcel packing room, a point not yet decided upon.

Electrics Loaded Below

The lowest floor in the annex, which is adjacent to the store's sub-basement, will be the loading room for electrics. This room also extends 20 ft. beyond the Pennsylvania Hotel, which gives it a floor space of 198 ft. 10 in. by 50 ft. as indicated in the sketch on page 311. This floor in the annex will be 5 ft. below the level of the store's sub-basement, allowing an additional 5 ft. of head room for the electrics, and will be connected with the store's sub-basement by a ramp 39 ft. long. The electric trucks on returning to the store will enter the elevator at the Thirty-second Street end of the annex. They will then be lowered in that elevator, which has a capacity of 12,000 lbs., to the sub-basement annex. Here they will be lined up, head to the wall and at right angles to it, along both sides of the room, except in front of the four elevators or the charging board on the right hand wall. They will be loaded at the rear from handtrucks. The drivers of the electrics will push these handtrucks from the dispatching and sorting rooms, along a passage in the sub-basement about 175 ft. long, and then down the ramp and into the sub-basement annex, as shown in the sketch on page 311. When loaded the electrics will proceed into the truck elevator at the Thirty-third Street end, which has a capacity of 15,000 lbs., and will be raised to the ground floor level and pass out directly into Thirty-third Street. Both Thirty-second and Thirty-third Street are "one way" streets, the former east, and the latter west, so that this method of entering on Thirty-second Street and passing out into Thirty-third Street obviates the necessity of making a detour on approaching or leaving the store.

Loading in Garage

The sub-basement annex will act as a garage as well as a loading floor for the electric trucks. When these trucks have finished work for the night, they will be lowered to this floor and garaged there. In this way they can be loaded in the late evening during the peak load period and so get away on their routes earlier in the morning. This sub-basement garage will be paved with cement and will drain toward the center. It will be equipped with high-pressure pipes for heating; taps and hose for washing down the cars and the floor; numerous electric lights, the wiring for which will be inside the ceiling and out of the way of possible damage, and a large Allen-Bradley charging board with sixty charging plugs.

The parcel elevators for carrying parcels up to the ground floor annex will also open into this sub-basement annex. The gasoline truck drivers will push their hand-trucks from the dispatching room along the same passage and down the same ramp and so into the parcel elevators, which will raise them to the ground floor annex as already described.

The two floors next above the sub-basement annex will be paved with wood and the ground floor annex with asphalt. This last will also have taps for hoses, electric lights with inside wiring and steam pipes, and will be drained to the center. But the gasoline trucks will be kept at the main garage.

Advantages and Disadvantages

The advantages of an indoor loading system have already been described and, within certain limits, Gimbel Bros.' new indoor loading floors will embrace all the good features of an efficient indoor loading system. The long, narrow shape of the two indoor loading floors has the advantage of eliminating pillars and so allowing practically every foot of the floor space to be utilized. The arrangement of exits and entrances for both classes of trucks not only saves an additional run in approaching and leaving the store, but obviates the necessity either of turning inside the loading room itself or of backing the trucks in or out. The use of the sub-basement annex as a garage as well as a loading floor for the electrics saves the run to and from the garage and means that during the peak load period the electric trucks can be started on their routes earlier in the morning by loading them the night before.

There are two possible disadvantages, which could not under the circumstances be avoided. The first of these is the long passage (about 175 ft.) from the dispatching room to the electric trucks and to the entrance to the parcel elevators, through which the drivers will have to push their handtrucks. This will entail a considerable loss of time, but, without entirely reconstructing the store's sub-basement, could not be avoided.

The second is the question of possible congestion of hand-trucks during the peak load period, either in the long, narrow passage from the dispatching room to the sub-basement annex, in and before the parcel elevators, while the electrics are being loaded from other handtrucks, or in the narrow ground floor annex, where the gasoline trucks will be loaded. However, Gimbel Bros. believe that this last problem can be partly circumvented by parking the gasoline trucks at an acute angle to the wall.

Moreover, as the drivers arrive at 6 in the morning and are loading steadily from that time on and getting away one at a time, the firm believes that there will be no great congestion of hand-trucks.

SNOW PLOW

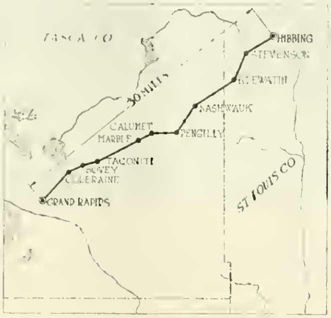
Helps to Maintain Bus Schedules

Where Trucks Run Over Country Roads Not Kept Cleared of Snow, Own Plow Is Only Salvation

MOTOR bus lines operating from city terminals out into the country territory where the roads are not cleared of snow in the winter, will find that it pays to provide their own snow plow equipment. This has been the experience of the Mesaba Transportation Co., Hibbing, Minn. When that company first started operation between Hibbing and Alice, a distance of two miles, it found that the heavy snows and cold weather during the winter of 1915-1916 proved at first an almost insurmountable obstacle. Some of the townships along the route refused to co-operate in helping to keep the highways open for traffic. After the buses had been held in the garage for an entire week because they could not get through on account of the deep snow, the company determined to break open its own road. A White 5-tonner, equipped with a steel plow attached to the front end of the frame was purchased. Since that pathfinder arrived on the job, little difficulty has been experienced in keeping the roads open at all times. This has enabled the Mesaba company to run its buses on a regular schedule.

Schedules Most Important

Keeping schedules is one of the first requisites towards the successful operation of a bus line. If the buses do not operate on schedule, the prospective passengers along the route grow dissatisfied with the service and will travel by electric trolley or steam train, if either of these means of communication is available. While the White 5-tonner with its plow was purchased expressly for keeping the roads open and represented a considerable investment for only a few months each year, it has not been allowed to stand idle during the summer months. Then, with its plow removed, the truck is employed to handle all sorts of supplies and carry on work of the Mesaba company which cannot be done economically by the buses. The White snow plow truck is equipped with a driver's cab completely inclosed, in order to protect the driver and his helper not alone from the cold but also from the fine snow dust set into motion during the plowing work. For operation at night, the inclosed cab is furnished with a large searchlight at the top just above the center of the built-in windshield. The plow in action is shown in the illustration at the bottom of this page.



Map showing the main 30-mile route covered by the eighten white buses operated by the Mesaba Transportation Co., between Hibbing and Grand Rapids.

The value of the snow plow is well shown by the fact that during the winter of 1917-18, which was one of the most severe in the history of Minnesota, the Mesaba buses maintained their regular schedule and were never more than ½ hr. late on any one trip. During the same winter, the trains on the railroads connecting the same chain of cities as served by the motor buses, were on several occasions snowed in for a period of from 3 to 7 days at a time.

When the Mesaba Transportation Co. first began operation in 1915, it ran two passenger car chassis fitted with special bus bodies. The continual service with long operating hours of from 18 to 20 hrs. daily, proved more than the passenger car chassis could stand. These vehicles were continually laid up, from time to time, for repairs, and the service to the community was thus interrupted. As a result, the company then purchased three 2¾-ton White

This is the White 5-ton truck with the snow plow which has enabled the bus company to keep the roads open on all of the routes, no matter how deep the snow

Two of the ¾-ton, eighteen-passenger White buses operated between Hibbing and Grand Rapids, Minn. Convertible bodies are employed. Pneumatic tires are used front and rear and a spare is carried at the rear. Note that the engine hood and radiator are protected by a cover for retaining some of the engine heat under the hood

buses, each with a seating capacity for eighteen passengers. When these two vehicles proved their reliability, the company extended its service to Nashwauk, a distance of 16 miles. As the business increased, the company continued to buy more trucks until at the present time eighteen buses in all are in operation. With the increase in the size of the truck fleet came an increase in the length of the route covered, and the territory was gradually enlarged until the buses served the towns of Leetonia, Stevenson, Keewatin, Pengilly, Calumet, Marble, Taconite, Bovey, Coleraine, and other places as far west as Grand Rapids, Minn.

Main Route 30 Miles

As shown by the map on page 313, the main route is 30 miles long, and has Hibbing and Grand Rapids as its terminal cities. The route between Hibbing and Nashwauk is 16 miles long. Five buses also run between Alice, Kitzville, Brooklyn, and Mahoning, a distance of 6 miles.

The ¾-ton buses are mounted on pneumatic tires both front and rear, while those of 2-ton capacity are fited with pneumatics in front and cushion tires in the rear. Each bus carries a spare pneumatic tire either on the side or at the rear, as shown in the illustration at the top of this page.

The use of pneumatic tires has provided very easy riding qualities almost equal to those of the average passenger car. It has also resulted in a decrease in the operating expenses and in mechanical repairs. The two White buses purchased in 1915 have already run over 225,000 miles in the first 3 years and have been thoroughly overhauled three times. The company feels that these two trucks are still good for at least 200,000 miles more.

All of the buses are electrically lighted and are equipped with special heating devices which draw fresh air from within sleeves fitted around the exhaust pipes from the engines. The bus bodies are of the convertible type with large glass side and rear end windows in sashes, which may be let down into the body sides during summer weather. The bodies on the ¾-tonners are large enough to carry eighteen passengers and those on the 2-tonners, twenty-two passengers. Each body is of the pay-as-you-enter type, operated on the one-man system in which the driver both operates the bus and collects the fares.

The Mesaba company maintains garages at both Hibbing and Grand Rapids, or at each end of the main route. While the maintenance of more than one garage may not be necessary for bus lines that operate entirely within a city, it is of greatest importance for lines running between cities. Some of the buses remain overnight at one end of the route and others in the garage at the other end. This increases the cost of the bus maintenance but is of great help in maintaining schedules. If any bus should require any minor repairs or adjustments, these are attended to at the nearest garage, so that the truck does not have to run back to its starting point before the work can be done. Mechanics are employed at both garages and all of the trucks are given a thorough inspection each night after the day's work is over. By this means, no small repairs are allowed to develop into serious ones which might adversely affect the running schedule by making it necessary to tie up the bus until all of the repairs were made. On the main route, the buses operate for a full 20 hours each day. They start out at 5:30 a. m. and run until 1:30 the following morning.

Early Experiences

Speaking of the early experiences of the Mesaba company, G. E. Wickman, Vice-President, said: "We purchased our first two Whites with a great deal of reluctance. We wanted to give our customers the best service possible, so we made a survey of several successful bus companies in various parts of the country. After this investigation, we found that cheap equipment would not prove an economy and so standardized on Whites. Our trucks have more than paid for themselves.

The degree of success which the Mesaba company has attained is shown by the fact that it has been able to increase the size of its fleet from two to eighteen trucks, notwithstanding the fact that there are railway connections between most of the towns served by the lines.

Advantage is taken of the window space in order to get the best of lighting facilities. The portable crane in the foreground is a handy device for carrying such heavy parts as springs, engines, etc.

Broken Springs and Bodies

Are Big Problems of Contractors

Overloads Cause of Greatest Wear and Tear—Making Own Parts Cuts Repair Cost

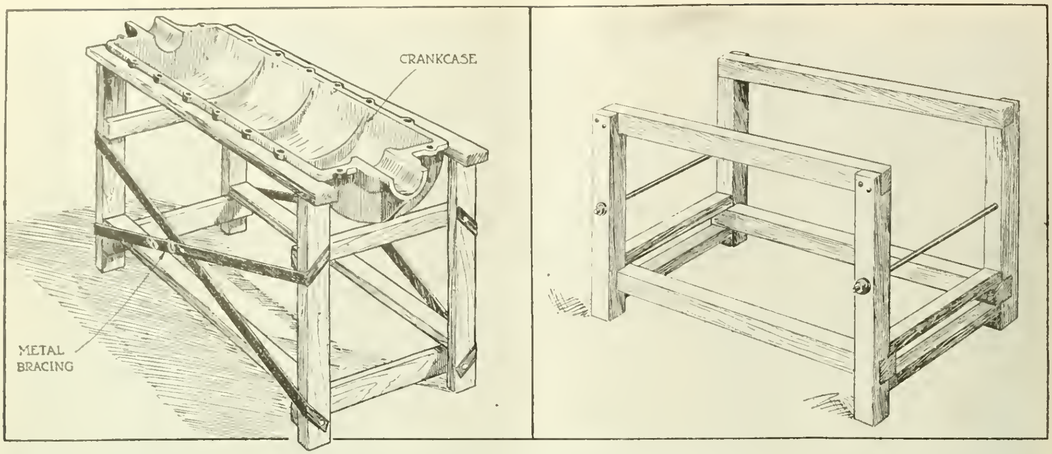
CONDITIONS under which trucks are operated in the contractor's field are such as to call for overloading in most cases. Because trucks will carry more than capacity loads, contractors as a class, overload them on the theory that they would rather get the work done quickly, even though the cost of truck repairs be high. Though this is common practice in the contractor's field, it is doubtful whether the time saved by overloading pays in the end, because of the large expense incurred in the repairing of the trucks. By using more trucks and cutting down the loads, the contractor would gain not only in repair expenses but also in keeping the trucks working the maximum time. A contractor using a fleet of trucks in the hauling of rock, ashes, etc., is often forced to maintain his vehicles under most severe operating conditions. It is manifest that a dump truck loaded with heavy rock is under a handicap, even when normally loaded. Overloading magnifies this handicap to such an extent that the vehicle is under almost constant repair, a costly operation.

A Complete set of parts is always on hand, their value being placed at $10,000.

Three Big Problems

Jacob Fradus, a large contractor in New York City, has eliminated much of the trouble incurred through this rough handling by reinforcing the truck chassis where the wear and tear is most likely to happen. Fradus handled the Pennsylvania Hotel work, and is still under contract for work on the subway extensions throughout the Metropolitan district. His trucks were the first to do cellar work in New York City, being run down into the excavation and then run out fully loaded.

There are three big maintenance problems that a contractor such as Fradus, has to solve. The first one is the elimination of broken frames caused by the vibration during the



A Useful Device in Engine Overhauling

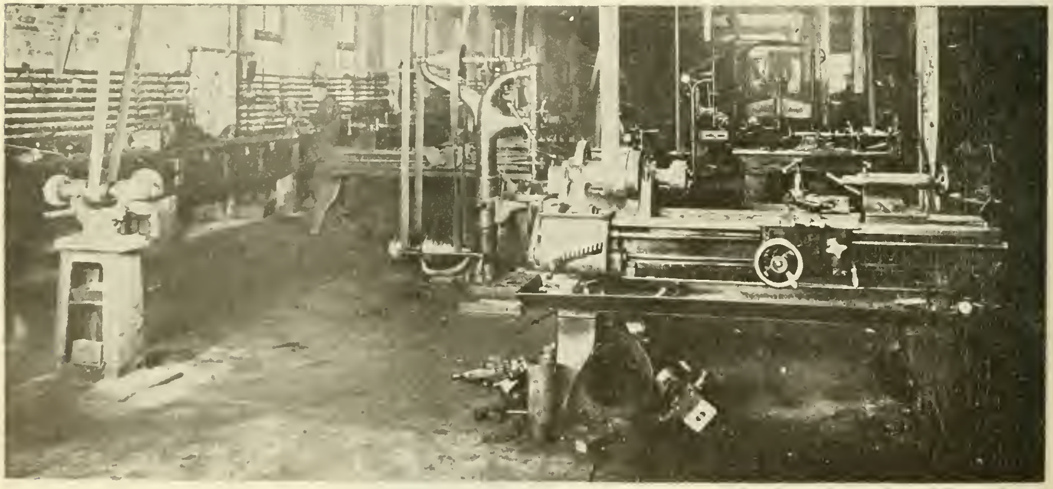
Much time is saved during the overhauling period by dropping the crankcase from the engine and then mount- lower halves of the main bearings, as well as on the crank- ing it on a separate wooden stand, where work on the case itself can be done while the rest of the engine is being attended to

Instead of tearing the engine down while in the truck frame, it is lifted bodily out of the frame and conveyed to this wooden stand where the mechanic is given the opportunity of working right in the machine shop where his tools are handy. The supporting arms of the engine rest on the side rails of the stand

unloading of the dump trucks. The usual practice when a truck is loaded with heavy rock is to back the truck against some obstruction to the rear wheels, thus expediting the dumping of the rock by giving it an additional momentum. By successive jamming of the rear wheels, the rock is completely dumped. It is manifest that this severe vibration is bound to have a deteriorating effect on the frame, resulting finally in a breakage. Fradus has solved this problem by reinforcing his frames with ½-in. angle iron, bolted and riveted to that member on the outside of both sides. This has necessitated lengthening the jackshaft ½-in. on each end.

The second problem is the elimination of spring breakages due to the excessive loads carried. The rear springs have been reinforced at the shackle ends by the addition of two extra leaves. These are long enough to cover the exposed part of the longest leaf at the shackle ends and to reinforce the springs sufficiently enough to eliminate breakage.

The third problem is the elimination of the body floor breakage due to the loading of tons of rock on it from the hoppers, sometimes 8 ft.



Fradus Does All of His Own Overhauling and Repairing

Four machinists work in the machine shop and six repairmen are used for work on the engines, transmissions and other heavy parts. The trucks are overhauled once a year being practically rebuilt. The machine shop equipment includes 12-, 14- and 20-in. swing lathes; a 16-in. shaper; a power hacksaw; emery wheel; 20-in. drill press; speed drill press, and an arbor press. This is a complete equipment for the Fradus fleet of thirty-two trucks

The Garage Is Designed for Quick Maneuvering of the Trucks

It is 85 ft. wide and 200 ft. deep, and of brick and concrete construction. The roof is supported by cross girders and columns. The latter run in two rows far the length of the garage, leaving ample room between the two rows for the trucks to run in and out of the garage. The columns are spaced 20 ft. apart, allowing room for parking two trucks between them. Ten skylights in the roof give excellent lighting facilities.

above the truck. Fradus has solved this problem by reinforcing the body floor with ⅜-in. steel plates.

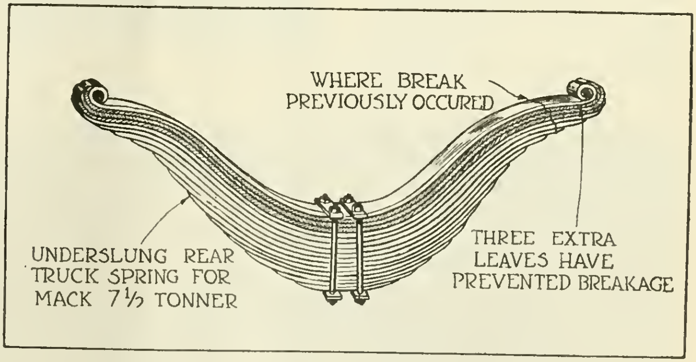
$10,000 of Parts on Hand

Fradus at first experienced much trouble through broken differential cases, due to overloading and the breaking of the jackshafts. These differential cases are reinforced by ribs, the fracture taking place at the base of the ribs. Instead of scrapping these parts when fractured, Fradus reinforced them by welding the place where the fracture occurred. Before this member is welded the male and female members are bolted together after the spider has been installed. A mandril is then run through the casing and tightened onto the case by two nuts. The reason for using a mandril in this work is to prevent a swaying of the part when it is heated.

The Fradus fleet consists of nine Mack 7-ton tractors and twenty-five 7½-ton Mack dump trucks. The maintenance of these vehicles is taken care of entirely in the Fradus garage, where there is a well-equipped machine shop and stockroom. The machine shop equipment consists of an emery wheel made by the Diamond Machine Co., Providence, R. I.; 16-in. shaper made by the Perkins Machine Co., Boston; a 14-in. swing lathe made by the Hendy Mfg. Co., Torrington, Conn.; a 20-in. swing lathe made by David W. Pond, Worcester, Mass.; a 12-in. swing lathe made by the South Bend Lathe Mfg. Co., South Bend, Ind.; a power hack-saw made by the Millers Falls Co., Millers Falls, Mass.; a 20-in. drill press; an arbor press made by W. E. & J. Barnes, Rockford, Ill., and an Excelsior speed drill press. A portable hand crane, made by the Dale Engine & Supply Co., Franklin, Pa., is used to carry heavy parts around the garage. The value of the parts on hand in the stockroom is placed at $10,000.

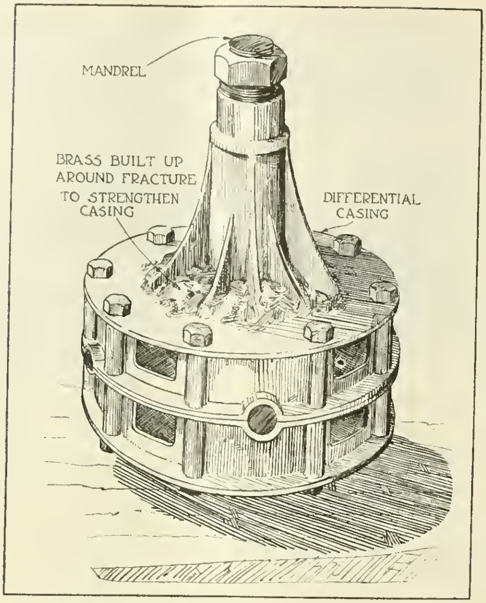
One of the peculiarities in the contractor's field is the fact that contracts will last for a period of years, subject to the original price set for the work. For instance, Fradus' contract for work on the New York City subway, was made 5 years ago when prices were low, as were the estimates. Prices for truck parts, wagons, etc., have been increased while the income from the work has not increased proportionately. As a result of these conditions, Fradus has had to cut down his expenses to the minimum in order to make a fair profit. He has elected to do his own repair work and to eliminate purchases of parts as much as possible in order to offset the rise in prices.

His machine shop personnel includes a foreman, four machinists, and six repairmen who work on the engines, transmissions and other heavy parts. Four mechanics are also on duty at night. One of the machinists supervises the work in the machine shop, subject to orders from the foreman. The latter is in charge of other work.


WHERE BREAK PREVIOUSLY OCCURED
UNDERSLUNG REAR TRUCK SPRING FOR MACK 7½ TONNER
THREE EXTRA LEAVES HAVE PREVENTED BREAKAGE

The Springs Are Reinforced with Extra Leaves

Breakage due to overloading of the trucks usually occurred near the shackle ends. As a result, the extra leaves were made long enough to reinforce that part of the spring where the breakage occurred



Differential Casing Strengthened

The overloading of the trucks cause a fracture in the end plates of the different casings. In order to eliminate this trouble, Fradus has reinforced this plate by welding the fracture and building up that section of the plate with brass. Before this work is started, a mandrel is placed in the casing so as to prevent swaying of the hub of the casing due to the heat during the welding process. This mandrel is held tight by means of a nut

The machinists play an important part in the functioning of the repair work. With their equipment they are able to make spring leaves, brake cones, etc. Fradus buys his spring steel and the machinists taper the ends and fit the leaves to the springs themselves. Molds have also been made for the brake cones, timing gears, pulleys, and pump impellers. Instead of scrapping these parts when they become worn, they are collected and sent to a neighboring foundry, where they are melted and made into the parts most needed. Fradus figures that he saves at least two-thirds of the cost of new parts. These parts are sent back from the foundry in the rough and are then machined at the garage.

Saving on New Parts

In the same manner, money is saved on the crankshaft bearings. Instead of scrapping the bearings when they are worn beyond their usefulness, the babbitt is scraped out and then melted, after which it is poured back again on the bearing shells. All roller and ball bearings are sent to a factory which makes a specialty of renewing these parts. When the cylinders become worn, they are sent to the Haupert Machine Co., Long Island City, N. Y., where they are reground and oversize pistons fitted.

At present, due to a slack period, the foreman in charge, F. W. Whitney, is supervising the complete overhauling of four trucks. These are being entirely rebuilt. All heating work is done by the aid of an oxy-acetylene outfit and a blacksmith shop, located in a small shed outside the building. Normally, two trucks are overhauled at one time, the time taken for this work being from 5 to 6 days. Each truck is supposed to last at least 1 yr., before being called in for overhauling. The work consists of tearing down the engine and the chassis, renewing worn parts, as well as repairing the body and the cab.

The drivers report daily any troubles that have occurred and these are taken care of by the four mechanics on the night shift. These men handle the small repairs only, the heavier repairs being carried over to the next day.

The trucks are inspected every Sunday for signs of wear and tear, and are then thoroughly greased. The drivers are responsible for the oiling of the engines every day. As these trucks are out on their work 16 hrs. at a time, their engines running most of the time, it is necessary to keep an extra supply of oil on the truck, so as to preclude the possibility of the oil supply running dry in the engine. The oil is carried in two 1-gal. cans on the oil filler side of the engine. The old oil is drained every week and is used for lubricating the driving chains.

A handy device for truing up the piston rod bearings has been installed in the machine shop. This device consists of a portable stand upon which one end of the crankshaft is mounted and a stationary holder bolted to the repair bench which holds the other end of the crankshaft. The crankshaft is held rigid in the latter holder by means of two bolts which tighten a wooden block over it. The connecting-rod bearings are then painted with Prussian blue and rotated on the crankshaft bearings to ascertain the wear, if any.

During the overhauling period when the engines are torn down, instead of working on them on the repair bench, the engines are placed on specially built stands. These stands are made up of 2 by 4's, bolted together and braced on either end by ½-in. metal strips. One stand is built so as to accommodate the complete engine. After it is placed on the stand, the crankcase is dropped and placed on another stand, especially built for the purpose. This plan permits splitting up of the engine work so that one man may work on the crankshaft, cylinders, etc. on one stand, and another on the crankcase. The latter work is done by the repairman operating the acetylene welding outfit, his particular duty being to take care of any fractures that may have occurred in that part.

Fradus uses six forms for keeping a record of his costs. The first is the driver's daily report, which gives a record of the particular piece of work the truck is on; the oil and fuel consumption; the number of trips; the time of arrival; the material handled; where the material is dumped; the time the driver left the dump, and a general summary, showing the amount of different materials hauled. A big feature of the driver's report is the space set aside for making a record of accidents.

The second form takes in the daily consumption of oil and gasoline of all the trucks; the third is a report handled by the time-keeper at the place where the trucks are working. The fourth form is an office record of the parts purchased and used. In the lower right-hand corner of this report, space is set aside for a summary of all the parts taken out of the stockroom.

The fifth form is a monthly record kept by the stockroom clerk, giving the date any part is taken out, the truck using it, and the signature of the driver. The sixth and last form allows for a daily summary of the work done by each truck, the fuel and oil consumption, the loads carried, the material hauled, and the mileage. All these forms will be reporduced in a subsequent issue of The Commercial Vehicle.

Goodyear Cushion Tires CUT REPAIR BILLS

May Be Used All Around on 1-Tonners and for Front Wheels of 1½-and 2-Ton Trucks

A CERTAIN manufacturer of rubber heels in an advertisement in a national magazine makes the statement that if the shocks that your system sustains in a month from the mere act of walking with leather heels on your shoes could be combined into one tremendous blow, not only would your every bone be crushed but you would be reduced to a jelly. Fortunately, the combination is not possible, but the statement does serve to emphasize what anyone or anything must undergo when it is shod with solid heels or solid tires.

A truck comes down the street, over car tracks, ruts in the paving, cobblestones. It is bumping and banging, clattering and jolting. A passenger car is just behind but not a noise can be heard from it. The difference lies in the way the two machines are shod. One is riding on solid rubber; the other is riding on air—rubber and air. Nor does the only difference lie in the noise and discomfort caused by the use of solid tires. The biggest difference is in the size of the repair bill at the end of the month.

For a long time the Scudders-Gale Grocery Co., St. Louis, Mo., used solids on its fleet of 2-ton Packards and 1½-ton Autocars. They were satisfied with their performance because they had never known any other kind of tire. But about six months ago, Mr. K. H. Meyer, superintendent of the fleet, heard of the Goodyear cushion tire, a tire which was neither solid nor pneumatic. It was called a cushion tire, was solid but with a difference. On the inside circumference of the tire runs a hollow ring channel 1½ inches deep.

Mr. Meyer, always ready and willing to give a new idea a fair tryout, put two of the tires on the front wheels of one of the Packards. The driver of the truck was the first one to comment on the change. He told Mr. Meyer that the truck was riding more like a touring car than a truck.

But a fleet superintendent looks more favorably on cutting costs than he does on the physical comfort of the drivers, so he waited for further proof of the advantage of the new tires over the old solid sort. It came at the end of the 3 months, during which the company runs its trucks without a general overhauling. The truck was sent to the shop and not only did it come out, ready for more work, in 2 days less time than usual, but the bill that came with it was $200 less than the usual bill.

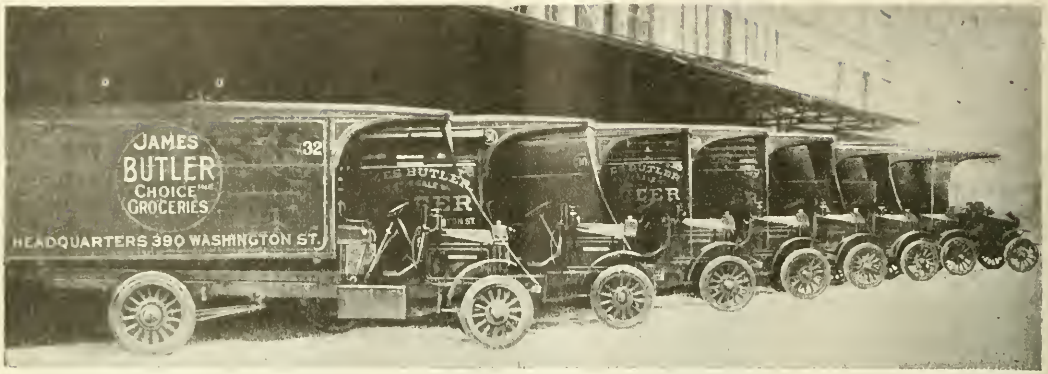
Showing how stones are absorbed by the Goodyear cushion tire

Mr. Meyer immediately admitted that the new tires had proved themselves, for they were the only change that had been made on the truck since the last time it had been overhauled, and thus could be the only cause for such a great lessening in repair bills.

He has found, however, that the cushion tires not only save on repair bills, but even last on the average of 100 per cent longer than solids. The original cost is 68 per cent higher, but this is more than saved by the longer life of the tire and the longer life of the machine, to say nothing of cutting down repair costs. The first set have run 16,000 miles and are still giving good service. Mr. Meyer says that he expected to get at least 24,000 miles out of each set.

The sizes in which the Goodyear tires are offered; the sizes of solid tires which they replace and their comparative cost with solids were published on pages 86 and 87 of THE COMMERCIAL VEHICLE for September 1, 1919.

A portion of the Scudders-Gale fleet of 2-ton Packards and Autocars. All of the front wheels of the Packards shown are equipped with Goodyear cushion tires. The Autocars have the cushion tires all around


JAMES BUTLER CHOICE GROCERIES
32
HEADQUARTERS 390 WASHINGTON ST.

Part of the James Butler fleet of sixty-two Pierce-Arrows, of which fifty-nine are large 5-tonners and three of 2-ton capacity. This standardized fleet delivers about 750 tons of foodstuffs daily to a chain of grocery and meat stores

COST OF OPERATION *OF*

5-Tonners in Wholesale Grocery Business

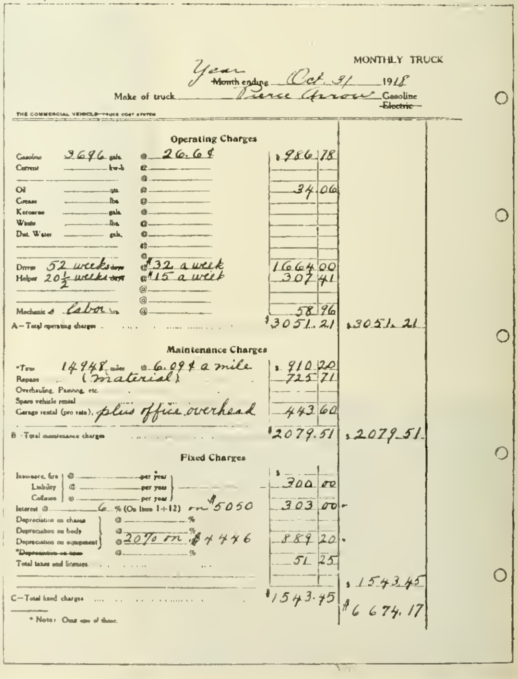
Standardized Fleet of 62 Pierce-Arrows Replaces 500 Horses and Delivers One-Third More Tonnage

THE operating records of the James Butler fleet show some interesting cost figures on the operation of 5-ton Pierce-Arrow trucks in the wholesale grocery business. For example, a typical set of cost figures for one of the 5-ton Pierce-Arrows shows a cost per day operated of $24.41 and a cost per mile run of 45 cents. Other figures on forty-two of the fleet of fifty-nine 5½-ton Pierce-Arrows as given in the table on the opposite page, show the average mileage per day to be 46.5; the average days in service per year to be 287 and the average miles per gallon of gasoline to be 3.3.

Of course, these figures are of little value unless analyzed. As the cost system followed by the Butler company does not include the items of depreciation and interest on investment, both of these important figures must be added in order to determine a final cost which will be comparable with other cost figures published in past issues of THE COMMERCIAL VEHICLE. Without the items of interest on the investment and depreciation, the average cost per day would figure out at $20.08. However, by adding the yearly sums of $303 to cover the interest at 6 per cent on a track investment of $5,050 and $889.20 at 20 per cent on an investment of $4,446, the total cost per day is increased from $20.08 to $24.41.

The Figures Analyzed

This cost, however, does not include supervision such as would have to be added if the same trucks were operated for hire in a similar line of work. All of the cost figures given on the form of THE COMMERCIAL VEHICLE Standard Cost Keeping System for Motor Trucks as printed on this page were obtained from the records of the James Butler company, with



MONTHLY TRUCK

Year ~~Month~~ ending Oct. 31 1918

Make of truck Pierce Arrow Gasoline ~~Electric~~

THE COMMERCIAL VEHICLE TRUCK COST SYSTEM

Operating Charges				
Gasoline	3696 gals.	@ 26.6¢	$986.78	
Current	kw-h	@		
		@		
Oil	qts.	@	34.06	
Grease	lbs.	@		
Kerosene	gals.	@		
Waste	lbs.	@		
Dist. Water	gals.	@		
		@		
		@		
Driver	52 weeks ~~days~~	@ $32 a week	1664.00	
Helper	20½ weeks ~~days~~	@ $15 a week	307.41	
		@		
		@		
Mechanic's labor	hrs.	@	58.96	
A—Total operating charges			$3051.21	$3051.21
Maintenance Charges				
*Tires	14948 miles	@ 6.09¢ a mile	$910.20	
Repairs	(material)		725.71	
Overhauling, Painting, etc.				
Spare vehicle rental				
Garage rental (pro rata),	plus office overhead		443.60	
B—Total maintenance charges			$2079.51	$2079.51
Fixed Charges				
Insurance, fire	@ per year		$	
Liability	@ per year		300.00	
Collision	@ per year			
Interest @ 6 % (On Item 1+12)	on $5050		303.00	
Depreciation on chassis	@ %			
Depreciation on body	@ %			
Depreciation on equipment	@ 20% on	$4446	889.20	
*~~Depreciation on tires~~	@ %			
Total taxes and licenses			51.25	
				$1543.45
C—Total fixed charges			$1543.45	$6674.17

* Note: Use one of these.

A typical cost sheet for one of the Pierce-Arow 5-tonners. The yearly cost exceeds the first cost by $1620 the exception of two items of interest on investment and depreciation, both of which are marked with asterisks. The investment figures given on the form on this page were also estimated, but provide a good average, since some of the trucks were purchased in 1914, 1915 and 1916, when the prices were lower than in 1917 and 1918. Similarly, the cost of $604 for a set of tires on a 5-ton Pierce-Arrow is higher than the market value at this writing. It is interesting to note that the total operating cost of the 5-ton Pierce-Arrow shown on the two cost forms given on this and the opposite page, is approximately $1,620 in excess of the first cost of the truck chassis, its tires, equipment and body.

In a further analysis of the James Butler cost figures, it must be remembered that the company's fleet is a standardized one, with no other trucks employed. This has a large influence on the cost of upkeep, because all of the mechanics are well acquainted with each truck and therefore with all of them, since they are all alike. Similarly, the employment of only one make of truck makes it necessary to carry such a large stock of repair parts as would be necessary if more than one make were used.

Slow Loading

The work which the trucks do also has considerable influence on the cost of operation. All of the trucks are fitted with permanent panel bodies. The loading of 5 tons of miscellaneous groceries into these bodies takes from ¾ hr. to 1½ hrs. While many other grocers on the Metropolitan territory have adopted semi-trailers and short-wheelbase tractors to get away from this long loading time, the Butler company still employs the conventional fixed body. The subject of fixed bodies vs. semi-trailers and tractors is sufficient unto itself for a separate article and the reasons given by the James Butler company for retaining the fixed bodies will be discussed in a future article in The Commercial Vehicle.

Helper on Each Truck

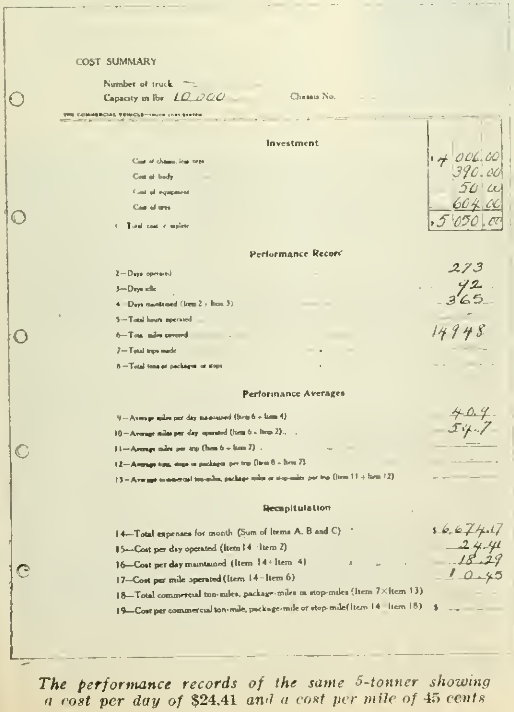
Aside from this question of loading, the cost figures given herewith may be better understood when it is known that the standardized Butler fleet distributes daily about 750 tons of foodstuffs. Points within a radius of 65 miles from New York are reached. The longest trip is to Freehold, N. J., 132 miles for the round trip. Other points reached include Long Branch, N. J., a round trip distance of 116 miles; Red Bank, N. J., 120 miles; Peekskill, N. Y., 95 miles, and Norwalk, Conn., 95 miles. From three to ten stops are made on each of these trips. While trips are made occasionally to the more distant points given above, the bulk of the distribution is spread over New York City and Brooklyn, in which the majority of the chain of Butler stores is located. As each truck leaves the warehouse, it carries a full capacity load, but no overload.

A driver and a helper are furnished on each truck. On the average, drivers are paid $32 a week and helpers $15. Of the sixty-five drivers employed by the company, many have been employed continuously for 8 or 9 years.

A shop foreman and a crew of six mechanics constitute the maintenance force which is required for inspecting, oiling, greasing and repairing.

Of the fleet of sixty-two trucks, fifty-nine are 5-ton-

(Continued on page 334)



COST SUMMARY

Number of truck —
Capacity in lbs 10,000 Chassis No.

THE COMMERCIAL VEHICLE—TRUCK COST SYSTEM

Investment

Cost of chassis, less tires	$4 006.00
Cost of body	390.00
Cost of equipment	50 00
Cost of tires	604.00
1 Total cost complete	$5 050.00

Performance Record

2—Days operated	273
3—Days idle	92
4—Days maintained (Item 2 + Item 3)	365
5—Total hours operated	—
6—Total miles covered	14948
7—Total trips made	
8—Total tons or packages or stops	

Performance Averages

9—Average miles per day maintained (Item 6 ÷ Item 4)	40.9
10—Average miles per day operated (Item 6 ÷ Item 2)	54.7
11—Average miles per trip (Item 6 ÷ Item 7)	
12—Average tons, stops or packages per trip (Item 8 ÷ Item 7)	
13—Average commercial ton-miles, package miles or stop-miles per trip (Item 11 × Item 12)	

Recapitulation

14—Total expenses for month (Sum of Items A, B and C)	$6,674.17
15—Cost per day operated (Item 14 ÷ Item 2)	24.41
16—Cost per day maintained (Item 14 ÷ Item 4)	18.29
17—Cost per mile operated (Item 14 ÷ Item 6)	1 0.45
18—Total commercial ton-miles, package-miles or stop-miles (Item 7 × Item 13)	
19—Cost per commercial ton-mile, package-mile or stop-mile (Item 14 ÷ Item 18)	$

The performance records of the same 5-tonner showing a cost per day of $24.41 and a cost per mile of 45 cents

Mileage and Gasoline Averages on 5-Ton Pierce-Arrows

Truck No.	Days in Operation.	Total Mileage.	Total Gals. Gasoline.
25	282	13,000	8867
26	273	14,984	2596
27	269	12,215	3725
30	275	12,201	3625
31	300	14,377	4077
32	300	13,222	3714
34	285	16,042	4403
35	294	14,966	3952
36	282	14,228	3815
37	276	15,038	4311
38	289	14,359	3839
39	297	13,433	4005
40	249	10,199	3453
41	294	12,530	4219
42	288	15,188	4077
43	266	12,483	3676
44	301	13,959	3992
45	284	13,633	3922
46	296	13,402	4135
48	284	13,848	3755
49	281	11,952	3960
50	269	9,818	3745
51	250	9,666	3604
52	310	14,338	4259
53	280	12,774	3948
54	287	13,567	4072
55	281	14,239	4265
56	261	21,395	4848
58	291	13,126	4261
59	201	14,475	4266
60	292	12,402	3896
61	280	11,446	4100
62	293	12,743	4131
64	284	11,819	3807
65	270	11,221	3807
68	290	13,980	1064
69	263	12,210	3800
70	236	9.543	3309
71	287	12,670	4186
72	275	11,579	3675
73	308	13,399	3954
74	283	9,819	3758
Total	11,859	551,482	165,973

Average miles per day........46.5
Average miles per gallon of gasoline........3.3

New Method of Routing

Increases Wholesale Poulterer's Business

Special Systems for Sorting and Loading and Bonuses for Drivers Also Important Factors in Truck Operation

SPECIAL sorting, routing and loading systems and bonuses for drivers and helpers are four features of truck operation by which the Nathan Schweitzer Co., Inc., New York City, has increased the efficiency of its delivery fleet and thereby increased its business to a marked extent.

Mr. William Schweitzer, who has entire charge of the Nathan Schweitzer Co.'s trucks, gives a considerable share of the credit for the success of the large and growing business to the well-organized system of trucking operation which the company has installed. Almost all of the deliveries of the company are made by motor truck. The company deals in meats, poultry and games, delivering large quantities to each customer. It has for its customers a considerable number of the New York hotels and restaurants, several of the big steamship lines and also a great number of retail butchers in all parts of New York City, upper New York, Brooklyn, New Jersey, Long Island and points further afield.

Freight collections and deliveries from and to some of the steamship wharves are still made by horse wagons and when not otherwise engaged they are also used for a certain number of deliveries close to the establishment. But the vast majority of deliveries are made by motor truck.

The Sorting System

The company's fleet consists of three White trucks of ¾-ton capacity; seven autocars of 2-ton capacity and two Packard 3-tonners. The White trucks are used for special rush deliveries, of which the company has to deal with a considerable number. The Autocars are engaged in making city deliveries; that is, in handling the bulk of the company's business. The two Packards are employed in making collections and deliveries from and to some of the steamship wharves. These last also collect freight shipments and transport goods to the freight yards for the company's out-of-town freight deliveries.

The goods handled by the Nathan Schweitzer Co. are stored in the upper floors of the company's building. When an order is received for goods, the latter are collected on these upper floors and are then transported by elevator, on hand trucks, to the ground floor. It is on the ground floor that all goods are sorted for delivery. This floor is entirely free of all obstructions except columns. It is paved with cement and the walls are in white tiles. In addition, it is furnished with a number of water taps and can be cleaned and washed down at frequent intervals. The question of cleanliness is a very important one to the business in many ways and will be dealt with more fully in a later issue of THE COMMERCIAL VEHICLE, together with a fuller exposition of the company's sorting system.

William Schweitzer, who is superintendent of all trucking operations for the Nathan Schweitzer Co., Inc.

The ground floor space is divided into sections according to the localities in which the deliveries are to be made and goods arriving from the upper floors are trucked immediately to that part of the ground floor reserved for the locality to which they are to be sent. This interior trucking is accomplished by means of two-wheeled hand trucks; flat, four-wheeled hand trucks; high four-wheeled hamper trucks with shelves, and the Bartlett hand truck with platforms. The first are used for barrels; the second for heavy boxes; the third for light baskets and small light parcels, such as braces of game birds, and the fourth for heavy meat baskets, which can be piled up one on top of another. The meat, however, is kept in a large cold-storage room on the ground floor, back of and opening into the ground floor sorting room. From this cold-storage room, consignments of meat are transported on hand trucks to the delivery section of the ground floor reserved for the locality in which they are to be delivered. All goods for delivery are carefully and tastefully packed either on the upper floors or on the ground floor before leaving the establishment, because the appearance of the goods both at the store and in process of unloading and delivery to hotels and restaurants is of great importance to the latter and therefore to the dealer supplying them.

Excellent Routing System

The Nathan Schweitzer Co. has also thoroughly systematized its routing system. The entire territory served by the company is divided up into regular routes. This is done first on a large scale; that is, New York City proper is divided into west side, east side and downtown. The rest of the territory in which the company operates is divided into Brooklyn, New Jersey and Long Island, in which deliveries are made by the company's trucks, and into a freight zone for out-of-town shipments. The west side of New York is then subdivided into five routes and the east side into three routes. The con-

View of the Nathan Schweitzer Co. premises from the front. Note the uniformed drivers. Note also the long, fixed canopy which extends out over the rear of the trucks and protects goods in the process of loading

fines of these subdivisions do not change because the business has no peak load period and it is not necessary, therefore, to reroute the trucks into smaller routes for a period of greatly increased deliveries. In this connection, it is pertinent to mention here that the company's excellent system of maintenance by means of its own mechanics enables all truck to be operative practically all the time, except for occasional slight repairs, painting and periodical overhauls.

Although there is no peak load period to reckon with, the company has another delivery difficulty to be solved which involves the question of overhead cost of making deliveries. This is the number of rush orders with which the company has to deal. Very often an order will come into the store for a large consignment of meat, game or poultry —or all three of them—which must be delivered immediately.

Rush Deliveries Important

If the man in charge of routing the trucks left this consignment to go in the regular truck supplying the locality concerned, it might arrive too late to meet the customer's requirements and the chances are that his next order will be placed with someone else. It is therefore necessary to keep a certain number of trucks of lighter capacity always ready to go out on rush orders. However, there are two factors that help out in this difficulty. The first of these is the fact that many such orders embrace a large number of parcels and barrels and a variety of goods, so that the truck does not set out to make the delivery loaded very greatly under capacity. The second is the fact that, because of the large size of the usual individual consignments, a fully loaded truck on an ordinary route has comparatively few calls to make and can, therefore, complete its trip more quickly. In this way the ¾-ton trucks are able to average at least five trips a day over the same route and the 2-ton trucks at least three trips a day. Therefore, a rush order for goods will often find a truck just about to start for the locality to which the goods were consigned. That truck then makes the rush delivery first after reaching its route, which obviates the necessity of sending out a special truck with one rush delivery.

The routing of the individual trucks themselves is handled as follows:

In the company office on the ground floor, Mr. Schweitzer has installed a series of pigeon-holes, arranged in three tiers for the east side and three tiers for the west side and down town. In the first of these tiers for each side of the city

(Continued on page 342)

Side view of one of the Nathan Schweitzer 2-ton Autocars in process of being loaded in front of the establishment. Driver and helper are loading the truck while the checker (in a white coat) stands by and checks the goods as they are loaded. The width of the street enables the trucks to maneuver and back up to the curb with ease

COLD-WEATHER HINTS *In Truck Operation*

Methods That Will Save the Fleet Owner Much Worry, Time and Money

No. 4—CARE OF GARFORD TRUCKS

AS the winter season approaches, the wise truck owner, whether he possesses a single truck or a fleet, will prepare ways and means to keep his equipment at the maximum point of efficiency in spite of bad highway conditions, storms and extremely low temperature.

1—In the actual operation of a truck during the cold weather, the first and most important thing to be considered is protection for the driver. No owner can expect an operator to protect his truck investment if the driver is left unprotected and at the mercy of the elements. In the first place, he will feel that his employer is not interested in him, and in the second place his personal efficiency will be reduced at least 50 per cent due to body discomfort and in some cases, actual suffering. The engineers of the Garford Motor Truck Co., Lima, Ohio, recognized the importance of the above fact and in the design of the various trucks, especially the heavy-duty models, have made ample provision for the drivers' protection. A strong sheet steel cab is provided and fully equipped with a glass windshield and a full set of curtains capable of completely inclosing the cab. The windshield and curtains should be examined to determine whether or not they are in good shape. Do not wait until the snow flies to unroll the curtains and then find some of the celluloid so badly broken that the curtains are useless.

2—See that each truck is provided with a good radiator cover that fits, preferably one that has an adjustable roll curtain in front. Trucks operating in rural and suburban districts should be provided with a shovel and a bucket of sand. These can be best carried hooked on the under side of the body between the cross sills where they will be entirely out of the way.

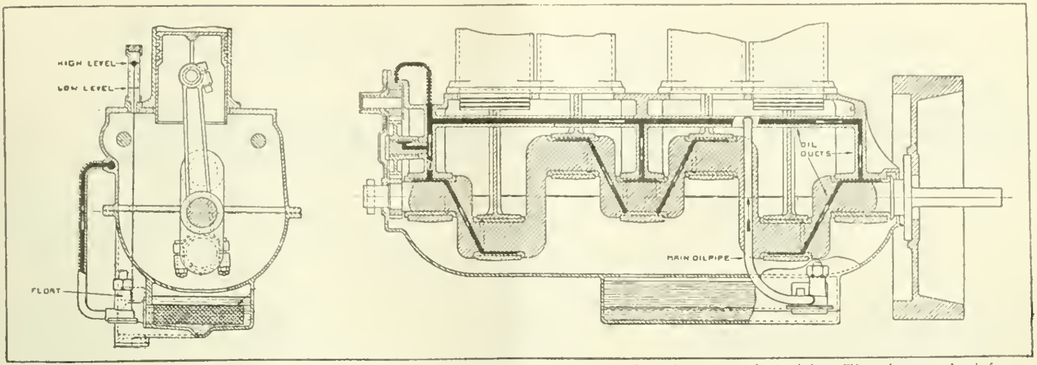
THIS is the fourth of a series of articles pointing out some of the best methods which fleet owners have followed in the maintenance and operation of their trucks in freezing weather. Some of the methods apply particularly to Garford trucks, while others apply equally well to all makes of trucks. The fifth article, in the next issue, will give cold-weather hints for Autocar trucks.

3—Not enough attention is paid to the proper handling of skid chains. There are on the market several good makes of skid chains, any one of which will prove excellent for use on a Garford truck, provided the directions of the chain manufacturer are carried out. The great trouble is these directions are usually entirely ignored, not only by drivers, but by garage superintendents as well. Chains are permitted to run in a very loose condition, with the result that they catch in the drive chains or brake operating levers, resulting in serious damage. On the other hand, they should not be too tight. If the chain is so tight around the tire that it cannot shift slightly, serious damage to the tire will result.

4—Get the mechanical condition of the truck in perfect shape to withstand the winter siege. Do It Now. See that both sets of brakes operate properly and that they are equalized. Nothing will make a truck skid quicker than unequalized brakes.

Examine the transmission and differential for lubrication. See that they are filled with a grease that will flow. Have all steering and front axle connections tight. Driving into snow piles and mud with

The built-in windshield and cab curtains furnished as standard equipment on the heavy Garford models, protect the driver, keep him in good humor and result in his doing more and better work. This means better truck satisfaction



End and side sectional drawings of the lubrication system used on the Garford heavy truck models. The view at the left shows the location of the oil gauge. The view at the right shows the pressure oiling system employed.

the front end in a loose condition is bound to mean trouble.

5—Thoroughly inspect, clean and adjust the ignition system. Starting a motor with present day fuel in cold weather is difficult enough without adding trouble in the ignition system. Keep the gaps in the spark plugs fairly close. Then it will not require such a hot spark to jump.

6—Go over the entire fuel system. Make sure that there is no water or sediment in the gasoline tank. Clean all water and sediment from the carbureter.

Don't have any small leaks in the cooling system, especially if a non-freezing mixture is to be used.

Prevent Frozen Radiators

7—To prevent the water from freezing in the cooling system, replace some of the water with wood alcohol, as per the following table:

Alcohol by volume, per cent	Water by volume, per cent	Freezing Point, D. of Fahr.	Specific Gravity
25	75		.969
30	70	7	.963
35	65	—15	.957
40	60	—22	.951

When wood alcohol is not obtainable and it is necessary to use **denatured** alcohol, increase the percentage of alcohol about 5 per cent.

If alcohol is not used, drain the entire cooling system by opening the drain valve under the radiator under the pump and at the bottom edge of the cylinder water jacket.

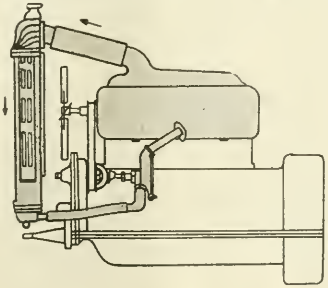
Do not let the truck stand in water or mud when put up for the night, as it may freeze before morning and operator will find all four wheels stuck fast to the ground.

8—To start a truck stored in a cold place, close all drain cocks and replace drain plugs. Fill the cooling system with warm water, not hot water, as the sudden increase in temperature may cause unequal expansion, which is likely to crack the cylinder water jacket. Open the four priming cocks on the motor and pour about a teaspoonful of gasoline into each one. This will not only serve to prime the motor, but at the same time will cut the congealed oil on the pistons and cylinder walls.

Do not use too much gasoline for priming. Crank the motor and let it run slowly. Do not race it but give it a chance to warm up gradually. Immediately after the motor starts, open the try cock in the oil line to determine whether or not the oil is circulating. This try cock is located near the oil pump. If the oil is not circulating, stop the motor immediately.

9—If the gasoline supply is cut off due to water frozen in the settling chamber, or carburetor strainer, thaw out by wrapping a rag soaked in hot water around the frozen part.

10—If the motor will not start due to the failure of the gasoline to vaporize on account of low temperature, wrap a rag soaked in hot water around the carburetor and around the intake manifold. This method is much better than pouring hot water over these parts as it does away with the danger of getting water into the air valve.



Side view drawing of the pump operated cooling system on the Garford 1¼-ton trucks

11—If the truck is frozen to the ground by having been left standing in mud or water the night before, do not attempt to move it by the power of the motor, as serious breakage of some driving part may result. Do not attempt to break it loose by jacking or prying with a bar, as this may result in damage to the rubber. Thaw out the ice or frozen mud by pouring hot water around the lower section of the tire where it comes in contact with the ground.

A Few General Hints

12—Do not try to get home with frozen radiator. Put the truck in a warm place or thaw it out by pouring hot water over the outside. More cylinders were cracked from overheating due to lack of circulation during the extreme weather of January, 1918, than from actual freezing.

13—Keep the truck cleaner in winter than in summer. Frozen mud on brake connections helps to destroy brake efficiency.

14—On slippery streets do not keep too close to the machine ahead. It might stop before you can. Start slowly and stop slowly.

In the northern sections of the country, where the weather is continually cold, the fan may be removed.

Do not have a truck leave the garage until it is in condition and equipped to do a day's work.

Read the Eight Principles in Installing Trucks in the Transfer Business

GETTING RID OF HORSES

in the Transfer and Express Business

Only Trucks Made Possible the Development of New Business Area

NO. 5

This is the fifth in a series of articles on the principles to be considered in getting rid of horses in different industries. The first four articles in this series were published as follows:

No. 1 Coal . . . . . . Aug. 15
No. 2 Paper . . . . . . Sept. 1
No. 3 Lumber . . . Sept. 15
No. 4 Groceries . . . Nov. 1

Article No. 6, on getting rid of horses in the florist business will appear in the issue of Dec. 1, 1919.

WHEN an owner of a fleet of horses wishes to replace these with a motor truck fleet, he must take into consideration certain fundamental principles in effecting this replacement. In the transfer business there are eight cardinal principles which must be considered. An example of the working out of these principles may be taken from the experience of Lueddeke's Newark & New York Express Co., Newark, N. J. That company operates an express line between Newark and New York City, a distance of 12 miles, on an hourly schedule, daily, up to 12 o'clock noon. Though the company carries all classes of merchandise, it makes a specialty of handling leather for about 400 concerns or practically every manufacturer and retail merchant handling that commodity between the two cities.

The Lueddeke company bought its first truck in 1915 and has built up its fleet since that time to twelve Federals, three of them being of 2-ton capacity; four of 3½-ton capaciy, and five 5-tonners. Besides the motor equipment, it has five head of horses. These are used in picking up and delivering merchandise in and about Newark.

The Utility of Trucks

1—The first point to be considered in the installation of a fleet of trucks in the transfer business is the determination of the utility of motor trucks versus horse wagons in hauling merchandise. The cost of delivery is the paramount issue to be decided upon before anything else is brought up. Mr. Lueddeke figures that his trucks cost him on an average $25 per day each to operate, including $4.16 a day for the driver, $2.50 for a helper, gasoline and oil consumed, tires, insurance and depreciation; whereas, a team of horses cost him a little over $10 to $12 a day, including a driver and helper. This difference in cost, however, is greatly offset by the all-around efficiency of the truck; the increased delivery radius; increased load capacity and greater durability.

Mr. Lueddeke established his business in 1903. At that time and until June, 1915, its principal work consisted of hauling general merchandise in and about the city of Newark. By giving satisfactory service, the business of the company increased very rapidly and it was able to occupy a large one-story wooden stable, which was used to house the horses and wagons and to store whatever goods the company had to hold over until the following day. This method of using horses to haul the goods was satisfactory until some of the shippers began to ask themselves why they shipped their goods by railroad for such a short distance as that between Newark and New York City. Lueddeke also saw the possibilities that this class of work offered. He accepted the New York City-Newark work, as he did many other shipments to towns and cities within a radius of 10, 15 and even 20 miles. In doing this work, he did his best to give the service he had always given when handling local shipments, but it was not long before he came to the conclusion that this work was not as profitable as the local work. It was practically impossible to load the wagons to capacity, owing to the strain on the horses in hauling such distances. Besides, the horses could not travel over 20 miles per day, even under the best of circumstances (the extreme heat of summer and the slippery condition of the roads in the winter greatly reduced this mileage), and this meant additional expense in putting the driver up at a hotel and stabling the horses until the following morning.

An experiment made with the first truck soon showed that the long-haul work could be handled efficiently and economically. As a result, another truck was purchased and later five more were added to the fleet. Before any trucks were bought, Lueddeke had fifty-one head of horses. Up until last year, this number had been reduced to twenty-one. Recently, he has replaced sixteen of these twenty-one horses with five 5-ton Federals. As a further argument in favor of the use of motor trucks in the transfer field, Lueddeke has found that a truck will outlast a horse by some 4 years, the life of a horse being estimated at 3 years, and that of a truck at 7 yrs.

Area of Delivery Territory

2—An increase of business through an increase of delivery area is economically impossible beyond a certain local point when horse vehicles are used, as shown above. However, motor trucks in the transfer business insure the new business, which also means an increase of advertising as well as in trade, since the presence of a motor truck on the streets is as much of an advertisement as a billboard on a fence.

3—A transfer company which contemplates taking care of an increased tonnage must figure from two angles: 1—The determination of the size of trucks to take care of these loads, and 2—The determination of the right number of each size to purchase. Lueddeke is using his 3½- and 5-ton trucks for the heavy loads to and from New York City. The 2-tonners are used for local work only. In the transfer business, it is necessary to overload at times on account of the peculiarities of the work. For instance, after a Lueddeke driver has delivered his load in New York City, he will often find that his truck will have to be overloaded on the return trip in order to satisfy the customer. If this extra load is not carried, the customer will probably give the business to some other transfer company. As a result of this overloading, Lueddeke has found it more economical to use solid tires, as pneumatics will not stand up so well under the heavy overloads. All of Lueddeke's trucks are equipped with Firestone tires.

Establishment of Garage

4—The design and location of the garage must next be considered in the installation of a fleet of trucks in the transfer business. With three to four trucks, such a fleet owner may house his trucks in some neighboring garage. Those who are planning the erection of their own garages should consider its erection as close by the existing stables as possible so as to reduce mileage in the running of the trucks between the stable and garage during the exchange of goods from trucks to wagons. In the replacement of a horse drawn fleet for a motor truck fleet, a transfer company can often convert its stables into a garage. Attention should be paid to the lighting conditions and the elimination of the excessive number of roof columns frequently found in stables.

When the railroads began to receive more goods than they could handle and when they began placing embargoes at different points so that some of the congestion would be relieved, many merchants who had always shipped their goods by rail turned to the motor truck as the only solution for getting their goods through. This not only made an additional increase in Lueddeke's business, but he found it impossible to handle the goods at his receiving stations at Newark and New York City. To overcome this, larger quarters were leased in New York City and a new building constructed in Newark directly opposite the old wooden structure. The new building is one story and of fireproof construction, 100 by 104 ft., and cost $30,000. At present it is divided in half by a metal partition which will be removed upon the growth of business, one side being used to garage passenger cars, the other to house the company's own trucks. There is also a 100 by 10 ft. platform on the side wall of the garage. On the opposite wall is a smaller unloading platform. This same scheme is repeated in the passenger car garage, looking toward future development and the elimination of the stables.

5—The fifth principle takes into consideration the loading of the trucks. A transfer company whose business dates back long before the advent of motor trucks will find that its loading platform will probably not be high enough to accommodate the higher bodies of the trucks, nor be long enough to accommodate an expansion of the fleet. Loading of some of the trucks the night before will help solve this problem.

The Loading Conditions

All goods transferred by Lueddeke that are consigned to New York City are sorted on the garage loading platform. If these goods are received before 12 o'clock noon, they are at once loaded on a truck which leaves at that hour for New York City. If the goods are brought into the garage after 12 o'clock noon, they are stored there until 7 a. m., the following morning. The trucks leave the Newark garage for New York City beginning at 7 a. m., and every half hour until 12 o'clock noon. After reaching New York City, each proceeds to deliver its goods if they are for customers below Fifty-Ninth Street. While doing this, the driver calls on the company's regular customers in that vicinity for goods to take back to Newark. If the load from Newark is for customers above Fifty-Ninth Street or in Long Island or Brooklyn, the truck takes the goods to one of the company's three New York City offices, where they are transferred to other express companies, who act as agents for Lueddeke. When these trucks reach Newark, they drive to the sorting platform at the stable instead of the garage. This keeps the shipments from the two cities separated. The goods which arrive from New York City by the first truck leaving the Newark garage that morning are sorted at the stable and delivered by wagons in Newark that day, but the goods arriving later than 3 p. m. are stored at the stable until the next morning. To save time, and so that the drivers can start delivering the goods from New York City the first thing in the morning, the company employs two men who work at the stable during the night sorting and loading the New York City shipments consigned to Newark. By doing this all wagons and trucks are loaded ready for the drivers as soon as they report in the morning for work.

Bodies Are Important

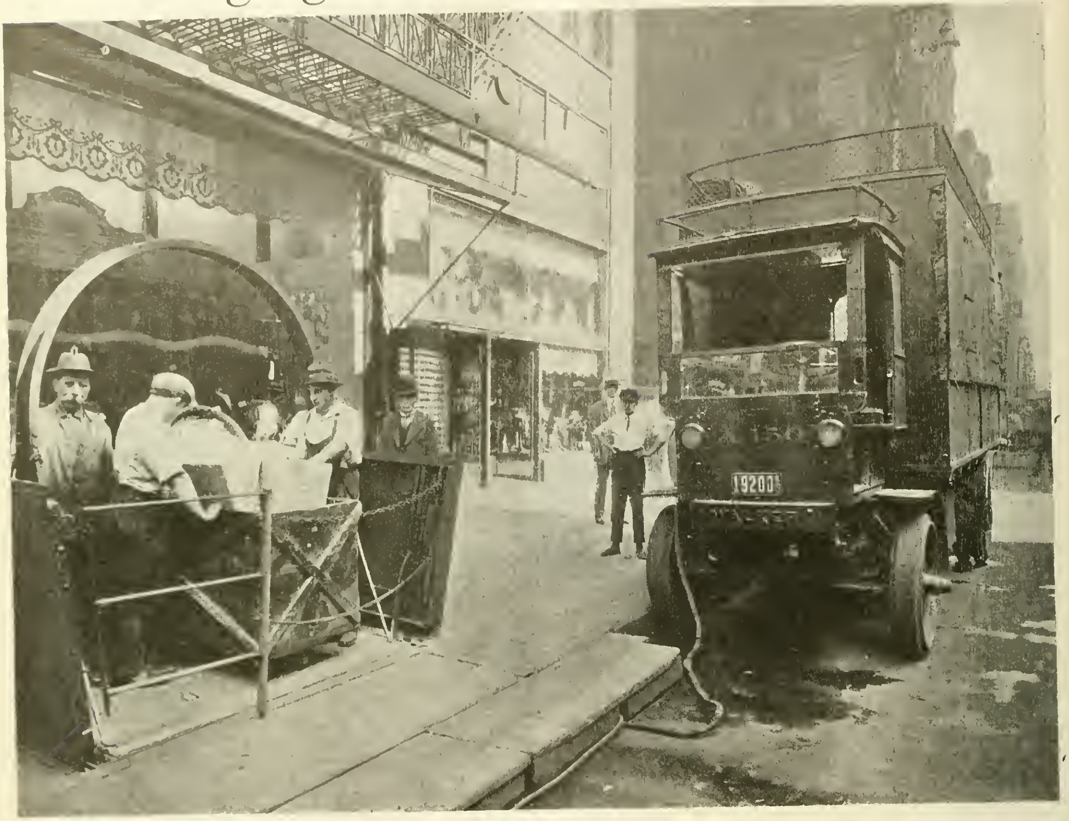
6—The selection of body types is contingent upon the class of goods hauled. Where a transfer company specializes in its haulage work, as does the Lueddeke Company, which carries leather for the most part, it is a simple matter in selecting a body. All of that company's bodies are of the rack type, equipped with a tarpaulin covering for use in inclement weather.

7—Maintenance of trucks is dependent on the size of the fleet. The establishment of a service station is the result of a process of development in the size of the fleet. From an economical point of view, an owner of five or six trucks may not find it worth while to maintain his own trucks. There might not be enough work to keep a mechanic or two busy all of the time. In a case of that kind, it would be better for him to have this work done in a local repair shop or service station. On the other hand, as the fleet grows to eight or ten trucks, he must consider taking care of such work as engine repairs, tires, etc. Lueddeke employs two mechanics to take care of his twelve trucks.

Old Horse Wagon Drivers

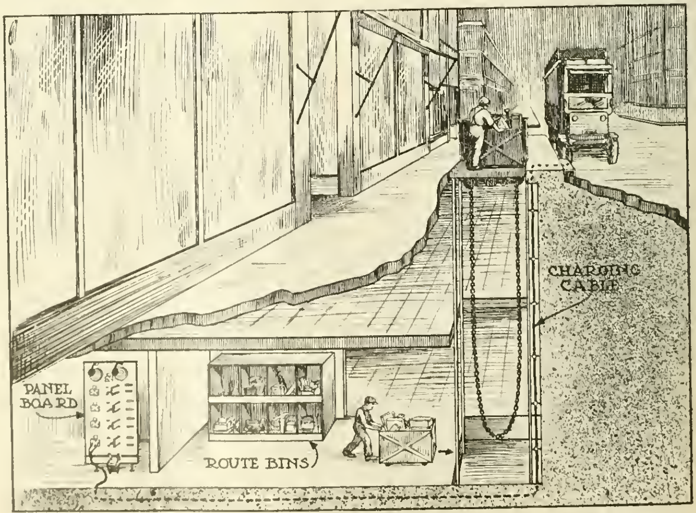
8—Mr. Lueddeke has found that the best drivers of motor trucks in the transfer business are men who formerly drove his horse vehicles. Outside drivers proved a failure because they were not familiar with the conditions peculiar to the transfer business.

Charging Electrics on the Street



WHEN the Boston Store, Chicago, decided several years ago to load all of its delivery trucks in the basement by carrying them down on the regular store elevators, and thus eliminate sidewalk loading, it was found that the elevators were too small for the 3 ton electric trucks. These trucks were used to carry packages between the store and the company's outlying sub-stations. As a result, some means had to be found for loading the transfer trucks at the sidewalk and of charging their batteries during the loading operation in order to make it unnecessary for the trucks to make a special trip to the garage.

How this problem was solved is shown in the two accompanying illustrations. As the Boston store had fitted up a portion of its sub-basement as a garage to charge the batteries of the ¾- and 1-ton electric trucks, and provided a panelboard, it was only necessary to connect up one of the switches of this board with the plug at the street level.



Sectional view showing how the charging cables are led up the elevator shaft to the truck standing at the curb

Truck Mechanics

CUT OUT THE TWO FOLLOWING PAGES

IDEAS

¶The ideas expressed in the Repairshop Shortcuts shown on the two following pages may save you many dollars and much time in the upkeep of your trucks, no matter of what make or how many there are in your fleet.

¶If you have similar ideas, send them in to the Repairshop Shortcut Editor. He will pay you at $1 for each idea accepted.

HANG UP THESE TWO PAGES IN YOUR SHOP

Better Truck Repair and Maintenance

To help motor truck owers and operators to save money in the maintenance and repair of their trucks, The Commercial Vehicle prints on these pages better methods of maintaining trucks and the latest ideas in making quick repairs.

THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 38—Pole to Take Up Towing Rope Slack

OFTEN in towing a disabled truck to the nearest garage, the towed vehicle overtakes the towing truck in coming to a stop and permits the slack of the tow rope to drop onto the street where it may be run over by the front wheels of the towed vehicle. When this occurs the towed vehicle must be pushed backwards until the towing rope is free before another start can be made. A spring pole made of any flexible material either steel or wood may be attached to the rear frame of the towing truck to overcome such a difficulty. The free end of the pole is provided with a wire loop through which the towing rope is inserted. When the towing rope is caught the spring pole is bent downward to almost a horizontal position but as soon as there is any slack in the rope, the pole springs upward and carries with it the towing rope so that it cannot drop into the street.—Motor World, KENYON'S GARAGE, New London, Conn.

No. 39—Cork Plugs For Testing Radiators

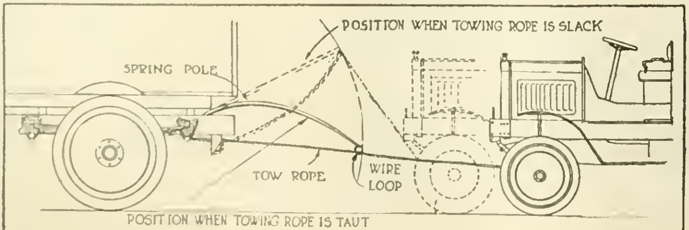
ORDINARY bottle corks may be used to good advantage to plug up the inlet, outlet and overflow pipe openings of the truck radiator while it is being put under air pressure to test it for leaks in the core or case. These corks are inserted as shown in the accompanying sketch. Plain corks are used to plug two of the openings, that for the third opening being provided with a hole through its center into which a tire tube valve may be screwed. This valve serves for attaching the hose of the tire pump, so that the radiator may be put under pressure to force out the water through any leaks in either the radiator core or case. The position of the cork with the tire valve inserted in it is shown in the accompanying sketch. When the air pressure is once put on the radiator it is a simple matter to discover the location of the leaks.—Motor World, E. B. J. ROUFS, Winsted, Minn.

No. 40—Hand Bellows to Clean Out Dirt

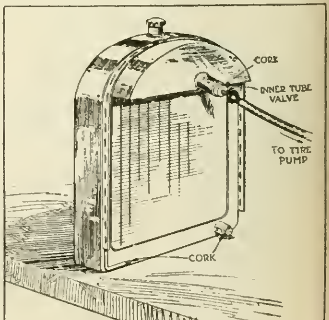
AN ordinary hand bellows anywhere from 16 to 22 in. long is a convenient tool to have around a motor truck garage for blowing dirt or small pieces of carbon out of engine cylinders, valve pockets or the like. If such a bellows is hung up near the work bench, it will often save considerable time in a garage which has compressed air available for the same purpose.—Motor World, FLOYD BLISS, Aurora, Ill.

No. 41—Finger Grips For Oiling Cans

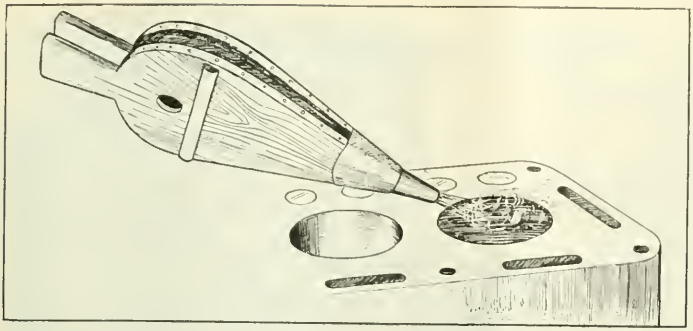
THE trouble sometimes experienced in having an oil can drop out of a mechanic's hand either because his hands are covered with grease or the exterior of the can is oily, may be overcome by means of a simple grip, as shown in the accompanying illustration. The grip is made of a narrow piece of sheet metal bent in the middle to conform with the top of the oil can where the spout is screwed on. The ends of the metal grip are bent upward to provide a gripping surface. A hole is bored in the center of the strip so that the spout may be screwed down through it into the can and thus hold the strip in place.—Motor World, C. H. WILLEY, Concord, N. H.


POSITION WHEN TOWING ROPE IS SLACK
SPRING POLE
TOW ROPE
WIRE LOOP
POSITION WHEN TOWING ROPE IS TAUT

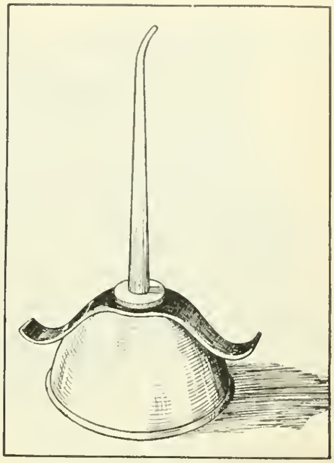
No. 38



No. 39



No. 40



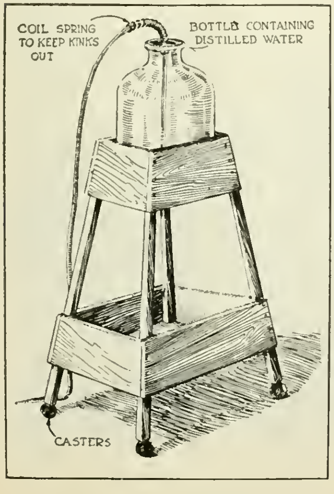
No. 42

No. 42—Portable Stand For Battery Distilled Water

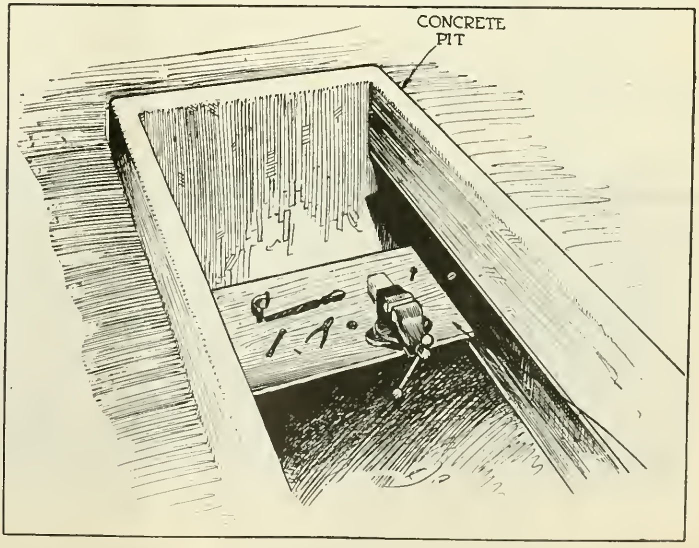
A SIMPLE stand mounted on castors is a convenient tool to have around a garage in which trucks fitted with storage batteries are maintained. Distilled water for flushing the storage battery is generally kept in glass bottles. These are often broken in moving them from the place where stored to the batteries in the chassis. To prevent breakage of this kind, a small stand mounted on castors and provided with sideboards at the top to form a pocket around the top shelf is a handy means of moving the bottle. The pocket at the top of the stand prevents the bottle from working off while being moved. The water is taken from the bottle by means of a piece of ⅝ in. flexible rubber hose which acts as a syphon. A coil spring is placed around the hose at the point where it is fitted into the cork in the neck of the bottle to keep the hose from kinking. A lower shelf may be provided near the bottom of the stand to carry an extra bottle of water.—Motor World, J. R. Argall, La Crosse, Wis.

No. 43—A Repair Pit Sliding Toolbench

IN designing a repair pit for a motor truck garage, a simple sliding toolbench may be inserted in the pit provided the channel irons used along the sides of the pit are placed with their bosoms looking towards the center and are not covered with concrete. The bench is made of wood and is slightly less in length than the distance between the bosoms of the two side channel irons so that it acts as a platform which may be slid along the channel irons as desired. A vise may be mounted on the platform so that the mechanic can do some of the minor repair work without having to get out of the pit and back again. In this way an ordinary repair job may be completed in much less time than would ordinarily be the case. Because the shelf may be slid along, it does not get in the way of the workman.—Motor World, J. H. Sanglin, New York City.


COIL SPRING TO KEEP KINKS OUT
BOTTLE CONTAINING DISTILLED WATER
CASTERS

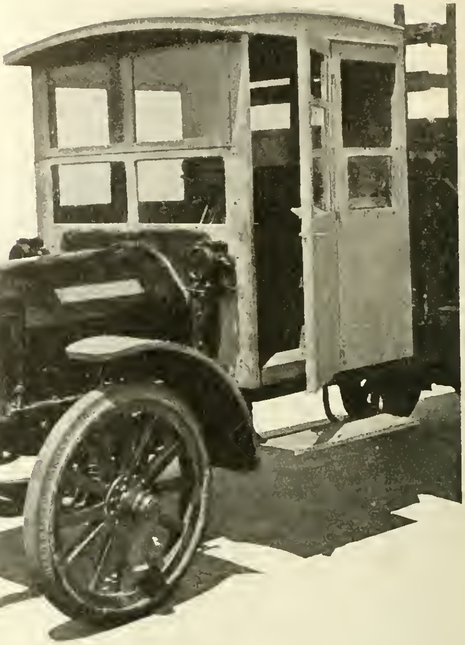
No. 41



No. 43

1½ Ton Diamond-T Designed for Farmers' Needs

Equipped with a Combination Express, Grain-Tight and Cattle Type Body



The Diamond-T 1½-ton Farm Special truck is fitted with a closed cab at an extra cost of $160. Note the two-part windshield

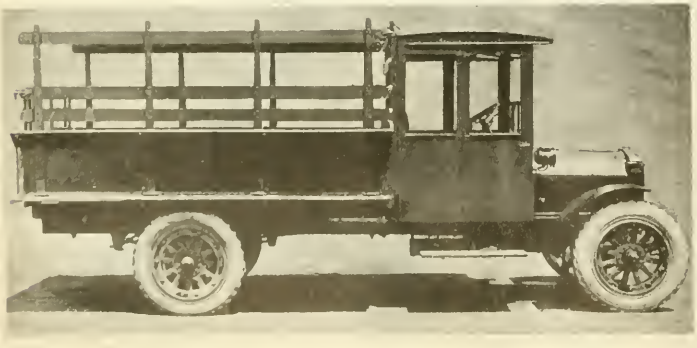
DIAMOND-T SPECIFICATIONS

Capacity, tons	1½
Price	$ 2.445
Wheelbase, in.	144
Tires, front	36x3½
Tires, rear	36x5
Bore, in.	3.75
Stroke, in.	5.25
N. A. C. C. hp.	22.5
Speed, r.p.m.	.....
Speed, m.p.h.	.....
Gear ratio in high gear	8.25 to 1
Final drive	Worm

THE Diamond-T Motor Co., Chicago, has brought out a truck model especially designed to successfully cope with the farmer's varied hauling needs. After careful investigation, that company selected the 1½-ton size as being best adapted to the needs of the average farmer. It is possible in this size to keep the wheelbase short, 144 in., and have a small turning radius, making the truck easy to handle on narrow roads. Naturally this model will be more economical to operate and maintain than a larger size, not only because of the efficiency of the engine, which is modelled after the Class B truck engine design, but also because parts for replacements are relatively inexpensive.

The truck, which is worm-driven, sells at $2,445, this price including a combination express, grain-tight and cattle type body, and a cab with side curtains and a windshield. A closed cab is optional at an extra cost of $160. Other equipment includes front fenders of extra heavy steel designed for severe usage; running boards; oil side and tail lamps; Presto-Lite equipment; horn; complete set of tools; jack; tool box and seat. Pneumatic tires cost extra.

The express body, which has a capacity of 62.5 cu. ft., is 120 in. long, 60 in. wide and 15 in. high. The flareboards are 9 in. wide and heavily ironed. The outside runningboard is 6 in. wide, running the length of the body. It is estimated that 2,438 lbs. of barley; 2,813 lbs. of corn; 1,623 lbs. of oats; 2,625 lbs. of potatoes; 2,812 lbs. of rye; 3,000 lbs. of wheat; 3,120 lbs. of coal; 5,900 lbs. of gravel; 2,480 lbs. or forty crates of eggs, and 3,620 lbs. or thirty-two 10-gal. cans of milk can be carried in the express body.

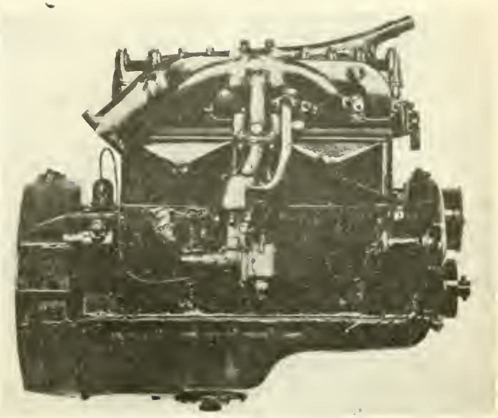


The Diamond-T 1½-tonner fitted with a cattle rack and closed cab. The rack is 54 in. high and between the top two stringers there is a space of 14 in. to accommopate the heads of cattle when carried crosswise of the truck body

The grain-tight body has a capacity of 100 cu. ft., being 60 in. wide; 120 in. long and 24 in. high. The grain-tight extensions add 9 in. additional height to that of the express body. It is possible to carry 3,900 lbs. of barley with the grain-tight body. Its capacity will also allow the carrying of 4,500 lbs. of corn; 2,600 lbs. of oats; 4,200 lbs. of potatoes; 4,500 lbs. of rye, and 4,800 lbs. of wheat.

The cattle body may be substituted in place of the grain-tight extensions. This rack is 54 in. high, from body floor to top of rack, with a space of 14 in. between the two top stringers to accommodate the heads of the cattle. The capacity load of this body is 1½ tons.

The Comstock tailgate allows quick loading and unloading of material in bulk, boxed or crated. Moreover, a rod is bracketed to the rear, which may be used for supporting skids or hinging another type of tailgate.



The Diamond-T Farm Special model is equipped with a specially designed engine modeled after the Class B truck engine type with a hot-spot manifold to admit of the use of heavier fuels without extreme inefficiency

With the exception of the engine, the new model differs little from its predecessor. The spring hangers and shackles are cast from the same patterns which are used for the larger models.

The four-cylinder powerplant, with its cylinders cast in block, was designed to give a maximum economy with the poorer grades of fuels on the market today. A hot-spot manifold is used to give the entering fuel the proper amount of heat to vaporize it for easy burning in the cylinders. Gasoline is fed by gravity to the carbureter from a 10-gal. tank, located under the seat. The radiator is of the vertical finned-tube type with a cast iron case. Water is circulated by means of a centrifugal pump. The engine is suspended at three points through the use of a heavy steel cross member in front and two ball and socket joints in the rear. This makes a flexible mounting which cradles the powerplant against the constant jolts, jars and side twists of travel over country roads.

Realizing that this truck will operate in localities where conditions are of the worst, a flexible connection was secured between the transmission and the bearing near the center of the truck. This flexible connection is in the form of two Thermoid-Hardy fabric disk joints connected by a seamless heat-treated steel tube fastened to the yokes of the joints by a patented process which prevents it from loosening. These joints, aside from their flexibility and cushioning properties, require no lubricants and have a long life. The bearing carrier separating the forward propeller shaft from the rear propeller shaft with the two universal joints of the Spicer type, has been used in Diamond-T trucks for many years. It eliminates the whipping in long propeller shafts.

The new model is made up of standard parts as follows: Smith frame; G. & O. radiator; Bosch magneto; Stromberg carbureter; Timken front and rear axles and Mather springs.

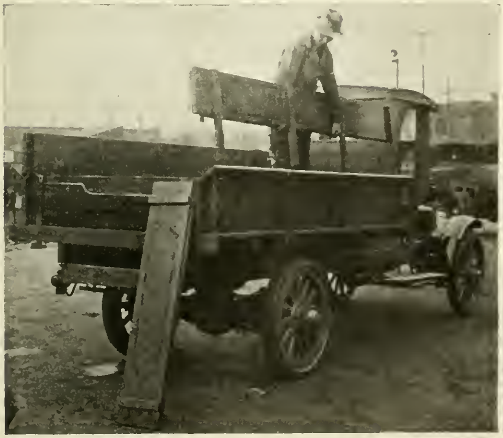
The wood wheels are mounted with solids all-around. The three-speed, selective gear-set is a unit with the motor and the clutch is of the multiple dry-disk type. Propulsion and driving torque are taken through the half-elliptic springs. The foot and hand brakes are of the Timken duplex type.

Knox Plant Sold

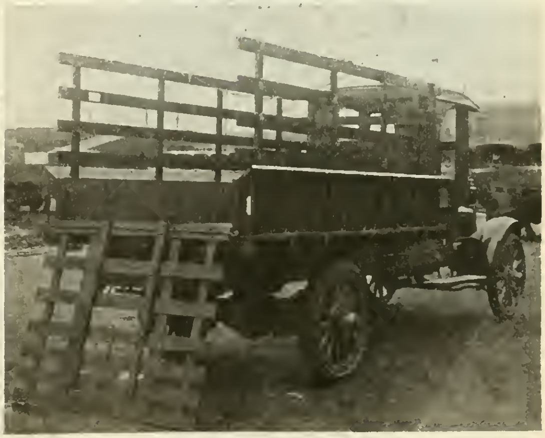
Springfield, Mass., Nov. 2—The plant of the Knox Motors Co., this city, has been sold to N. R. Sinclair of New York City, president of the Militor Motors Corp. In disposing of the plant, the Knox company reserves the right to use a part of the building for its needs for a period of 2 years. The Knox company will continue the manufacture of its tractors as well as parts for its former models at the Springfield plant. It is understool that the company has plans under consideration which will increase its present line.

New Federal Service Station

Cleveland, Nov. 10—The A. O. Wood Truck Sales Co., Cleveland, has opened a Federal service station here.



The grain-tight body, made by adding 9-in. extensions to the body. The Comstock tailgate allows quick loading and unloading of material in bulk, boxes or crates



Rear view of the Diamond-T Farm Special truck fitted with the cattle rack. In this case the rack takes the place of the tailgate when carrying hogs, sheep or cattle

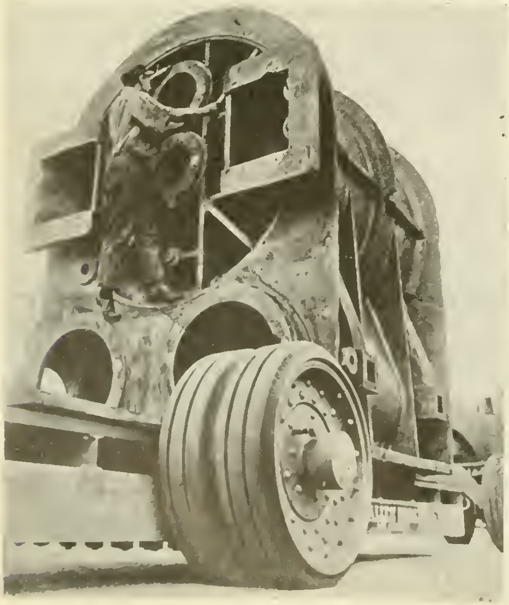
Dual 10-In. Tires Used in Carrying 40-Ton Load

CARRYING loads in excess of 25 tons presents unusual problems for the fleet owner. While the moving of such large loads is only done occasionally, it requires that the contractor desirous of obtaining such business must provide himself with special motor truck or trailer equipment. Allen Brothers, Los Angeles, Cal., were recently called upon to move a giant marine engine cylinder weighing 40 tons. Of course, it was out of the question to attempt to carry this huge load on any form of motor truck and a four-wheeled trailer had to be employed.

Rear Wheel Weighs 2,050 Lbs.

One of the special features of the trailer are the rubber-tired wheels on which it is mounted. At the rear, dual 40 by 10 in. tires are fitted on each wheel and 40 by 12's on each of the two front wheels. Some idea of the great size of these rear wheels may be had from the accompanying illustration and from the fact that each rear wheel weighs 2,050 lbs. To carry two 10-in. tires, each rear wheel has a flange approximately 22 inches wide. This necessitated the construction of a special wheel built up of steel plates and angles riveted together. No standard size of bearing is sufficiently large to carry such a wheel, so that a special hub and plain bearing had to be devised and lubrication provided by a grease cup from the outer face of the wheel disk.

With two 10-in. tires on each rear wheel and 12-in. singles at the front, the total tire width of all four wheels of the trailer is 64 inches. At a maximum carrying capacity for solid rubber of 800 lbs. per inch of tire width, this will give a total carrying capacity of 51,200 lbs. With the engine cylinder weighing 40 tons, or 80,000 lbs., and the trailer itself 12,700 lbs., the total load carried, in the case mentioned, was 92,700 lbs., or almost double the guaranteed carrying capacity of the tires. While this tremendous overload is not recommended for ordinary work and will not mean a long tire life, it nevertheless shows the ability of large sized truck tires to stand up when put under severe strains.



Dual 10-in. tires are used on each rear wheel which weighs 2,050 lbs. complete

The test was no easy one in that the cylinder was carried 23 miles over city streets and country roads. The cylinder was hauled from an iron works in Los Angeles, where it was cast, to a shipbuilding plant in San Pedro in 2 hrs. 45 min. In order to secure the proper traction, the towing truck was ballasted with an engine weighing nearly 7 tons, a cargo in itself much heavier than the average truck load.

Operating Cost of 5-Ton Pierce-Arrows

(Continued from page 321)

ners and three of 2-ton capacity. The first 5-tonner was purchased in 1913. After several months of operation, five more were ordered. In the following year, 1916, thirty-four more were purchased and others have been brought from year to year until today, when the fleet numbers sixty-two. While the age of trucks thus varies from 1 to 5 years, none of the trucks are given easy routes. In fact, the trucks are shifted from one route to another at intervals, and the oldest trucks are kept in such good mechanical condition that there is hardly any noticeable difference in their operation from the newer units of the fleet.

Replaced 500 Horses

The sixty-two trucks replaced 500 horses formerly used by the Butler company, and deliver one-third more tonnage than when horses were used exclusively. In addition, the use of trucks has enabled the Butler concern to enlarge its territory to points which would have been positively inaccessible with horses. When the latter were used, the radius of delivery was 10 miles, with a maximum daily mileage of the wagons of 20. With the trucks, stores within a 65-mile radius are served. These trucks on the long hauls cover 130 miles.

The table of figures given on page 321 show some of the records of the forty-two of the 5-ton trucks during the fiscal year ending October 31, 1918. The remainder of the trucks owned by the company were at that time employed on bakery work, which is considerably different from handling wholesale groceries, and for that reason their performance records are not given herewith. The figures show that the average miles per gallon of gasoline for the forty-two trucks is 3.3. The trucks which run on the long routes, however, have an all-year average of 4.4 miles to the gallon. The figures also show that the average mileage per day is 46.5 and that the average days per year in operation is 287. The average miles per truck per year is 13,130.

These cost figures are of particular importance because they are averaged from a large fleet of trucks working under both city and country conditions. For this reason they are more valuable than would be the cost record of but one truck continually engaged in city hauling. With the many long runs made by the Butler trucks, the effect of long non-stop trips is shown in the figures as well as the more expensive short city hauls where congestion is more pronounced and the stops for unloading more numerous.

Wholesale Tobacco Trucks

Some Problems of Their Use Briefly Analyzed

(*Continued from page* 305)

the big manufacturer. It is as important to the success of his business as selling his goods. It is just as complex and requires just as much attention and concentration as selling goods. But the attention it receives is often merely cursory compared to that given the selling end of the business.

The problem of hired versus owned trucks is a very important item in the list of problems of truck operating costs. For a large firm like the American Tobacco Co., the installation of but one economical feature in the trucking organization may prove a very great economy in the course of a year. It will be readily seen that this is the case from the fact that the American Tobacco Co. paid $500,000, or half a million dollars, yearly for trucking alone, before the installation of its own trucking equipment. The company has minutely investigated the question of hired versus owned trucks as applied to its own business. This has been done generally and in many cities particularly, taking into account local conditions in those cities. In almost all cases the company has found that owned trucks are not only much more economical, but that they actually pay for themselves in the first year. This question was dealt with in the November 1, 1919, issue of THE COMMERCIAL VEHICLE. But it will be pertinent to point out briefly here the immense saving which owned trucks may prove to a big company.

In Richmond Va., for example, the average cost per 100 lbs. hauled by hired trucks is 9.5 cents. After the company installed its own fleet in Richmond, the cost of goods trucked by this fleet worked out at 2.8 cents per 100 lbs. This price includes a depreciation item which writes off the trucks in less than 3 years. A single truck in Richmond carries at least 1,000,000 lbs. of goods per month, which is a very low estimate, or 12,000,000 lbs. of goods per year. These figures give an average yearly economy of $8,040 for one truck. Moreover, 2,000,000 lbs. per month is not an unusual haulage for one truck, so that the above is probably a very low estimate. When it is considered that the company already employs its own fleets aggregating over forty trucks and something like four times that number of hired trucks, the great potential economy in this problem is at once obvious.

Centralizing Operation

The company has found, however, that in one or two cities, local conditions make the hired truck actually more economical. This may be due to the small amount of trucking to be done, owing to local railway sliding facilities. It may also be due to local labor conditions, low contract charges or several other factors. But the company has not found it to be the case in many of the cities where its factories are located. The investigation which the trucking department of the American Tobacco Co. is still making into local conditions is exhaustive and therefore, necessarily gradual. But in the vast majority of cases so far investigated, the owned truck has easily proved its superior economy over the hired truck, though in varying degrees. The very large potential economy of company-owned trucks therefore remains established—for the wholesale tobacco business at least.

One other problem remains. In several cases the company has established more than one factory in a single city. For example, in Durham, N. C., there are three American Tobacco Co. factories at the present time. In Louisville, Ky. there are two. Altogether, the company's seventy-four factories are located in forty-nine cities, which gives an average of nearly two factories to a city. At the present time, where the company has installed its own fleet, each factory has its own local trucking representative, its own trucking organization and its own fleet. In Durham, N. C., therefore there are three local trucking representatives and three local fleets, quite separate from each other and reporting direct to the central office. This is the case also in other cities where the company has more than one factory. The trucking department intends, eventually, to eliminate this duplication of organization in one city and to establish a single control trucking organization in each city. This organization will handle the incoming and outgoing deliveries of the factories located in that city, whether there be one of these or more. Such a system will undoubtedly reduce trucking costs still further.

At the present time the American Tobacco Co. owns and operates over forty trucks, which is from 20 per cent to 25 per cent of the total number of trucks serving its factories. As a result of the investigations which it is now making, it expects, eventually, to have practically 100 per cent owned trucks, split up into small fleets and operating centrally in each city, with a single fleet assigned to each of the cities where factories are located throughout the United States.

Windshields on Macks

New York City, Nov. 2—The International Motor Co., this city, has standardized on windshields for both the Mack AB and AC models, for which the following are the net additional prices, subject to change without notice: AB model, wooden windshield, mounted, $40; AC model wooden windshield mounted, $50.

The Editor's Viewpoint

Delegating Truck Authority

THERE is nothing quite so simple as a chart to indicate how the authority required for the operation and maintenance of a fleet of motor trucks is delegated downward from the chief of the truck equipment to the truck driver. Again, very few fleet owners go to the trouble of making such a chart because they do not think a chart is necessary for the successful operation of their equipment.

In most cases, more men have simply been added as the size of the fleet increased. Of course, we will assume that these added men have been kept busy continuously or else they would not have been put on the payroll. Very often, however, their work overlaps in some measure and as the size of the fleet increases, the various tasks become split up under different heads when one centralized head would do the same work at a lesser cost. One of the easiest ways to find this out is to make a chart showing how the authority is delegated. One such chart is shown in this issue. It would pay every large fleet owner to make such a chart and then analyze it to discover how the same work could be done just as well with fewer men.

Value of Enclosed Cabs

THE value of an enclosed cab to protect the driver in winter weather is without question. No fleet owner can properly expect to protect his truck investment unless he takes steps to keep his drivers warm and dry. Cold and wet drivers do not do good work and do not take good care of their trucks. A cab costing one or two hundred dollars is one of the best investments which a fleet owner can make and such an investment will begin to pay handsome dividends from the instant it is made.

A driver forced to sit in the open and unprotected from the elements, will feel that his employer has forgotten him and he, too, will forget his employer's best interests, for that is human nature. The driver's efficiency may be reduced at least fifty per cent and that is bad for truck efficiency and a maximum truck output of work.

Now that winter weather is upon us, it does no good to know these facts unless something is done about them. All cabs and cab curtains should have been inspected by now. If they have not been so inspected, it should be done at once so that when the time comes for the use of side curtains, it will not be found that some of the celluloid windows are so badly cracked or broken as to render the entire curtain useless as a protection.

Need for Radiator Covers

RADIATOR covers and engine hood covers are taken as a matter of course when fitted on passenger cars in winter. However, with trucks they are looked upon as an unnecessary luxury. This is certainly not due to any deep thinking on the part of the fleet owner but rather to precedent. If a radiator cover or hood cover helps to keep the engine of a passenger car running at a temperature which insures its greatest efficiency, it follows that the same will be true with the motor truck.

Wise fleet owners should consider this fact and equip their trucks with some form of covers, preferably those which can be partially opened or entirely closed as required to meet the changing temperature of winter weather and in this manner keep their engines running without overheating or overcooling, with less fuel and oil consumption and with fewer troubles caused by overheating or overcooling.

The Fleet Owners' Forum

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Advantages of Hauling Fruit by Trucks

To the Editor, COMMERCIAL VEHICLE:

Will you please supply us with whatever data you have concerning the economical advantages of the use of motor trucks in transporting fruit? We have endeavored to secure data of this nature from the engineering department of many agricultural colleges but without success. If you have published any articles on this subject, will you please give us a list of these stories and in what issues of your publication they appared?—EDWARD A. STREET, Los Angeles, Cal.

Speaking generally, the economical advantages of the use of trucks for hauling fruit may be reduced to one main factor of greater speed. With this one main advantage secured, there are several other lesser advantages resulting. For instance, due to the fact that trucks have a greater speed than horse wagons, fruit can be handled directly from the orchards to the nearest railway sidings. Sometimes these are far enough away as to require hauls on which horses cannot be used economically. On longer hauls it is sometimes possible by the use of trucks to haul the fruit to the railroad cars direct instead of first storing the fruit in a nearby warehouse. Furthermore, with the use of pneumatic tires, still greater speed may be obtained and the added cushioning effect of pneumatic tires instead of solids makes for easier riding with a resultant smaller damage to the fruit while in transit. By the direct motor truck delivery the fruit need be handled only twice, once at each end of the route, instead of four or five times, as is the case when the fruit must pass through a warehouse.

Articles on the handling of fruit by motor trucks were published in the following issues of THE COMMERCIAL VEHICLE:

Motor Trucks Making Good Hauling Farm Products and Fruit Into Seattle, Portland and Tacoma, pages 24 and 25 of the September 15, 1918, issue. This article gives some specific examples of the economies of motor haulage in handling fruit in the great Northwest.

Increased Use of Parcel Post Motor Trucks Will Help to Lessen Serious Food Wastage, pages 52 and 53 of the November 15, 1918, issue. This article tells of the work already performed by the Parcels Post Dept. trucks in hauling fruit and food direct from the farms to the various postoffices.

Countrywide Investigation Shows Great Value of Motor Trucks to the American Farmer, pages 21, 22 and 23 of the May 1, 1919, issue. This article discusses the question of food and fruit haulage throughout the United States and gives some comparative cost figures of farm haulage by motor trucks and by horse wagons. It also shows a picture of a Nash 1-ton truck mounted on 36 by 6 giant pneumatic tires and used by Mack Bros. of Kissimmee, Fla., for hauling fruit direct from the orchards to the nearest railroad siding. The use of

(*Continued on page* 339)

Where to Get Repair Links for Truck Chains

To the Editor, COMMERCIAL VEHICLE:

Will you please advise where I can buy twist link chains for renewing cross chains for heavy truck chains? Can you tell me where the best wheel or non-skid chains are obtainable?—R. A. LIVESEY, Pedro, W. Va.

Below is a list of makers of tire chain repair links:

American Auto Products Co., Washington, D. C.
Zinke Co., Chicago, Ill.

Some of the most prominent chain makers are the following:

American Chain Co., Bridgeport, Conn.
Arrow Grip Mfg. Co., Glens Falls, N. Y.
Challoner Co., Oshkosh, Wis.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Never-Skid Mfg. Co., New York City.
Rowe Calk & Chain Co., Plantsville, Conn.
Standley Skid Chain Co., Boone, Iowa.
W. E. Townsend Co., New York City.
United Sales Co., Minneapolis, Minn.
Foley Traction Rim Co. Inc., Minneapolis, Minn.

Green Concrete Is Carried in Truck Bodies

To the Editor, COMMERCIAL VEHICLE:

Will you please tell us if green or fresh mixed concrete has ever been carried in motor trucks? Please also tell us if any concerns make a practice of carrying such concrete in motor trucks and if so what have been their problems in such work and how have these problems been solved?—P. J. D., Atlanta, Ga.

Green concrete has been carried in motor truck bodies in many instances and with a good degree of success.

The Rogers & Hagerty Co., New York City, contractors for certain portions of the Metropolitan subway system, carried many hundred thousand cubic yards of green concrete in motor truck bodies. The use of trucks for this work enabled a central mixing plant to be established instead of having to employ smaller plants and move them along with the work.

The length of haul is an important consideration when green concrete is to be moved because if the haul is too long the concrete is liable to get its initial set before being dumped into the forms. Metal bodies of the dumping type are best for such work. A dumping body should be employed because of the speed of unloading. This is also important because the heavier aggregate settles to the bottom of the body, leaving the fluid cement at the top. For proper mixture in the forms, the whole mass must be dumped very quickly and the dumping body provides the easiest method of accomplishing this end.

The body used for this work should be narrow and high rather than low and flat in order to cut down the free surface of the material and lessen the body and chassis strains which are directly proportional to the area of free surface.

The real problem in handling fresh concrete in trucks is to provide some sort of watertight tailgate to prevent the leakage of the concrete in transit. A very efficient clamp of this nature was worked out for hot asphalt by the Union Paving Co., Philadelphia, Pa., and was described by word and sketch on page 136 of THE COMMERCIAL VEHICLE for

September 15, 1919. While this clamp was designed originally for hot asphalt, it is also equally suitable for fresh concrete.

Care should be taken to provide round corners in the metal body used for such work as square corners tend to make some of the material cling to the body when it is elevated for dumping.

Hand shoveling of the concrete remaining in the body when elevated is slow and laborious work and Rogers & Hagerty overcame this difficulty by cleaning out the body wth compressed air, which is usually employed in contracting work for operating drills, derricks and other equipment. All that is needed is a hose with a pipe at the end. When the air is turned on, this pipe is moved up and down the floor of the body and the compressed air quickly cleans out all the material remaining. Rogers & Hagerty further provided metal steps on the side of the truck body so that the workmen could use the compressed air hose with the least difficulty. These steps were fastened to the body in an inclined position when the body was horizontal so that the steps were horizontal when the body was raised to its full elevating height.

Costs and Other Data on Farmers' Trucks

To the Editor, COMMERCIAL VEHICLE:

The writer was recently appointed by the Ontario Government as a special investigator of motor transportation in rural Ontario, particularly in connection with agriculture. I have read THE COMMERCIAL VEHICLE with much interest and have gotten from it a large amount of valuable help in my work. I have found it very difficult to obtain operating and maintenance costs from farmers. Will you please give me the titles of such articles as have been published in THE COMMERCIAL VEHICLE on this subject?—DONALD R COWAN, Toronto, Canada.

Below is a list of some of the most recent articles appearing in THE COMMERCIAL VEHICLE on the use of motor trucks on the farms. Some of these articles contain cost data which may be of value to you in your work for the Canadian Government.

Trucks Have Advantage of Speed and Low Cost in Farm-To-Market Milk Haulage, July 15, 1919, pages 24 and 25, tells how motor trucks haul milk to Milwaukee from the surrounding territory within a radius of 25 miles and of the savings which they have effected for the farmers.

Fleet Owner Opportunities in Livestock Haulage, July 1, 1919, page 9, is a short story in which the advantages of hauling livestock by trucks are pointed out.

Trucks Plus Good Roads Move Food Crops Both Quickly and Economically, May 15, 1919, pages 5 to 9, tells of the use of trucks hauling foodstuffs in the Sacramento Valley.

Countrywide Investigation Shows Great Value of Trucks to the American Farmer, May 1, 1919, pages 21 to 23. This article gives a survey of the difference in cost of hauling by truck and horse wagon in different parts of the country. On page 23 is a table showing comparative costs of farm haulage by trucks and horse wagons.

Unloading Means, Manure Dump and Washstand Suggested at Kansas City Stockyards, April 15, 1919, pages 5 to 11, treats of the use of trucks in hauling livestock to the Kansas City Stockyards and of certain suggestions made by the editor of THE COMMERCIAL VEHICLE to provide better faetilities at the stockyards so that more trucks could be used in hauling livestock to that yard and other markets throughout the United States which may adopt the same suggestions.

Ship-By-Truck Movement Invades South to Prove Great Benefits of Highway Transport, April 15, 1919, pages 19 to 21, tells of the introduction of the ship-by-truck movement in the South with data on the first fleet of four trains of trucks running out of Macon, Ga., to nearby cities within a 50-mile radius.

Iowa's Rural Motor Express Has Accomplished Great Work in Developing Farm Sections, April 1, 1919, pages 15 to 18. The success of truck hauling in the state of Iowa is shown in this article by quoting figures of the livestock, etc., handled by this method and pointing out what saving has been effected.

Motor Trucks Making Good Hauling Farm Products Into Seattle, Portland and Tacoma, September 15, 1918, pages 24 and 25. In this article the use of trucks on the farms in the Far West is brought out and the profits which their owners have reaped as a result are indicated.

Detroit Farmer Finds Motor Truck Quicker and Cheaper Than Horses for Delivering Goods to Market, July 1, 1918, page 25. As the title of this article suggests, this is a short story bringing out the advantages of hauling by motor truck over trucking with horses.

Motor Truck Rural Express Routes in Maryland Increase Vital Food Production, April 1, 1918, pages 26 to 28. In this article it is shown how the farmer takes his produce to market by means of the rural motor express routes.

Varied Uses of Motor Trucks Bring Bigger Profits to Enterprising Farmers, April, 1, 1919, pages 21 to 23. This article points out how the truck may be used efficiently about the farm.

A Standard Bill of Lading for overland haulage of goods by farmers and concerns making a specialty of the work is reproduced on pages 116 and 117 of THE COMMERCIAL VEHICLE for September 1, 1919.

Any satisfactory bill of lading should bind the operator to the obligations of a long carrier and should set forth very clearly the extent of his liability. It should also be designed to permit the transfer of goods from one carrier to another. In addition to the items of the ordinary railroad bill of lading, one for motor truck lines should include some of the features of the invoice and the expense bill so as to obviate the need of a large number of forms for a relatively small business.

The standard bill of lading shown in the September 1, 1919, issue has been patterned somewhat after the uniform bill of lading as used by the railroads, but certain important changes have been made to conform to the needs of the motor transportation business. The bill of lading oentains certain items not ordiraliy incorporated in the regular bill of lading, such as space for statement of the value of the goods carried and the shipping charges. While these items are not a part of the ordinary bill of lading, it is perhaps best to refer to the form as a bill of lading, although it includes the essentials of the invoice and the expense bill. In some cases it might be necessary to modify certain provisions of the standard bill of lading as reproduced in the September 1 issue to conform with the laws regulating the business of long carriers in the different states.

It is also to be noted that a space is provided for a declared value of shipment and since motor truck owners have found it advantageous to insure the goods carried as well as the trucks which carry them, some certain value is generally accepted as a minimum at which the goods will be carried without an extra charge for insurance. For instance, if a value is declared greater than 50 cents a pound, insurance at the tariff rate in effect will be added to the charges.

The conditions under which the goods are handled, as printed on the reverse side of the standard bill of lading, are most complete and should be carefully studied as a means of protection to the shipper and incorporated with the bill of lading. Too often the motor truck operator who handles other people's goods for hire accepts the goods without any condition, with the result that in case of damage due to accident or collision, he gets into a controversy which either results expensively for him or makes him lose the business of the customer.

Helpful Data to Form Haulage Company

To the Editor, COMMERCIAL VEHICLE:

Two other young men and myself are preparing to start in business together in the operation of motor trucks for public haulage. We want to get a good start in the right direction and will appreciate any information which you can give us on the following list of questions:

1—What sort of hauling should we go in for?

2—What particular phase of hauling should we take up if we operate within 50 miles of Philadelphia? We do not want to enter a portion of the field which is already well provided with truck service.

3—Please give us a list of the approximate rates that are usually charged for truck haulage.

4—What particular kinds of mills and factories require most hauling that is readily handled by trucks?

5—In congested districts where trucks are often tied up by traffic and long waits are necessary before receiving or discharging loads, do you think it feasible to haul at night if we could haul 15 per cent to 20 per cent as much in a given time? In this case we could do our own loading and unloading, only making needful the presence of the already necessary watchman at the receiving and discharging points.—C. F. W., Philadelphia, Pa.

Answers to your questions in the order given are as follows:

1—We cannot tell you definitely what kind of goods you should attempt to haul on motor trucks within a radius of 50 miles of Philadelphia. You will have to determine this yourselves by actual first-hand information. By getting it yourselves you will know exactly where the possible work can be obtained and you will undoubtedly get much other information which will be of value to you in the formation of such a company as you propose. As the motor truck cannot compete with the railroads in the haulage of bulky goods of low cost over any considerable length of haul in excess of 10 miles under ordinary conditions, it is apparent that the kind of goods which you should haul are those of high cost and with which there is a demand for speed in delivery. For instance, you could get a much higher rate for hauling a 5-ton load of silk than you could for a 5-ton load of sand, because the rate on silk would be less in proportion to the cost or value of the silk than would be the case with the sand. We would suggest that you first obtain a list of the manufacturing concerns in the territory in which you wish to operate. The next step would be to call on the traffic managers of these concerns and find out what kind of goods they have to be shipped and where they go. Similarly you should find out what kind of goods are brought into the plant and where they are sent from. Doing this in the plants in the territory under discussion will enable you to obtain some idea as to the maximum tonnage of goods moving in both directions. The next step will be to determine how these out-going and incoming goods are now being handled and how much the various concerns pay for the work. When this study has been completed, you will have a good idea of just which of the work will be most suitable for motor trucks.

2—The kind of goods handled, the length of haul and the manner in which deliveries must be made should be considered in determining upon a basis of charge for the truck service. Where the goods are picked up at a fixed point and delivered to another fixed point, the rate is generally determined on the tonnage basis. If packages are handled, the rate, of course, would be based on the package. The shipper is not interested in the cost per ton-mile or the cost per package mile, these two being units which the truck owner can calculate as the means of determining upon the rate given the shipper. When the price is given per ton, of course you must take into account the mileage which the trucks can cover. The best method of determining the cost per-ton price to be given the shipper is to estimate the number of miles which can be covered in a day in that particular work and the tonnage which can be carried. Knowing these two factors, you can figure the cost of actual truck operation for the work. With this total cost of truck operation determined, the figure should be doubled to take care of the items of truck supervision, administration, advertising, office help, cost of doing business, getting business, etc. By doubling the actual cost of operation you will obtain a figure which will insure you a profit of from 10 to 15 per cent on your investment. For example, if your truck costs $19 a day to operate, you should double this figure and obtain $38 as your total cost of operation. If you could carry 10 tons during the day, the rate per ton which you should give to the shipper would be $3.80.

Of course, it is always advantageous to secure work on a contract basis, as this enables you to get started and to have some work which will keep your trucks busy throughout the major portion of the year. With this once done, you can add more trucks to take care of the additional business as it develops.

It is customary for truck owners handling other people's goods to carry full insurance on those goods while in transit. If you carry this insurance it will not be necessary to carry bonds. Insurance should also be carried on trucks themselves, as one bad accident on trucks which are not properly insured might eat up all of your profits.

3—Using a 5-ton truck, the rate for public haulage the country over is about 1 cent per 100 pounds per mile. Thus, with a 5-ton truck making a trip of 100 miles, the charge to the shipper will be $100. On such long hauls as this, care should be taken to secure return loads so that the run back home is not made empty.

4—It is very difficult to state just what particular kind of mills, factories, etc., require haulage which can be done by motor trucks. Anything which is of considerable value and is not handled in bulk such as sand, coal and the like, is suitable for handling by trucks. For instance, all forms of machinery installed in any kind of factory are good goods to haul by motor trucks. When shipped by railroad, machinery must be hauled from the point of shipment to the freight car, unloaded again at the destination and then hauled to the plant of the consignee. By trucks, the delivery may be made direct, thus reducing much wasted time consumed in looking for the freight car and of having it spotted at a point where the machinery can be unloaded. Phonograph records, clothing, paper products, glass, hardware, etc., provide good loads for motor trucks, provided there is a necessity for a speedy delivery.

We also have in mind a New England shoe manufacturer who has only recently put into service a fleet of trucks to haul lumber from a nearby city to the home plant for the manufacture of boxes in which the shoes are shipped by railroad to all parts of the country. There is almost an unlimited use of trucks in handling a great variety of goods.

5—Provided the goods do not have to be delivered to the consignee at night, there is no objection to operating trucks at night instead of in the day time. While there is less congestion on the roads at night than in the day, the use of trucks makes it necessary to provide a check on the driver's operation and to use careful drivers, especially when the trucks are operated over country roads and where the liability of going into a ditch is ever present if the vehicles are operated at their maximum speed.

Advantages of Trucks Handling Fruits

(Continued from page 337)

giant pneumatic tires has enabled the truck to run continuously at the rate of 25 miles an hour even when under a full load.

Trucks Plus Good Roads Move Food Crops Both Quickly and Economially, pages 5, 6, 7, 8, and 9 of the May 15, 1919, issue. This article treats principally of the haulage of grain and other food products in the Sacramento Valley.

Striking Success of Truck Terminal

Enlarge Floor Space as Result of Increased Business During First Month

Minneapolis, Minn., Nov. 14.—The volume of its business has increased to such an extent that the Minneapolis Ship-by-Truck terminal has doubled its floor space after little more than 1 month's operation. The terminal was established to help in solving the return loads problem for the motor express companies operating in the environs of Minneapolis. It is established in the heart of the wholesale district and affords a central depot for ten motor express companies, whose routes radiate in all directions from Minneapolis within a radius of 100 miles.

The trucks of the express companies carry to the city large quantities of cream, butter, eggs and potatoes. Quite a large proportion of these goods now transported by motor truck are surplus farm products, which, without the inexpensive motor express service, would probably go to waste or to the feeding of hogs. On their return journey the trucks take back to the farmer his requirements in furniture, farm machinery, groceries and other necessities of life.

The terminal is the central station from which incoming loads are distributed throughout the city and at which outgoing loads are assembled. The venture represents a practical movement toward systematizing the motor express service in this territory on an economical basis for all concerned.

Wholesalers and large shippers are lending the terminal management unanimous support, and every morning their trucks may be seen delivering merchandise at the loading platforms. This merchandise is then sorted and distributed in turn to the rural express operators. With very little delay the goods are then started on a rapid and uninterrupted course to their destinations in the country.

The terminal is incorporated for $100,000, and the company operating it is at present making a flat rate of 5 cents per cwt. for its service. The latter includes obtaining new business for truck line operators; making collections and taking care of bookkeeping. Drivers of trucks are instructed to take orders from rural merchants for any goods which the latter may need from wholesale houses in the city. These orders are turned in to the terminal company by the drivers and are then forwarded by the company to the wholesale houses concerned. A large number of orders is turned in each week and this feature is very much appreciated by the wholesalers.

The small charge made by the terminal company represents a very large saving to the motor express companies over what it would cost them to operate their heavy trucks over the congested city streets in making collections of goods consigned to rural districts.

Urge New Bus Service for Detroit

Prominent Detroiters Favor Line Similar to That Running in New York

Detroit, Nov. 8:—Motor buses for Detroit were urged at a dinner at the Detroit Athletic Club, arranged by Henry M. Leland, president of the Lincoln Motor Car Co., and Harold Emmons, formerly of the aircraft production division of the army. Mayor Couzens and members of the street railway commission, former Congressman Edwin Denby and others of prominence in city and state affairs were present.

Colonel G. A. Green, general manager of the Fifth Avenue Coach Co., New York City, and Herbert Moser, superintendent of transportation for the New York concern outlined the method of operation of the New York lines and gave minute details as to costs, profits, etc. All of those present favored the plan to relieve Detroit's transportation problem, which proposes the operation of 100 buses on five streets.

Coming Events

1919

Nov. 17-22	St. Louis, Mo., National Exposition of Mines and Mining, Old Southern Hotel.

1920

Jan. 2-10	New York City, Motor Truck Show, 8th Coast Artillery, Regiment Armory, 193d St. and Jerome Ave.
Jan. 24-31	Chicago, Motor Truck Show, International Amphitheater, Stockyards.
Feb. 9-14	Louisville, Ky., American Good Roads Congress.
Mar. 13-20	Boston Motor Truck Show, Mechanics Bldg.
Mar. 22-27	Wilkes-Barre, Pa., Motor Truck Show, Armory.

New Federal Highway Bill Progressing

Nationwide Highway Bill to Go Before Congress Late in December

Washington, Nov. 14—It is now expected that the Federal Highway Bill which will provide for a Federal Highway Commission to control all governmental highway activities will be brought before Congress late in December. In the meantime, the Committee on Post Offices and Post Roads is taking up the measure and will hold hearings on it in the near future and put the bill in its final form to be presented to the Senate.

The purpose of the bill is to take care of interstate traffic; to serve the large centers of commerce in each state, and to meet the military needs of the country. It will tie the country together into one unit so that it will be possible for the states to plan and connect their highway systems with the national highway system and thus link all the important centers by means of highways. The counties will then connect with the state system and build highways out from the centers of population into the farming communities like the spokes of a wheel. Each unit will be made more effective and efficient and the farmer will be given a number of markets for his produce instead of one. This road plan will greatly reduce the cost of transportation and lower the cost of living to the consumer.

The national highway system will form the backbone of the main commercial arteries of the nation. It will greatly stimulate the states to connect up their systems with the national system and the counties to connect up their systems with the state system, thereby making a general road plan which will effectively meet the road needs of the country. The purpose of the plan is to build, in the shortest possible time and at the lowest possible cost, a national road system which will be of the greatest possible value to all the people.

Pneumatics on Ford Trucks

New York City, Nov. 8.—The Ford Motor Co. is now equipping its 1-ton truck with 30 by 3½-in. pneumatic tires, clincher type, in the front and 32 by 4½-in. straight side pneumatics, demountable, in the rear.

Trailer Legislation in New Traffic Bill

Badly Needed Trailer Laws Are Approved by Federal Highway Council

Washington, D. C., Nov. 14.—At a meeting held last week at the headquarters of the Federal Highway Council it was decided to incorporate, in the uniform traffic bill now in process of formulation, certain legislation as regards trailers and semi-trailers. Registration of trailers and semi-trailers will be provided for and annual fees fixed at 15 cents per 100 lbs. gross weight of trailer, body and rated load capacity on pneumatic tires; 25 cents on solid rubber tires, and 35 cents on iron or steel tires.

These legislative provisions require one number plate on the rear end of the trailer; limit the weight on any one axle to 22,400 lbs.; the weight per inch width of tire to 800 lbs. and the maximum length of trailer trains, including towing vehicle, to 85 ft.

The provisions call for the use of a safety chain to prevent a trailer breaking away from the towing vehicle and a white light to be carried at the front of each trailer and a red light at the rear end of the last trailer at night.

It will also be provided that the weight of the trailer and its carrying capacity must be shown on the side. Highway authorities will be authorized, at their discretion, to issue special permits for the operation of trailers exceeding weights and dimensions fixed in the bill.

The uniform traffic bill is now being redrafted to include the trailer provisions and will be submitted for final approval of the Trailer Manufacturers' Assn. and of the Association of State Highway Officials. It will then be printed and offered for introduction in the twelve states whose legislatures meet next January.

Fulton to Reorganize

New York City, Nov. 11.—Plans have been made for a reorganization of the Fulton Motor Truck Co., Farmingdale, L. I., which when effected, will result in that company going ahead with its production on a much larger scale than heretofore. Charles Lang, who has been appointed receiver for that company on a claim of $4,045 made by H. L. Post for material furnished and work done in making bodies and cabs, states that the Fulton company has contracts on hand for 1,083 trucks with a selling value of $1,781,535. Due to a lack of money to meet obligations which have matured, Post says the liabilities amount to $250,000. The assets, however, are said to be worth much more and include the fully equipped one-story plant.

Two New Truck Express Lines

Lansing, Mich., Nov. 10.—Concrete evidence that motor truck express trains soon will be covering at least two sections of Michigan is seen in the granting of charters to the Upper Peninsula Motor Transit Co., capitalized at $20,000, and the Western Michigan Motor Transit Co., capitalized at $100,000.

Williamsport Service Station

Williamsport, Pa., Nov. 2.—The Harer-Wurster garage here has been opened. Repairing of trucks and storage batteries is to be made a specialty.

Motor Truck Freight Line for Lumber

Lumber Camps Are Now Linked with Shipping Point by Motor Freight Line

Eureka, Cal., Nov. 5.—The lumber camps of Humboldt County, Calif., are now served and connected with Eureka by a fleet of motor trucks. Eureka is the shipping point for lumber collected from the various lumber camps in this county.

The fleet consists of six Mack and Saurer trucks. It was installed and is now being operated by A. W. Way, who has organized these trucks into two fleets and has installed two regular freight lines. The two lines are known as the Ferndale - Loleta - Eureka Freight Line and the Ferndale-Petrolia-Upper Matole Freight Line. Their success up to the present time serves to show the superiority of motor truck freight lines over other means.

Waterproof Truck Body

(*Continued from page* 307)

the outside or final coat on the canvas in with the brush till the coat was nearly dry. The sides of the canvas lapped over the flooring for 2 in.—with a purpose. These sides he turned up, squeezing them tightly between the inside of the panel body sides and the outside row of a second layer of running-sills, of the same dimensions as the first, using, however, fifteen of them spaced 2 inches apart, the top row, of course, containing fifteen, instead of fourteen running sills, each still in the top, or second layer fitting over the space between two sills beneath, thus leaving no middle space of canvas for water to leak through when the paint might rub off.

To fasten together the top row of running sills, or strips, the two layers of painted canvas between and the bottom layer of running sills, flat-headed stove-bolts, threaded on the end and long enough to penetrate through all, were used, a nut running on the threaded end of each bolt, locking it securely through all the thicknesses mentioned. There were two bolts through all, at the end of each top sill and at intervals down the length, the total number of such bolts used approximating 350.

The heads of the bolts were all counter-sunk to the depth of ¼ in. in the top layer of running sills, so as not to interfere with the milk boxes in loading and unloading. In fact, catapulting, or tobogganing the wet boxes from the inside of the body to the unloading platform in Philadelphia, is a strong feature of "making speed" among the drivers.

The top layer of sills was thoroughly painted with the mixture of white lead and linseed oil, affording no chance for any leakage of water around the holes made in the sills and canvas by the bolts. The canvas, it will be noted, is fastened to the running sills by the penetrating bolts; is held tightly together also by the mass of white lead paint between the two layers and is held tightly all along its length on each side between the inside of the panel body and the outer top running sills.

Not a drop has the floor leaked, the truck has not been laid up for repair of broken springs and no time has been lost on that account. The same is to be said of the other trucks on which similar floors have been laid.

Routing Trucks in the Poultry Business

(Continued from page 323)

are placed the bills for the goods delivered. In the second are placed sheets containing rush orders for the locality concerned and in the third are placed the ordinary orders for that route. In this way a driver is able to locate his bills, rush orders and ordinary orders at once, because all three are in three pigeonholes on the same level and on the left or right side according to whether his route is on the west or east side of the city. But having the three papers in three different pigeon-holes obviates the necessity of sorting his papers and shows him at a glance how many rush orders he has and which deliveries must be made first.

The Loading System

The checking of the goods to be loaded and the loading of the trucks themselves are done in the simplest possible manner consistent with the elimination of mistakes. The goods to be loaded into a certain truck are selected and checked off by means of the drivers' orders already mentioned. They are then transported in the four different types of hand trucks to the sidewalk in front of the store, where they are loaded into the truck. During this selection and transportation the driver enters on his own trip record the goods which are to be delivered on that trip. Driver and helper then proceed to load the truck, placing the deliveries which are to be made last in the front part of the truck and so on until the first deliveries to be made are in the back of the truck and most easily accessible. During the course of the loading, and sometimes before the loading is begun, the checker, who is responsible for seeing that the correct deliveries are placed in the correct truck, checks off on his sheet each parcel or box or barrel as it is placed in the truck, or to be placed in the truck. This is usually done during the loading, but sometimes when two or three trucks are being loaded at the same time, it is necessary to check off the goods before the loading is done. In this case, the goods to go into a single truck are carefully segregated, after being checked, from any other goods which may be awaiting loading. The driver's record and the checker's record are then compared, the driver calling off the items and the checker comparing them. The two records must agree, of course, in every particular. The load of a ¾-ton truck averages from two to forty packages, i. e., boxes, barrels, baskets or parcels. Here the original small number is due to the fact that it is this class of truck that handles rush orders. The 2-ton trucks average from twenty-five barrels or large baskets to 125 boxes. The make up of such a load averages eighteen deliveries to a trip.

The Bonus System

Truck drivers operating for the Nathan Schweitzer Co. are carefully and thoroughly trained. For the most part they are recruited from the ranks of the helpers. When a helper has been with the firm for a year, he is given an oral test as to his knowledge of the parts and care of a truck. He is also given a thorough road test. If he has taken out a driver's license and succeeds in passing both tests he is then given a chance as a driver. Moreover, drivers and helpers whose work is satisfactory are given a bonus every three months, the former receiving $25 and the latter $15. Mr. William Schweitzer states that this system has supplied the company with a staff of well-trained drivers and helpers, among whom the spirit of co-operation and loyalty to the firm prevails.

Kansas City's Jitney Service Improved

$2,500 Bond Required—Specified Routes Assigned—Must Be Insured

Kansas City, Mo., Nov. 10—A jitney ordinance requiring a $2,500 bond went into effect last month, which is expected to raise the standards in jitney service, and bring a better class of equipment into the business. Jitney operators, numbering 1,320, have been licensed in Kansas City, this summer and fall, paying at the rate of $12.50 a year. The new ordinance as approved, provides for assignment of jitneys to specified routes; the employment of a jitney inspector to see that various rules for maintaining service are complied with, and the filing of a liability bond by all jitney operators. Bonds are, so far, being provided by only one company, the Automobile Liability Co., Milwaukee, Wis., the cost being $13 a month for $2,500 indemnity to one person and $5,000 on one accident. This bond also provides property damage indemnity.

Nearly 500 jitney operators have given bond. It is expected that about 200 more will comply with the new ordinance and continue to operate. Most of these are owners of passenger cars. The significant new development, is the inquiry among jitney operators, concerning truck bodies for worm-drive trucks, for use in passenger-carrying service.

American Stores Drivers Strike

PHILADELPHIA, Nov. 1—The warehouse drivers of the trucks owned by the American Stores Co., this city, have gone on strike. The Teamsters, Chauffeurs, and Helpers Union, of which these drivers are members, is demanding a minimum wage of $30 a week for the American Stores drivers. Many drivers, it is stated, connected with milk concerns and intercity trucking organizations are receiving from $35 to $40 a week. The American Stores Co. has refused to recognize the union. Its drivers receive a bonus in addition to regular pay.

14 Harrisburg Truck Lines

HARRISBURG, PA., Nov. 2—There are now fourteen motor truck lines running in and out of Harrisburg daily. A number of these lines have terminals in New York City. A farm-to-farm collection of produce and a house-to-house delivery of it is being considered for some of these lines.

Columbus Cyldesdale Service

COLUMBUS, OHIO, Nov. 5—F. J. Girard has become central Ohio distributor for the Clydesdale truck. He will open a service station at 42 North Grant Avenue, Columbus.

The Commercial Vehicle
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher

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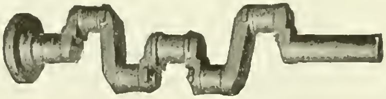


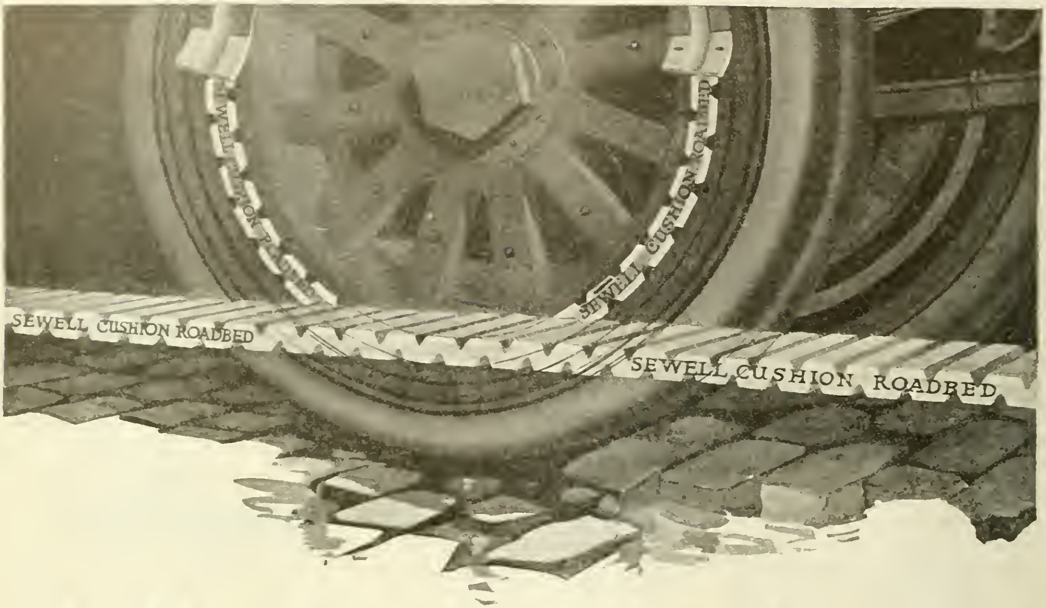
We have no desire to make ALL the forgings used by the industry, but for any VITAL part where the forgings call for "more-than-ordinary" service, we gladly offer our facilities for the solution of your problems.

Wyman-Gordon Co.

"The Crank Shaft Makers"

Worcester, Mass. Cleveland, Ohio

The Resiliency is Built in the Wheel



It Is This Sewell Rubber Roadbed

Built in the Wheel

That Receives and Absorbs the Road Shocks

All road shocks are picked up at the point of contact with the road by the Sewell Rubber Cushion and distributed over forty per cent of the wheel. So, these Road Shocks are **Diverted Away** from the Hub, the Axle, the Bearings, the Mechanism of the Truck. That is the action of the Sewell Principle—"The Resiliency Built in the Wheel."

What is the Sewell Rubber Cushion?

It is a continuous, permanent Roadbed of Soft Rubber, that does not and cannot wear out because it is not in contact with the road. The Motor Truck always carries this Rubber Roadbed with it, because it is literally "Built in the Wheel."

You buy this Sewell Rubber Roadbed when you buy your Sewell Wheels and it lasts as long as the truck lasts. No delays, no replacements, no repairs. When you buy the Sewell Rubber Roadbed you make a Permanent, Profitable Investment.

During the next five months when road conditions are the worst is when Sewell Wheels will pay you one hundred per cent on your investment.

The Sewell Rubber Roadbed is the reason why the country's largest truck owners have unreservedly adopted the Sewell Principle—

"The Resiliency is Built in the Wheel"

Sewell Cushion Wheel Company, Detroit, U. S. A.

Sewell Cushion Wheels

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Dec. 1, 1919 No. 9

UNIT SYSTEM

Cuts Repair Bills in Half

Method Also Reduces Time for Work From 39 to 10 Days per Truck per Year

BY F. E. SPOONER

FLEET owners can save 75 per cent of the time lost in the overhauling and running repair work of their trucks by the installation of the unit system of repairs as used by the Motor Haulage Co., New York City. That company operates fifty-one 5-ton Pierce-Arrow trucks, furnishing them to large firms on a contract basis as an alternative to owning their own equipment. This guarantees to the customer a 100 per cent service in so far as the number of trucks necessary daily for his business is concerned.

This guarantee is accomplished by having a sufficient surplus equipment which is self-supporting but not engaged on contract work and by employing a spare unit system that insures the highest point of mechanical efficiency for all of the trucks at all times and reduces to a minimum the frequent delays due to mechanical annoyances. Four or five trucks are usually kept as surplus equipment. These are only rented out daily, so that they may be called in at any time to take care of any demand for services by the regular customers.

In order to obtain the maximum economy in the operation of its fleet of trucks, the Motor Haulage Co. has found it necessary to maintain a definite schedule of rotation in repairs and maintenance. This can be obtained only by the unit system in conjunction with proper supervision and inspection.

By a comparative figure covering a period of 5 yrs., that company finds that the idle time per truck due to running repairs and overhauling has been reduced 75 per cent by the unit repair system. Formerly, the average time lost in overhauling and running repairs was approximately 39 days, divided into 24 days for overhauling and 15 for running repairs. The present method of the unit system of repairs has reduced the number of idle days from 39 to 10 during 1 year. These 10 days of lost time are consumed in replacing defective units, minor repairs and a general tightening up of the trucks.

The cost of maintenance due to time lost has been reduced over 50 per cent by the unit repair system. It has been figured that the fixed charges per day when a truck is in for inspection and repairs amount to $22.50. This amount includes the cost of administration, supervision, interest on the investment, depreciation, garage rental, insurance, etc. Figuring on the basis of 24 days in which to thoroughly overhaul a truck, the cost of maintenance due to time lost for one truck would be $540. With the unit repair system which requires only 10 days per year, the cost of maintenance due to time lost would be only $225 per truck per year.

Fleet owners in general lay their trucks up once a year and subject them to a thorough overhauling. The body is taken off; the engine is lifted out; the pistons removed; the transmission disassembled, and every part subjected to a careful scrutiny. The smallest defect is remedied. New parts are supplied; all parts readjusted, and the truck is put together again in perfect trim for another year's work.

The Problem Stated

How often should this overhauling be performed and what place should it hold in the maintenance of a fleet of trucks? There are two theories, as follows:

1.—That the periodic overhaul is a necessary supplement to any system of regular inspection. It is not practicable to inspect a truck once a month or so in a manner that will disclose every mechanical weakness. Moreover, it is often not practicable or economical to replace parts the minute they begin to show wear. This should be done at periodic intervals, such as every year, or every 10,000 miles.

2.—That the periodic overhaul is illogical inasmuch as it is an admission that certain mechanical troubles have escaped the regular inspections. It is contended that the monthly inspection should be so rigid as to detect every ailment at its inception.

Nat. Mallouf, vice-president and general manager of the Motor Haulage Co., New York City

Nat. Mallouf, vice-president and general manager of the Motor Haulage Co., does not believe in periodic overhauling. That company's trucks are maintained as they go. The determining factor is the thoroughness of the inspection and the amount of machine shop equipment and parts on hand to take care of the necessary maintenance.

Truck inspection is on a 5 weeks' schedule and 1 full day is given to each truck. Lubrication, adjustment and replacement of small parts, or, if necessary entire units, are included in the inspection. The entire system is on a spare unit basis, so that reserve engines, rear ends, transmissions, radiators, etc., may be replaced at this time. This eliminates the necessity of the complete overhauling of the trucks, as a truck is kept continually in good mechanical condition and 1 day's time is ample to install any new units that may be needed. Due to the fact that the men are taught to specialize, in so far as possible, on different parts of the trucks, all of the different units, such as engines, rear ends, etc., might be replaced during an inspection period of 1 day by concentrating the efforts of the entire shop on one truck. Inasmuch as it is not necessary to do this, ample time is given to the men to repair the spare units as they come out of the trucks.

Due to this form of maintenance, it is possible to adhere to a definite schedule in regards to the time of replacing units and at all times have on hand completed units in order to anticipate emergencies. Three engines, three gearsets, and three rear ends, besides minor assemblies such as steering columns, clutches, radiators, wheels springs, etc., are kept on hand for a fleet of fifty-one trucks.

Six mechanics not including the foreman and tester, are all that are needed to take care of the repairs of these fifty-one trucks. Two are used for inspection and rear end work; two for engine work only; one for gearsets, and one for work in the blacksmith shop and as a helper. It has been estimated that were these trucks brought in for a yearly overhaul, at least fourteen men would be needed in order to get the trucks out of the shop in as fast time as possible. There would be more confusion and the work would not come up to the present degree of perfection when the men are not hurried in their work.

The Kind of Inspection

A complete mechanical record of each truck is kept by means of the rigid inspection system. This record is kept on a special form, as shown in the accompanying illustration on page 345. Two days prior to the date of inspection according to the rotation schedule, this inspection card is looked over carefully, together with other reports, if any, in the file and a work card is written out and made ready to attach to the truck on inspection day. Two mechanics, together with the driver of the truck, immediately prepare to take care of all the work items set down on the work card. The entire lubrication and greasing of the vehicles is accomplished during this inspection period.

At the conclusion of the inspection day, the tester, accompanied by the driver, takes the truck out for all necessary adjustments, etc. and if it is in the proper condition the driver signs the work sheet. In this manner the driver not only learns a great deal about his truck but feels the responsibility of taking care of that truck during the intervals between the inspection periods.

It is the policy of the company to always assign the driver to the same truck. The drivers are not, however, permitted to change the oil. The oil in the engines is changed once a week and the crankcases are washed out with kerosene once every 2 weeks. This work is done by a man thoroughly familiar with the engine and its lubrication. He makes a report daily regarding what he did the night previous.

It will be noted that the inspection card takes in every part of the truck, and includes the date of inspection; the tester's and inspector's names, together with those of the different men handling the actual repairs. Thus, if any repair or adjustment fails to stand up, the foreman can put his finger on the mechanic who did the work. And if the same trouble appears two or three times, either the mechanic is at fault or the part is defective.

Of course all of this work is supported by excellent facilities, such as special tools; an overhead traveling crane; a jib crane; one 21-in. lathe; one 13-in. lathe; a drill press; a 16-in. grinder: a turret lathe; a sensitive drill; a welding outfit; forge and anvil; two arbor presses; an oil grooving machine; a tool grinder; two engine repair stands; an engine testing stand, and a magneto testing stand.

Saving on Parts

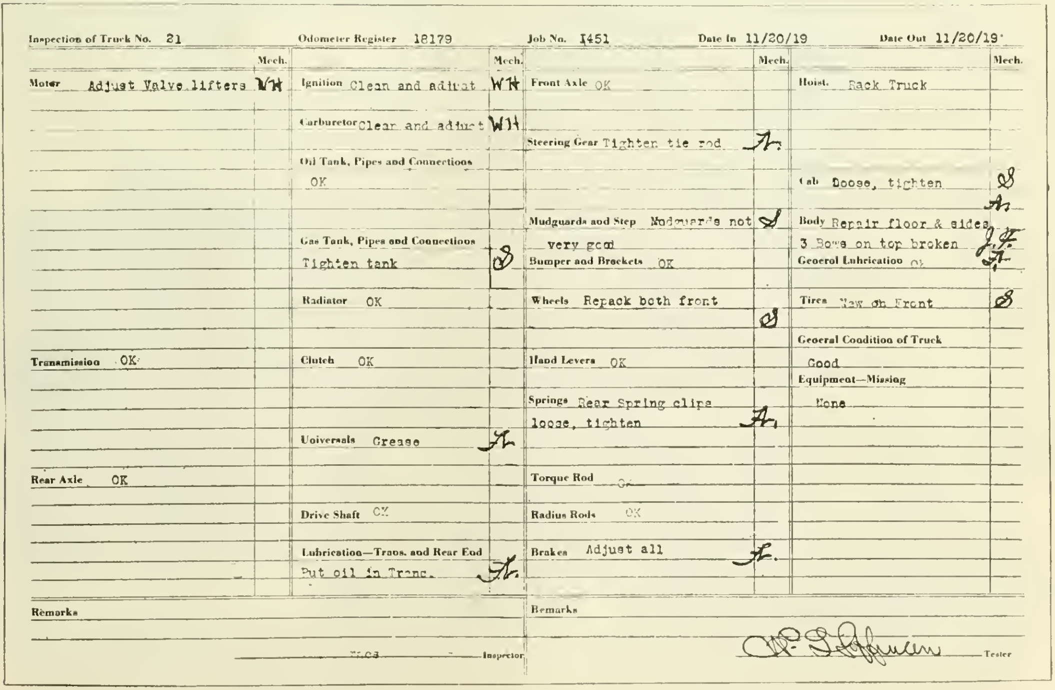
The turret lathe is a recent addition to the machine shop equipment. This lathe has saved the company $581 on the purchase price of 240 bushings from the manufacturer. On a run of 240 bushings, each costs the company 97 cents or $235 for the 240. The Pierce-Arrow price for each bushing is $3.40, or $816 for 240. As the lathe cost $2,100, the Motor Haulage Co. is saving enough on each run of 240 bushings to pay over one-quarter the investment in the lathe.

The average time to make a rear spring hanger bushing is 8 mins. The cost of turning these out on the lathe is 10 cents each, based on a labor rate of 78 cents per hr. The average weight of the rough castings is 4 lbs., 1 ounce. At the price of 50 cents per pound, each casting costs $2.04. As there is enough material in each casting for two bushings, the cost for one bushing would be $1.02. Adding 10 cents labor cost brings the price up to $1.12. The cost of 240 bushings is then $268.80, not counting in the sale of the waste bronze which amounts to 1.10 lbs. At 30 cents per pound, the price of 240 bushings is lowered $33, bringing the final price to $235.

The overhead traveling crane with a capacity of 3 tons runs the length of the shop. This makes it accessible in all parts of the shop. The crane is as wide as the shop and runs on two tracks. By this method, parts may be lifted from the truck and taken directly to the bench or lathes without a second handling.

The magneto test stand consists of a small table with a small electric motor. A rheostat on the side of the table and a gap-board are provided. The rheostat controls the speed of the motor, so that the magnetos may be tested at all speeds and all necessary adjustments made before being replaced on the truck.

The engine-testing stand allows the company to run in all of its overhauled engines before installing them in the trucks, thus eliminating all leaks or slight adjustments that could not otherwise be detected. It also makes it possible for the drivers to crank their engines without the usual difficulties experienced after an engine has had its bearings tightened.



Inspection of Truck No. 21 Odometer Register 18179 Job No. 1451 Date In 11/20/19 Date Out 11/20/19

	Mech.		Mech.		Mech.		Mech.
Motor Adjust Valve lifters	WH	**Ignition** Clean and adjust	WH	**Front Axle** OK		**Hoist.** Rack Truck	
		Carburetor Clean and adjust	WH	**Steering Gear** Tighten tie rod	A.		
		Oil Tank, Pipes and Connections OK				**Cab** Loose, tighten	S A
		Gas Tank, Pipes and Connections Tighten tank	S	**Mudguards and Step** Mudguards not very good	S	**Body** Repair floor & sides 3 Bows on top broken	J.F.
				Bumper and Brackets OK		**General Lubrication** OK	A.
		Radiator OK		**Wheels** Repack both front	S	**Tires** New on Front	S
						General Condition of Truck Good	
Transmission OK		**Clutch** OK		**Hand Levers** OK		**Equipment—Missing** None	
				Springs Rear Spring clips loose, tighten	A.		
		Universals Grease	A.				
Rear Axle OK				**Torque Rod** OK			
		Drive Shaft OK		**Radius Rods** OK			
		Lubrication—Trans. and Rear End Put oil in Trans.	A.	**Brakes** Adjust all	A.		

Remarks

Remarks

[illegible] Inspector

Tester

The inspection card used by the Motor Haulage Co., takes in every part of the truck

SORTING DELIVERIES

In the Wholesale Butcher Business

Success of Truck Work Depends Upon Sorting System Based on the Factors of:

1—Simplicity
2—Little Manual Labor
3—Cleanliness

HOW packages are sorted is an important factor in the general efficiency of a delivery department. System, or lack of system, in the sorting room may make, or break, the delivery department from the point of view of efficiency. The highly satisfactory delivery department of the Nathan Schweitzer Co., Inc., has played a large part in the noteworthy success of that meat company. The thoroughly-organized sorting system of the company must, therefore, be given a considerable share of the credit for its success.

Most of the goods handled by the Nathan Schweitzer Co. are stored in the upper floors. Meats, however, are kept in a cold storage room immediately back of the sorting floor. The latter is situated on the ground floor and has two large doorways opening onto the sidewalk, where the company trucks are loaded. Leading off the sorting room and to the right of the entrance is the office, where the paper work of the delivery department is handled.

When an order for goods is received, it is written out in duplicate on an order form. One copy of the order is then placed in a pigeon-hole, corresponding to the route concerned—that is, to the part of the city in which the goods are to be delivered. The other copy of the order is placed in a small Lamson automatic carrier which carries it up to the floors above.

Filling an Order

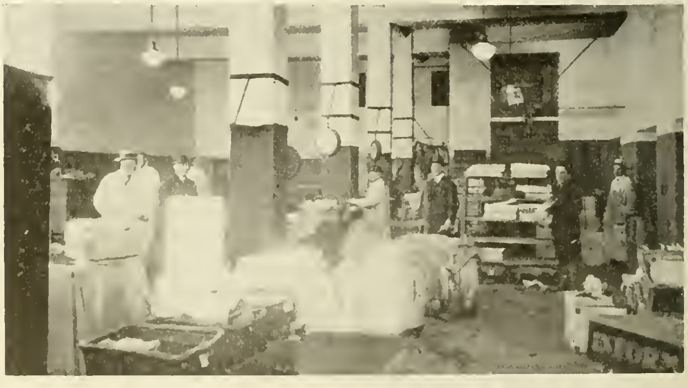
The order may include a large number of items for the company supplies many of the large hotels and restaurants in New York, as well as a number of steamship lines. The fact that these goods may be situated on different floors makes no difference in the efficiency of the system. When all the goods to be found on one floor have been checked off on the order, they are placed on hand trucks and dispatched via the elevator to a certain section of the ground floor sorting room. The order then passes on to the next floor and the same process is repeated.

On the ground floor the space is divided up into sections, corresponding to the different truck routes. Therefore, as goods arrive from the floors above, they are pushed on handtrucks to the area concerned; and even though the goods on one order may arrive at the ground floor in different lots at different times, they are collected automatically into one small area. Here it is a simple matter for the truck driver, with the other copy of the order in his hand, to collect and place on handtrucks the goods called for on his orders and which must go out on his next trip. When meat is included in an order, it is handled in the same way, the meat being collected and sent to the sorting room before the original order is dispatched to the upper floors.

Modern Facilities

In addition to the Lamson carrier, the company has installed many other facilities which simplify the transportation, collection and distribution of the goods from the upper floors and in the sorting room. The interior trucking is accomplished by means of two-wheeled hand trucks; flat four-wheeled hand trucks, high four-wheeled hand trucks with shelves; hamper hand trucks, and the Bartlett lifting truck and false platforms. The two-wheeled trucks are used for barrels; the flat trucks for heavy

(Continued on page 382)



Ground floor sorting room of the Nathan Schweitzer Co., Inc., as seen from the doorway. The room is tiled to the ceiling and the cement floor is washed down frequently with a hose. In the left foreground are baskets of meat on Barrett truck platforms. The high, shelved hand truck in the right background is used for small, light packages. The cold-storage meat room can be seen in the right background. Note floor space lighting facilities and other types of hand trucks visible in the background

Taking Care of

Valve Rods, Faucets and Lights

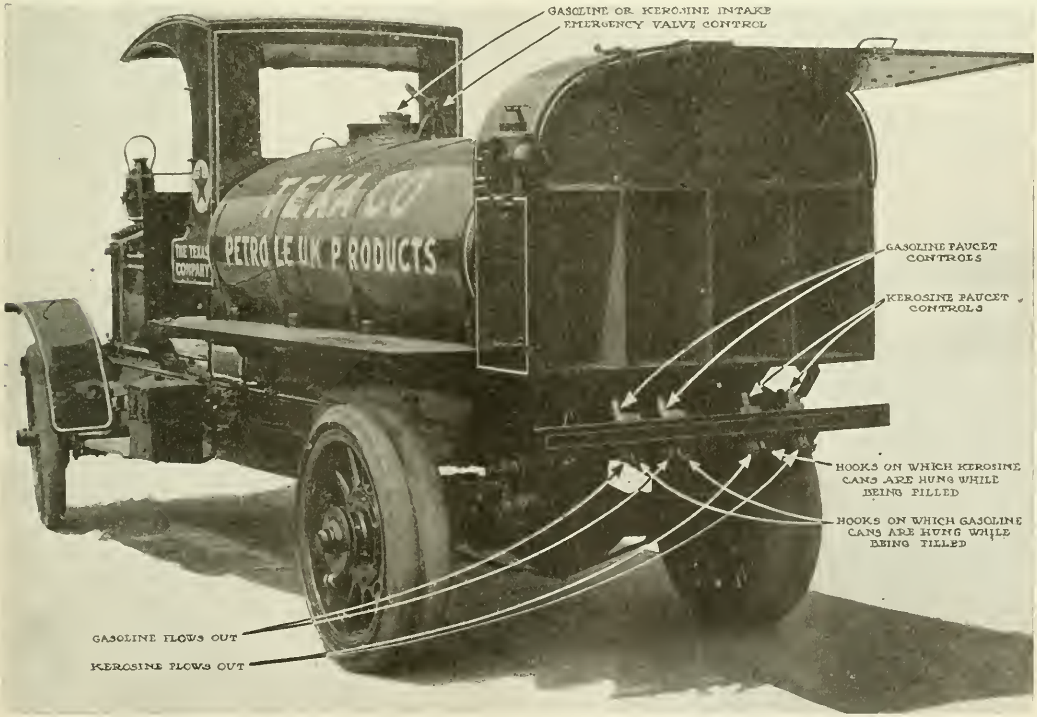
On Gasoline Tank Trucks

VALVE rods, faucets and lights and the lighting system are other parts of a gasoline tank truck which present serious problems for the man in charge of the maintenance of such trucks. Swash or baffle plates and emergency valves were dealt with in the Nov. 15, 1919, issue of THE COMMERCIAL VEHICLE.

The valve rod is a long, flexible rod, built in three sections, which connects the valve control on top of the tank with the emergency valve in the bottom of the tank. To open the valve, the control above is lifted up by the driver. This raises the valve rod and opens the valve. Occasionally, however, the valve sticks a little or the driver lifts the control too abruptly. In either case a strain is placed upon the valve rod. If the strain is too sharp, the joints cannot take it up and the rod breaks—almost always up close to the top where it is held rigid. Occasionally an extreme lateral, or fore and aft, sweep of oil will also break the valve rod in spite of the swash plates or baffle plates. As a result the valve may open, and if the faucets leak at all, loss of gasoline or kerosene results. It is very important, therefore, that these rods be inspected at frequent intervals and, when they are found faulty or broken, immediately replaced.

The faucets, shown at the rear of the truck in the illustration on this page, are a second means of control over the flow of oil from the tank. Two of them connect with the compartment of the tank containing gasoline and two with that containing kerosene. These faucets are self-locking, but they are subject to flaws in themselves and the washers wear out at uneven intervals. The faucets should, therefore, be inspected frequently in order to avoid a slight loss of the product, or, if anything goes wrong with the emergency valve, a greater loss.

Because of the explosive nature of the product carried in the tanks, oil lights cannot be used on gasoline tank trucks. The use of electric lights, however, means a generator and battery and presents another problem. This is solved by mounting the generator on the engine or, as in the case of some of the Mack trucks operated by the Texas Co., mounting the generator on the frame and driving it from the propeller shaft.



One of the Texas Co.'s combination trucks. These trucks are used in districts where deliveries are made in small quantities. The tank has two separate compartments, one for gasoline and the other for kerosene. In addition, separate, small capacity cans of gasoline, kerosene, lubricating oil and grease can be loaded in the carrier at the rear

Keeping FARM TRUCKS BUSY *All Year 'Round*

Removable Sheet Tin Lining Permits Hogs, Manure and Vegetables to Be Carried in Same Truck Body

THE problem of all-year-'round use of a motor truck on the farm has caused many farmers to stick to horses and mules. Because of conditions during the so-called idle seasons, many farmers do not consider the motor truck practical. But truthfully speaking, there is no idle season on a farm—at least not on the farm of R. W. Buckner, an enterprising Missouri vegetable grower and live stock raiser.

Mr. Buckner realized the value of a truck on the farm. When he considered the purchase of trucks to replace his mules and horses for hauling purposes, the same question came to his mind that has come to the mind of every farmer who is contemplating the purchase of a motor truck—that of all-year use.

Greenhouses are profitable. It is one of the most economical practices in which a farmer may engage, if he is interested enough, and there is no reason why he should not be interested. Instead of warming a chair seat all winter or wasting time in any other manner during the winter months, this farmer decided that he would pass his idle moments raising flowers. His decision was the keynote of the reason for his purchase of a truck.

No elaborate fixtures were to transform the truck into a service vehicle that would also haul hogs, manure, and fresh vegetables at various times of the year. His greenhouses are located a little distance from his manure storage barn, which adjoins his stables and which is within a reasonable distance from his hog pen and feeding houses. Notwithstanding the fact that the Buckner farm is provided with only one truck, as yet, his solution of hauling problems should interest all owners confronted with similar problems.

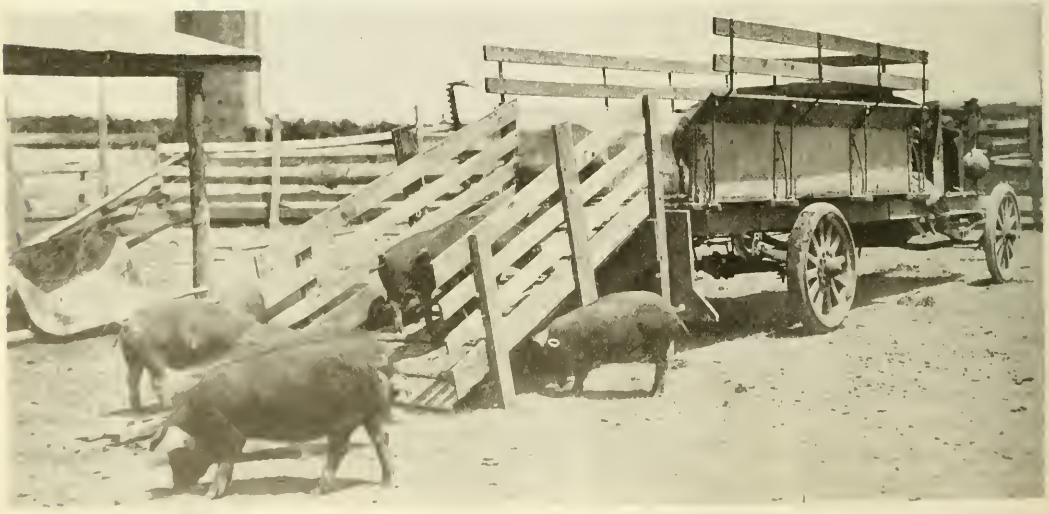
His first improvement on his truck, a 2-ton Traffic, was the erection of two removable side rails, which when in place, as shown in the accompanying illustration, add 2 ft. to the height of the body and thereby increase the value of the truck for livestock haulage.

The problem of hog loading was easily solved. Six pieces of ordinary fencing lumber was cleated together to make a floor for a runway from the ground to the truck body. The runway was about 6 ft. long.

A Sheet Iron Flooring

When hogs and manure is being hauled, no flooring is used in the truck other than the floor proper. When produce or fresh table delicacies constitute the load, a piece of sheet iron, obtained from a section of unused material for a ready-built silo, is placed in the truck body and keeps the vegetables from contact with either the sides or floor of the bottom. Although the truck sides and floor are cleaned after every load of manure or hogs, this does not render the body immaculate, as may

(*Continued on page* 381)



This Missouri farmer's truck, a 2-ton Traffic, is used all the year 'round. By going in for hothouse flowers, the truck is used for hauling them in the winter. By a removable sheet tin lining, hogs, manure and vegetables can be carried.

Safe and Sane Method of

SUPPLYING GASOLINE

To the Delivery Fleet

WHERE and how do your trucks get their gasoline? Is your system the safest system possible? Is it the most convenient system possible? Or is it highly inconvenient, and only safe in so far as it conforms to the letter of the law regarding the storing of explosives?

These are questions which every owner of a small fleet of trucks should ask himself and he should be sure that the answer is satisfactory. If not, this story tells how the problem can be solved at a minimum of expense and so as to obtain a maximum of safety and convenience.

G. E. M. Stumpp has a delivery fleet of four light trucks operating in New York City in addition to a fleet of heavy trucks employed in landscape gardening elsewhere. The store itself is situated on Fifth avenue, where rents are extremely high. The trucks are, therefore, garaged some distance away, in a building adjoining Mr. Stumpp's local greenhouse, near the East River. A certain number of deliveries are made from this greenhouse, in addition to those made from the store. Therefore, the trucks sometimes start on their routes direct from the greenhouse, without calling first at the store. For this reason, all gasoline supplies are kept at the garage and none at the store. Each driver fills the tank of his truck in the morning before starting out, whether he is starting for the store or on his first route for the day.

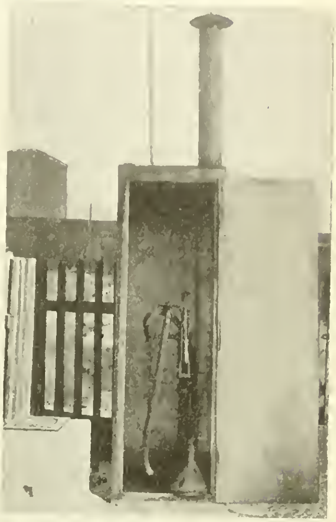
An Underground Tank

In order to simplify his gasoline supply system and make it as safe as possible, Mr. Stumpp installed an underground tank at the garage. A large hole was dug just outside the garage door and a cement tank built into it. When this was completed, it was entirely roofed over and closed in, with the exception of three small holes for pipes. About 1 foot of earth was then replaced on top of the completed tank, so that, except for the pipe connections, it is completely buried.

The tank holds 150 gal. of gasoline. The gasoline intake is also of cement and can be seen in the top illustration on this page, near the ground and on the left of the pump housing. The pump is directly above the tank and is completely housed in, as the picture shows.

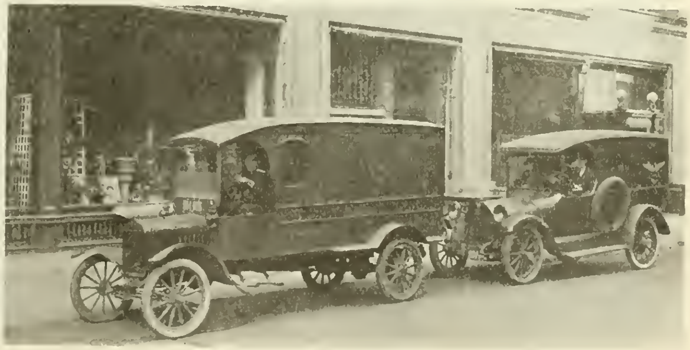
Pump in House

The third pipe connection is for the air intake which prevents the formation of a vacuum when the gasoline is being pumped out. The air enters through a 1-in. pipe which runs up behind the pump housing. Part of this pipe can be seen in the illustration. It runs up at the back and to the left of the pump housing, to a height of about 20 ft., to avoid the suction of dust nearer the ground. This pipe ends in a double elbow joint at the top, so that the open end points downward and no rain can get into it, nor, through it, into the gasoline tank below. The door of the pump housing is kept closed when not in use, and the interior is ventilated by means of the stove pipe visible to the right. This pipe runs down inside the pump housing to within about 6 in. of the floor.



View of the gasoline pump and its housing. The pump connects with the tank, is buried in the ground immediately under it, and is used to fill the truck tanks each morning. Note the air intake pipe projectnig from the top on the left and the ventilation pipe on the right.

The tank is absolutely fireproof because nothing can get at it to set it on fire. Moreover, Mr. Stumpp's trucks pull up to it, fill their tanks and start out again on their work for the day in about half the time taken to fill them by the old-fashioned method of using 2 gal. cans.



Two trucks, a Studebaker and a 1-ton Ford, belonging to Mr. Stumpp's delivery fleet. In this view, the two trucks are awaiting loading outside the store. They are garaged at the greenhouse where they fill their tanks each morning before starting for the store or on their first delivery trips

Real How Florist Decided to Buy Trucks—and without Regret

GETTING RID OF HORSES in the Florist Business

Only Trucks Make Possible the Large Expansion of Business Area

NO. 6

This is the sixth in a series of articles on the principles to be considered in getting rid of horses in different industries. The first five articles in this series were published as follows:

No. 1 Coal. . . . . .Aug. 15
No. 2 Paper. . . . .Sept. 1
No. 3 Lumber. . .Sept. 15
No. 4 Groceries. . .Nov. 1
No. 5 Express. . .Nov. 15

Article No. 7, on getting rid of horses delivering beverages will appear in the issue of Dec. 15, 1919.

MOTOR trucks are just as economical as horse drawn vehicles and four or five times as efficient for haulage and delivery in the florist trade. It took just one experiment 10 years ago to indicate this fact to G. E. M. Stumpp, one of the largest New York florists. A second experiment a little later convinced him. Once again the motor truck has proved its superiority over the horse-drawn vehicle. In this case it has proved its superiority, and moreover, in a business which might at first glance appear more adapted to the use of the horse and wagon because of the generally light nature of the goods hauled; the time limit set on all deliveries and the number of immediate deliveries involved.

The First Experiment

About 10 years ago, G. E. M. Stumpp, owner of the large business situated on Fifth Ave., New York, owned and operated forty horses. Shortly after that time, when the great superiority of the motor truck over the horse wagon began to be appreciated, Mr. Stumpp purchased a 2-ton Pierce-Arrow motor truck with a stake body.

The business embraces a great deal of landscape gardening and this naturally necessitates hauling small trees and bushes, and often larger decorative vegetation, which are both heavy and unwieldly to handle. Accordingly, the new truck was set to work in connection with Mr. Stumpp's landscape gardening activities.

The experiment was a success. Mr. Stumpp found that his new Pierce-Arrow truck performed the work of at least six horses, if not more; and performed it with greater efficiency and greater dispatch. However, the installation of this work was merely an experiment and Mr. Stumpp had no idea at that time of using other and lighter trucks in other departments of the business.

The main gardens and greenhouses of the firm are situated at Southampton, Long Island, 100 miles from the New York store. It is from there that Mr. Stumpp obtains trees and large bushes for his landscape gardening activities in the neighborhood, in Long Island generally and in other suburbs of New York. These greenhouses also supply flowers and smaller plants to his local greenhouse in New York and to his large store on Fifth Avenue, for his local retail trade.

At that time, deliveries of flowers and small plants from Southampton to New York were made by horse wagons. Southampton is about 83 miles from New York as the crow flies and about 100 miles by road. Deliveries from Southampton to New York had, therefore, to be made by express or freight, an expensive method, and one by which the very perishable commodities involved were not likely to arrive in the same condition in which they started. This method failing, one of Mr. Stumpp's horse vehicles had to start out on a long, slow and exhausting journey to the city, 100 miles away.

After the success of his first experiment Mr. Stumpp determined, therefore, to try a second. Accordingly, he purchased a 2-ton White truck, fittted it with a handsome panel body and started using it to transport flowers and small plants, ferns, etc., from the Southampton greenhouses to the New York greenhouse and the store.

The 2-ton White truck waiting at Southampton to be loaded before starting out on its 100-mile run to New York with new stock and orders for the New York store and greenhouse. This truck runs 200-miles a day for many days a month and has covered 100,000 miles with only one overhaul

The results were amazing. Mr. Stumpp found that the White truck made the trip daily from Southampton to New York and back again with ease. Moreover, in the season of ordinary deliveries, it was quite capable of transporting the entire quantity of flowers and small plants required for orders or for restocking the New York greenhouse, the store show windows or the store itself. In fact, the new method of making this journey compared to the old was, on a small scale, like comparing the voyage of the present day Atlantic liner with the old-fashioned, uncertain and perilous voyage of the sailing ship, where the passengers never knew how long the trip would take and were exceedingly uncertain of ever arriving at all.

Since the White 2-ton truck was first installed, it has made frequent and regular trips to Southampton and back again, covering 200 miles a day. Altogether, it has traveled over 100,000 miles with a single overhaul. It is many years since there has been, in Mr. Stumpp's mind, any question of the superiority of the motor truck over the horse wagon in the florist business.

Getting Rid of Horses

Soon after the first truck was installed, Mr. Stumpp began to get rid of his horses. He first sold two of them and later more, until by 1912, he had sold all but one horse and had ceased to use horses at all in his business. Most of the horses were sold at private sales. They were good horses, in excellent condition, and it was only necessary to place a reasonable price on each horse and advertise a description of the horse and the price. In most cases this resulted in a prompt private sale. A few of the horses were also sold at public auction, but this method, while satisfactory, was not so good as the other.

In any case all of the horses were sold except one. This last animal is still used occasionally for work round about the New York greenhouse. But for the most part he is allowed to browse in field or stable undisturbed, where he ruminates, doubtless, on the days of his vanished glory, now gone forever.

Because of the wide diversity of work for which they were required, Mr. Stumpp installed a fleet of motor trucks of widely different types. First of all, for the landscape gardening trucking, another 2-ton Pierce-Arrow was installed. The first of these was fitted with a flat, stake body and the other was supplied with a panel body like the White. The former was used to transport the larger class of young trees and large bushes, such as lilac bushes, etc., as well as other material used in landscape gardening. The latter was employed in transporting smaller but heavy bushes, flowering plants for out of doors, etc.

To some extent the 2-ton White was, and is, also used for landscape gardening work. But for the most part, its duties consist of making the long run between Southampton and New York and keeping the New York store and greenhouse supplied with stock from the greenhouses at Southampton. The White also makes a certain number of local deliveries of plants and cut flowers in and around Southampton.

To handle deliveries in New York, Mr. Stumpp now has two Ford 1-ton trucks and one Studebaker 1-tonner. These trucks make the usual deliveries; that is, those upon which the manager has sufficient warning in advance to arrange for delivery by regular trip. Rush deliveries wanted immediately are made by hand and three boys are maintained at the store for this purpose. All these trucks have panel bodies like the White 2-ton truck, to protect their contents from inclement weather and from theft. The bodies are handsomely designed and decorated, and as they pass through the streets serve as an excellent advertisement for the firm.

Operation Methods

The delivery trucks operate jointly from the New York greenhouse and from the store. The two establishments are connected by telephone and when an order is received for plants or flowers, which may be at the New York greenhouse but not at the store, the manager telephones the order and the address from the store to the greenhouse and delivery is made direct from the latter place. The store's operation system has already been described in a previous issue of The Commercial Vehicle, but it should be remarked here that all Mr. Stumpp's drivers are fitted with a uniform for winter and one for summer. Both of these are supplied free to the men, who are responsible for keeping the uniforms clean. Uniforming the men is done partly to give them a smarter appearance when making deliveries. But it is also done because the manager believes that a man who feels himself to be neat and smart is more likely to keep his truck and its engine in the same condition.

(*Continued on page* 382)

The view on the left shows Mr. Stumpp's 1-ton Studebaker truck ready to start on a delivery trip from the store. Note the small side opening to the driver's cab which can be entirely closed by curtains in winter. On the right is one of the Ford delivery trucks, in process of loading. This is the oldest of the light capacity trucks of the firm and has run many thousand miles making deliveries in New York

Highway Transport Conferences

At New York and Chicago Shows

To Discuss Subjects Vital to the Fleet Owner

THAT the Highway Transport Conferences to be held in conjunction with the National Motor Truck Shows at New York and Chicago, from Jan. 3 to 10, and from Jan. 24 to 31, will be the most comprehensive and important yet held, is indicated by the subjects to be discussed and a partial list of those who have accepted invitations to speak.

The feature of the Conference sessions will be the liberal use of illustrations, both in the nature of stereopticon slides and motion picture films, lasting ½ hr. or more, and following the sessions, each afternoon and evening. A large number of films, dealing with motor transportation in all of its varied phases, are being collected. Several are being secured from abroad. Dr. Francis Holley, Director of the Bureau of Commercial Economics at Washington, is co-operating in collecting interesting films having to do with highway transportation by motor vehicles.

The conference will open on he evening of January 3, in New York and the evening of January 24, in Chicago, with important inaugural sessions. Invitations to speak at these inaugural sessions have been extended to members of the President's cabinet; United States senators and governors of different states, and already several have accepted.

About Highways

Among those who will speak at the Highway Transport Conferences on subjects having to do with highways and highway traffic are:

Arthur H. Blanchard, Professor in Charge of Highway Engineering and Highway Transport, University of Michigan, and President of the National Highway Traffic Assn.; F. G. Thompson, Highway Engineer, State of New Jersey; M. O. Eldridge, Director of Roads, American Automobile Asso.; Harry S. Quine, Goodyear Tire & Rubber Co.; Robert C. Hargreaves, Goodrich Tire & Rubber Co.; Pyke Johnson, Secretary of Highways Committee, National Automobile Chamber of Commerce; George C. Diehl, Chairman of Good Roads Board, American Automobile Assn.; J. E. Pennypacker, and S. M. Williams, Chairman of the Federal Highway Council.

Authorities on motor express operation including intercity motor haulage and rural motor express, who will speak at the Conferences, include:

Tom Snyder, Secretary of Highways Transport Division, Indianapolis Chamber of Commerce; Professor Boyle of Cornell University; J. D. Eggleston, Chairman of Highways Transport Committee of Iowa, and F. W. Fenn, Secretary of Motor Truck Committee, National Automobile Chamber of Commerce.

On Truck Operation

The various subjects having to do with the actual operation of motor trucks, especially from the standpoint of efficiency, will be discussed by such well-known authorities as:

W. J. L. Branham, General Traffic Manager of the Otis Elevator Co.; Roderick Stephens, Stephens Fuel Co.; George H. Pride, President, Heavy Haulage Co.; W. H. Kennedy, Transportation Engineer; Joseph Husson, Editor of THE COMMERCIAL VEHICLE; Walter Wardrop, Editor *Power Wagon;* George W. Veale, Timken-Detroit Axle Co.; Ralph C. Rognon, President, Service Managers Assn. of New York; H. E. Merithew and H. W. Drew, Transportation Experts of the Packard Motor Car Co.; T. M. Knight, Armour & Co.; E. E. LaSchum, General Superintendent of the American Railway Express Co., and Walter M. Ladd, Service Manager of the Pierce-Arrow Motor Car Co.

Truck Legislation

One of the most vital phases of motor transportation at this time is that generally classed under the heading, Legislation. Among the speakers on this particular subject are: Charles Thaddeus Terry, Council to the American Automobile Assn., National Automobile Chamber of Commerce and other organizations; Charles S. Bond, Counsel for the Motor Truck Assn. of America; Henry Meixell, Jr., Secretary of the Legislative Committee, National Automobile Chamber of Commerce, and F. H. Erstman, Executive Secretary of the Motor Truck Owners Assn. of Chicago.

The program of the Highway Transport Conferences provides for an inaugural session on the opening night at both New York and Chicago, when the speakers will be men of national prominence, and the general subjects of highways and motor transportation will be discussed in a broad way, with special reference to the economics involved. During the remaining 6 days of each show, Conference sessions will be held in the evenings, for motor truck owners, operators and for shippers and any others interested in motor transportation. However, all sessions are open to the general public and everyone is cordially invited.

In New York, the truck owner subjects to be discussed are as follows:

Monday, January 5, Motor Vehicles in Passenger Transportation, Replacing Street Cars With Motor Buses, Motorbus Operation.

Tuesday, January 6, Increasing Motor Haulage Efficiency, Cost Accounting, Routing and Dispatching, Loading and Unloading Devices, Incentives for Drivers and Helpers.

Wednesday, January 7, A Rural Motor Express, Its Opportunities as an Investment and Business Career, Its Advantages to the Shipper, Its Benefits to the Producer and Consumer.

Thursday, January 8, Aids to Motor Truck Efficiency, Trailers, Pneumatic Tires.

Friday, January 9, Motor Truck and Railroad Freighting, Cost, Range and Service Comparisons, Connecting Farms and Markets.

Saturday, January 10, Highways and Motor Transport, Relation of Roads to Operating Cost, Progress in Highway Improvement, Constructing Roads for Motor Truck Traffic.

In Chicago the program will be as follows:

Monday, January 26, Motor Truck and Railroad Freighting, Cost and Service Comparisons, Economic Range of the Motor Truck.

Tuesday, January 27. The Farmer's Haulage Problems, The Horseless Farm, Connecting Farms and Markets, Farm Power.

Wednesday, January 28, Rural Motor Express, Its Opportunities as an Investmint and Business Career, Its Advantages to the Shipper, Its Benefits to the Producer and Consumer.

Thursday, January 29, Highways and Motor Transport, Relation of Roads to Operating Cost, Progress in Highway Improvement, Constructing Roads for Motor Truck Traffic.

Friday, January 29, Increasing Motor Haulage Efficiency, Cost Accounting, Routing and Dispatching, Loading and Unloading Devices, Incentives for Drivers and Helpers.

Saturday January 31, Aids to Motor Truck Efficiency, Trailers, Pneumatic Tires.

RESUME OF PARTS USED IN 1920 TRUCKS

Influence of Parts Makers Felt in the Design of Completed Vehicles—Lessons of War Seen in Commercial Models—Four-Speed Gearsets Gain

IN view of the great influence which the parts industry continues to exert on the design of the present-day American motor truck, THE COMMERCIAL VEHICLE publishes, this, its second annual parts résumé for the purpose of acquainting the fleet owner with the choice of truck makers in the employment of the ten major units, and accessories which go to make up the 1920 line of motor trucks.

The tables shown on the following pages of this article have been compiled from the annual specification tables published in the November 1, 1919, issue of the THE COMMERCIAL VEHICLE. In fact, they are a further analization of those tables to the end that the fleet owner reader may have served up to him on a platter, as it were, the real meat of the tables insofar as the use of the ten major parts is concerned.

These tables undoubtedly do show the choice of the manufacturers for different makes of truck units, although it must not be assumed that because any one particular part is employed on only a few models, that part is inferior in design to some other like part which is employed on a greater number of models.

The fleet owner should bear in mind however, that, other things being equal, he is liable to obtain better service from the maker of that part which is used in a larger majority of models than from the maker of a similar part which is used on only a few models. The underlying reason behind this condition is that when a part, such as for example an engine, is used on thirty or forty different models of trucks, the owner having a truck with that model of engine has more than one source from which to draw repair parts in emergencies when it would hold the truck idle too long to obtain these spare parts either direct from parts maker or from the truck factory. These tables, in connection with the specification tables published in the November 1, 1919, issue, will enable the fleet owner to determine on just what makes of trucks any particular part such as is used in his own truck is employed.

The Relation of the Parts Industry to the Fleet Owner

1—When the parts of a truck under consideration for purchase have the reputation for giving good service, the fleet owner's task is to determine whether these parts are properly proportioned in relation to one another to produce a well-balanced vehicle.

2—The practice of camouflaging truck parts by removing the parts maker's nameplate and substituting the truck maker's nameplate and then asking a higher price for the truck on the ground that its parts are specially designed and manufactured, is slowly but surely being eliminated.

3—The influence of the engineering brains of the parts industry is being felt by the fleet owner although he does not come into contact with the parts maker when purchasing his trucks.

4—Hot-spot engine manifolds are more numerous and four-speed gearboxes are now standard on the average 2-, 2½-, 3½- and 5-ton trucks.

The continued growth of the use of motor trucks in the United States until our country has become the mostly highly motorized motor truck nation in the world, has been due to what is commonly called the assembled truck in which the major units are purchased outside and then put together by the truck maker. Because components can be sold for a low price when produced in great quantities, the parts industry will continue to exert a big influence on future motor truck production.

It is very difficult to draw the line between a so-called assembled truck and the manufactured vehicle, on practically all those concerns which claim to produce a manufactured truck, employ at least one or two major parts produced outside of their own factories.

Motor truck buyers in selecting a truck inquire as to the names of the makers of the engine, clutch, gearset, rear axle and other parts employed. If each of the components which go to make up the truck has a record for good performance, the task of the buyer is then to decide whether or not the assembly of these various parts has been properly engineered in order to produce a balanced vehicle.

The effect of the war and the greatly increased production of motor trucks to carry on motorized warfare is now being felt in the commercial models. When the demand for war trucks became so insistent, the only method of obtaining a large truck production was to have the various parts manufactured by parts specialists and then assembled. This course was followed and the various parts turned out by these engineers are now being used in a modified form in many of the commercial models.

Better Manifolds Feature 1920 Truck Engines

HOT-SPOT manifolds and detachable cylinder heads are the two outstanding trends in the design of engines offered in the 1920 line of motor trucks. The hot-spot manifold and other forms of intake manifolds cored in the cylinder castings to heat the incoming fuel have been made necessary by the lower grades of fuel now sold on the market as gasoline. These fuels do not vaporize as readily as the higher grades and must be heated in order to be burned with maximum efficiency and with the least possible amount of carbon deposit in the cylinders. This problem has been met by combination manifolding in which the incoming gas from the carburetor is impinged upon some portion of the hot exhaust manifold to vaporize it so that no unburned particles of fuel remain in the cylinders to form a carbon deposit.

MAKES OF ENGINES USED IN 1920 GASOLINE TRUCKS

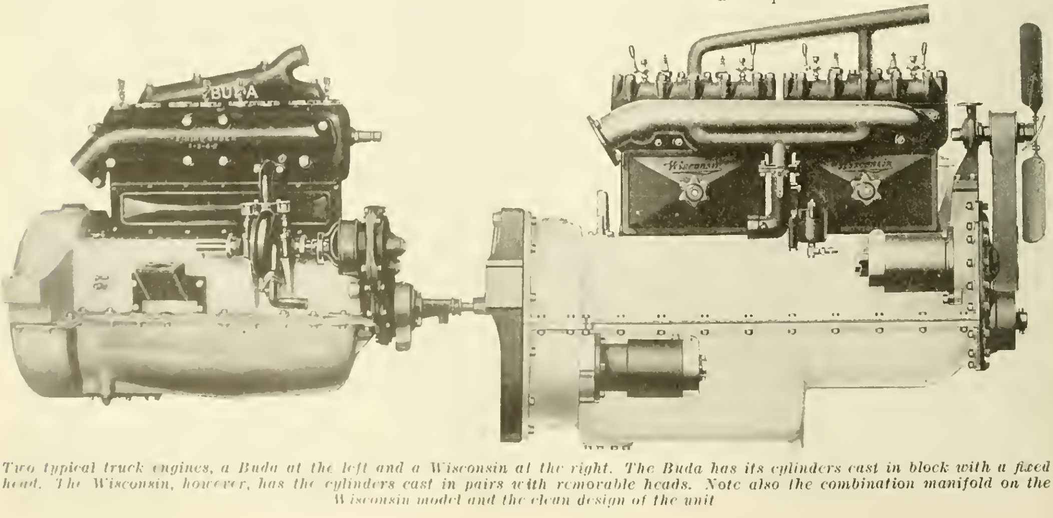
Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Beaver Mfg. Co., Milwaukee, Wis.	1	1	0.2
Buda Co., Harvey, Ill.	33	77	16.8
Continental Motors Corp., Detroit	76	206	44.9
Gray Motor Co., Detroit	1	2	0.4
Hercules Motor Mfg. Co., Canton, Ohio	2	4	0.9
Herschell-Spillman Co., N. Tonawanda, N. Y.	6	7	1.5
Hinkley Motors Corp., Detroit, Mich.	1	1	0.2
Le Roi Co., Milwaukee, Wis.	3	3	0.7
Light Mfg. & Foundry Co., Pottstown, Pa.	2	2	0.4
Lycoming Foundry & Machine Co., Williamsport, Pa.	1	1	0.2
Root & Van Dervoort Engineering Co., E. Moline, Ill.	1	2	0.4
Rutenber Motor Co., Marion, Ind.	2	4	0.9
Perkins (Elmira)	1	1	0.2
Waukesha Motor Co., Waukesha, Wis.	9	16	3.5
Wisconsin Motor Mfg. Co., Milwaukee, Wis.	10	35	7.6
	149	362	
Listed as own make	29	76	16.6
Not listed or doubtful	8	21	4.6
Totals	186	459	100.0

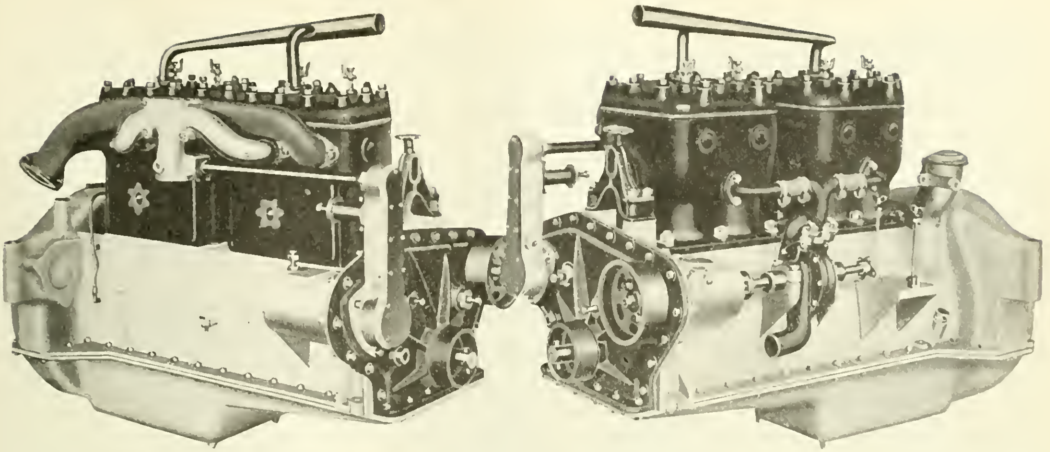
During the year 1919 further progress which is not shown in the accompanying table has been made to produce more satisfactory truck engines. This progress has consisted of the getting together of truck manufacturers and fuel producers. On their part, the fuel producers have attempted to indicate what quality of fuel may be expected or for the next 2 or 3 years. Knowing this, the engine designers can build their engines accordingly. The truck manufacturers have attempted to tell the fuel producers approximately how many trucks will be built in the next few years so that the producers can know of the fuel demands of these new trucks and those already in service. With this information at hand, the fuel producers can know within certain limits of the volume of fuel which must be provided and thereby advise the truck manufacturers as to what grade of fuel can be supplied in the required amount. This good work is still going forward, and undoubtedly will be more in evidence in the 1921 trucks than in those offered on the early 1920 market.

The Manifold Idea

The hot-spot manifold idea such as was first used on large truck engines in that employed on the Class B war truck, has become quite common on large engines and has even been used to a modified extent on some of the smaller trucks of ¾- and 1-ton capacity. Its use has been of the greatest importance to the fleet owner because fuel costs form an important item in the total cost



Two typical truck engines, a Buda at the left and a Wisconsin at the right. The Buda has its cylinders cast in block with a fixed head. The Wisconsin, however, has the cylinders cast in pairs with removable heads. Note also the combination manifold on the Wisconsin model and the clean design of the unit



Left and right sides of a typical Continental truck engine. Note that the cylinders are cast in pairs and that the heads are detachable. Note also the modified ram's horn combination inlet and exhaust manifold similar to that employed originally on the Class B war truck engine

of truck operation. Fuels which do not give up their full power because they are not completely vaporized and burned, result in a low number of miles to the gallon of fuel, besides causing other engine troubles such as over-heating, pre-ignition, etc., due to excessive carbon deposits.

Removable cylinder heads are coming into greater favor on motor truck engines because they permit the pistons and cylinders to be examined for carbon removal and repairs without the necessity of tearing the engine down to get at them. Along with the removable cylinder heads there has been a tendency to cast the cylinders in block even on some of the larger engines where casting difficulties previously made it necessary to furnish them in pairs. Of the 459 gasoline motor truck models offered on the 1920 market, all except three are fitted with four-cylinder engines. Two models of Autocars each have a two-cylinder horizontal engine and the Rowe 3-tonner mounted on pneumatic tires has an eight-cylinder engine.

Effect of Pneumatics

While the use of pneumatic tires on trucks of 1-ton capacity and over will undoubtedly affect engine design considerably, this influence has not been felt as yet because the giant pneumatic tire has not developed to the point where the great majority of truck manufacturers have turned out trucks especially designed for the use of such equipment. From the experience which has been secured through the use of pneumatic tires on trucks originally designed to run on solids, it has been shown that engines of greater power are required to secure the higher speeds which the use of penumatics permits. There undoubtedly will be a complete revolution in the design of motor trucks for the use of pneumatic tires and when this occurs, the engine will come in for its share of changes. Now, on solid tires, the engine must be built ruggedly enough to withstand the severe vibrations transmitted to it when traveling over rough cobblestone streets. When mounted on pneumatics, however, many of the parts may be lightened so as to produce a powerplant of greater horsepower but of no greater weight.

Fourteen makes of engines accepted as more or less standard design are furnished in the 459 models of gasoline motor trucks now offered for sale on the 1920 market. In addition to these, twenty-one makers list the engines as used in 59 models as of their own make.

Insofar as powerplant layout is concerned, the unit powerplant has held its own except on 5-ton models and on trucks with extremely long wheelbases. In the latter case, the gearset has been separated from the engine and placed amidships in order to divide up the propeller shaft into two lengths to prevent shaft whipping. As shown on pages 250 and 251 of The Commercial Vehicle for November 1, 1919, the average 2½-, 3½- and 5-ton trucks have their gearboxes mounted amidships. The 2-ton truck and the smaller models all employ unit powerplants.

Along with the improved manifolds has come a general cleaning up of the engine exterior. The valve mechanisms are being more and more enclosed, since this type gives less lubrication trouble than does the exposed type which collects a considerable amount of dust and dirt.

Vacuum Feed Gains

The vacuum gasoline feed system has gained slightly during the past year and more trucks than ever before will be provided with such a system in 1920. The increased use of the vacuum fuel feed on motor trucks has been due to a considerable improvement in the ruggedness of the tanks and floats in order to withstand the great vibration set up in the mechanism when carried on a vehicle mounted on solid tires. Of the 459 models of gasoline trucks offered on the 1920 market, 102 models or approximately 22 per cent are furnished with a vacuum gasoline feed system as standard equipment

This gain in the use of the vacuum fuel feed system has resulted in carbureters being placed higher on the engine mounting than previously. Considerable attention has also been paid to improving the methods of mounting the engine accessories, including the magneto or other ignition apparatus, the water circulation pumps, the governor, if any is used, and in some cases providing brackets for mounting electric starting and lighting apparatus or engine-driven tire pumps for the inflation of giant pneumatic tires.

(*Continued on page 357*)

Dry-Disk Clutches Predominate on the 1920 Trucks

DRY-DISK clutches predominate on 1920 motor trucks. Of the 459 models offered for next year, 280, or 61 per cent, employ clutches of the dry-disk type. This development of clutch use on motor truck has grown from the old cone and reversed-cone types, which were used to a large extent in old commercial vehicle design. In the dry-disk type a series of disks or plates are employed in which alternate members are attached respectively to a shaft or in a drum or to the casing of the clutch. These disks adhere when tightly compressed and cause the casing to drive the inner member or vice versa.

The dry-plate clutch, which is similar in design to the disk type, except that it has only three friction members instead of a plurality, is employed on ninety-four of the 459 models, or 20.4 per cent.

The wet-disk type, which follows the design of the dry-disk clutch except that the disks are of metal only, without facing, and run in a bath of oil, is employed on twenty-six or 5.7 per cent of the 459 truck models on the 1920 market.

The use of cone clutches has fallen off considerably as compared with the 1919 trucks. In these latter, sixty-six out of 489 models or 13.5 per cent, were fitted with cone clutches. For the 1920 trucks, however, only thirty-eight models out of a total of 459 are similarly equipped. The loss in percentage is from 13.5 to 8.4.

14 Clutch Makers

In all, fourteen different clutch makers have their products used in one or more of the 459 truck chassis listed on the 1920 market. Of the 186 makers which manufacture the 459 chassis offered for the coming year, 150 employ clutches manufactured by parts concerns; twenty-one claim to make their own clutches and sixteen are not listed or doubtful. Of the 459 models offered, 363 use some form of clutch made by the fourteen clutch producers.

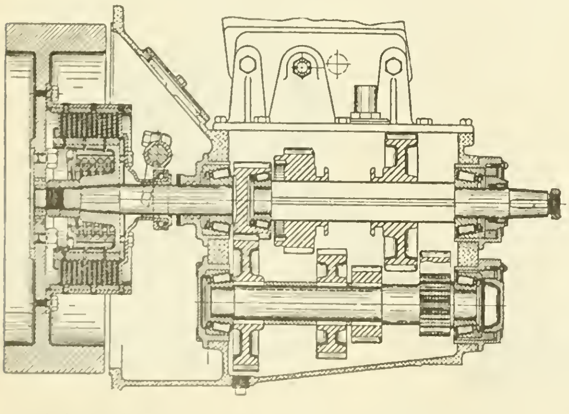
Minor refinements instead of radical changes in clutch design have been the tendency during 1919. These minor refinements have been made to the end of securing easier adjustment without the necessity for tearing down the whole casing. Then again, greater smoothness in operation and more flexibility have been sought. All of these have been secured through the improvement in small details, with the principle on which the design is based remaining the same.

Although the clutch is hidden away out of sight on the truck chassis, it is really one of the most important operating units in that it is one of

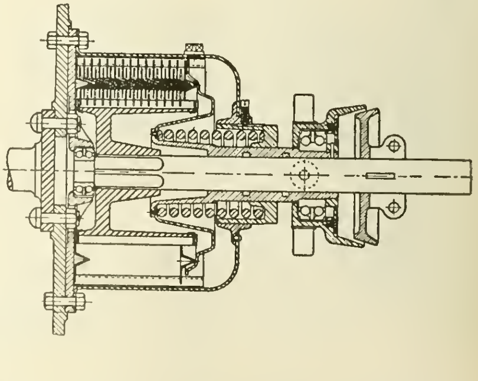
MAKES OF CLUTCHES USED ON 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Type	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Borg & Beck Co., Moline, Ill	35	85	18.7
Brown-Lipe Gear Co., Syracuse, N. Y	50	137	29.9
Covert Gear Co., Detroit, Mich	3	8	1.7
Detlaff Co., A. J., Detroit	3	4	0.9
Detroit Gear & Machine Co., Detroit	2	3	0.7
Fuller & Sons Mfg. Co., Kalamazoo, Mich	42	88	19.1
Hartford Automobile Parts Co., Hartford, Conn	52	6	1.3
Hele-Shaw, Merchant & Evans, Philadelphia, Pa	3	8	1.7
Lycoming Foundry & Machine Co., Williamsport, Pa	1	1	0.2
Mechanics Machine Co., Rockford, Ill	1	1	0.2
Merchant & Evans, Philadelphia, Pa	3	10	2.0
Warner Gear Co., Muncie, Ind	3	8	1.7
Universal (Old Reliable Truck Co., Chicago, Ill.)	1	2	0.4
Grant-Lees Gear Co., Cleveland, Ohio	1	2	0.4
	150	363	
Listed as own make	21	59	12.9
Not listed or doubtful	16	37	8.2
Totals	186	459	100.0



A Brown-Lipe dry-disk clutch as furnished in a unit power plant assembly with a Brown-Lipe selective gearset. The general outlay and its various components are clearly outlined in the above cross section

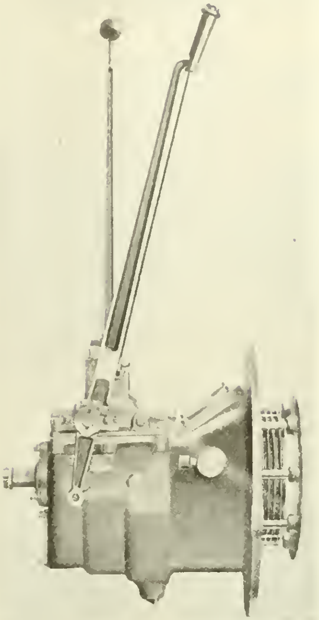


Cross-section of the Hele-Shaw clutch, showing the grooved disks which distinguished it from all other types of disk clutches. The outer plates are made of phosphor bronze and the inner ones of mild steel those most used. When its operation is imperfect, it is liable to have disastrous effects on all of the power-transmitting mechanism, including the engine, the gearset, the final driving gears and even the tires. When a clutch is let in suddenly, either through the carelessness of the driver or through imperfect mechanical operation, it sets up abnormal strains on all of the parts which have to do with the transmission of the engine horsepower. Any sudden grabbing or jerking action tends to make the clutch itself wear out much faster than it should and when transmitted to the rear tires causes excessive friction, which results in the formation of flat spots.

Design Tendencies

Going more specifically into the fundamentals of clutch design, the tendency has been to produce a unit which can be operated without undue effort on the part of the truck driver and in which the frictional area engaged is as small as possible consistent with the highest spring pressure to provide ease of operation. In this connection, however, the limit of the diameter of the clutch disk has forced the designers to use stiffer springs. The designing task has therefore been to properly proportion the two elements of spring pressure and frictional area so that the actuating mechanism of the clutch is not stiff and inflexible and the control not fatiguing or inaccurate. The engagement of the disks must not be overquick, spasmodic or jerky. This will result in undue heating, which carbonizes the oil bath and frequently results in the freezing of the pack of plates. When this occurs, distortions of the plates themselves are set up in cooling. This action results in undue wear since the plates then bear unevenly.

While most of the dry-disk or wet-disk clutches are of the flat-plate design, those built on the Hele-Shaw principle make use of a grooved disk which forms pockets for the collection of oil, thus preventing any grabbing or jerky action. Furthermore, the outer plates are made of a high-grade phosphor bronze and are driven by the engine. The inner plates, which are of mild steel, drive the clutch shaft and in this way transmit the power to the gearbox. The clutch case itself is bolted to the flywheel and has around its inner side, teeth which engage in the notches of the outer plates of phosphor bronze. The forward end of the clutch shaft is carried in a ball bearing centered in the bearing plate of the clutch.



A Fuller disk clutch as furnished in a unit with a gearset for a unit powerplant assembly

A further study of the clutch shows that a steel core rides on the clutch shaft and is driven by a square. The core has driving teeth on its exterior and these engage with the inner plate. A bushed sleeve slides on the shaft and ends in a presser plate which controls the pressure between the inner and outer plate. Normally, it is kept tight against the plates by the pressure of the main clutch spring. By this means no thrust is exerted on the engine or the gearbox while the clutch is engaged. An actuating ring is employed to disengage the presser plate and separate the disks.

One of the newer forms of dry-plate clutches as manufactured by the Borg & Beck Co., has three plates in all. These consist of two asbestos friction rings which in practice freeze to the unpolished faces of both the casing bottom and the metal clutch plate or clutch ring, even though they are not positively attached to either the driving or driven parts. They thus always run bodily with the flywheel. The friction plate is inserted between the two asbestos friction rings and remains practically at the same position on its shaft. The asbestos friction rings are backed away almost bodily to release them from the friction grip and to permit the main clutch plate and the other driven parts to come to a standstill while the flywheel and those parts of the clutch anchored to it are free to revolve idly.

In a further analysis of the makes of clutches used on the 1920 trucks and as given in the table on the opposite page, it is seen that 137 of the 459 models employ Brown-Lipe clutches. Next in order is the Fuller clutch, with eighty-eight models, and then the Borg & Beck clutch, which is used on eighty-five of the 1920 models. The percentages of the total number of truck models which use the three leading makes of clutches are as follows: Brown-Lipe, 29.9 per cent; Fuller, 19.1 per cent, and Borg & Beck, 18.7 per cent.

Better Manifolds on the 1920 Trucks

(*Continued from page 355*)

The prime consideration in the mounting of the engine accessories is to attach the devices so that they can be examined for inspection or taken apart for repairs without tearing down all of the other auxiliaries. Provision for mounting a tire pump on the engine is still comparatively new, for it has not yet been determined whether it is more advantageous to mount such a pump on the engine or drive it from the gearset.

TYPES OF CLUTCHES USED ON 1920 GASOLINE TRUCKS

Type	No. of Models Supplied	Per Cent of Models Supplied
Dry-Disk	280	61.0
Dry plate	94	20.4
Cone	38	8.4
Wet disk	26	5.7
Wet plate	6	1.3
Not listed	15	3.2
	459	100.0

Four-Speed Gearboxes Show Big Gain

As predicted on page 10 of The Commercial Vehicle for November 15, 1918, the use of four-speed gearboxes has increased until it is now the standard equipment on the average trucks of 2-, 2½-, 3½- and 5-ton capacity. In the 1919 trucks, the 2-, 2½- and 3½-tonners were equipped with three-speed gearboxes. This change has undoubtedly been brought about by the mounting of a four-speed gearbox on the Class B war truck, where it was fitted in order to give an especially large low gear reduction, so as to provide greater pulling power at slow speeds. By the use of four-, instead of three-speed gearsets, the fleet owner obtains a lower gear reduction for heavy going without reducing the number of speeds employed in ordinary driving over the average highway. Of course, along with the increased number of speeds has come a wider range of gear reductions from the engine to the driving wheels.

Another trend in design which is noticeable on the gearsets mounted on the 1920 trucks is the provision for the mounting of power take-offs for the operation of a winch, hoist or tire pump such as is required when giant pneumatics are employed. A great majority of the gearsets now fitted on the larger models of trucks are now furnished with an extended countershaft and special apertures for one or two forms of power take-offs. While the location of the giant pneumatic tire pump on the gearset or on the engine has not been conclusively worked out one way or the other, several of the gearset manufacturers have anticipated the demands of fleet owners using giant pneumatic tires and have made provision for the mounting of such an equipment on the gearbox.

Power Take Offs

One such concern is the Brown-Lipe Gear Co., which has furnished the Nelson Motor Truck Co., Saginaw, Mich. with a four-speed gearset for its new Jumbo 3½-ton truck, in which a winch, hoist and tire pump take-off can be mounted on the gearset simultaneously. This is an unusually complete installation, as previous types have simply provided for either a winch or a hoist take-off. The new Jumbo truck and the new type of gearset are explained in greater detail on pages 386 and 387 of this issue.

In type, the selective sliding gear remains far in the lead, no less than 388 of the 459 models on the 1920 market being equipped with this type of gearset.

This number of models employing the sliding gear type is 84.5 per cent of the total number of chassis offered. The use of the individual-clutch or constant-mesh type of gearset has fallen off somewhat, only twenty models having it specified in the 1920 trucks as compared with forty-four in the 1919 trucks. The progressive type of gearset in which neutral is located either between first speed and reverse or between first and second, has also lost slightly, the number of models on which it is used having decreased from nineteen of the 1919 trucks to ten of the 1920 vehicles. The planetary type of gear set is used on but one truck model, the Ford. Friction driving gears are almost extinct, although used to a considerable extent in the early days.

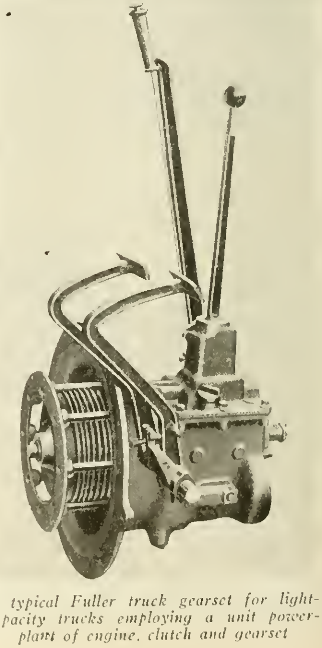
MAKES OF GEARSETS USED ON 1920 GASOLINE TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Baker Gun & Forging Co., Batavia, N. Y.	1	1	.2
Brown-Lipe Gear Co., Syracuse, N. Y.	58	170	37.0
Cotta Transmission Co., Rockford, Ill.	8	18	3.8
Covert Gear Co., Detroit	10	26	5.6
Detroit Gear & Machine Co., Detroit	8	14	3.1
Durston Gear Corp., Syracuse, N. Y.	3	4	.8
Fuller & Sons Mfg. Co., Kalamazoo, Mich.	45	93	20.2
Grant-Lees Gear Co., Cleveland, Ohio	8	15	3.6
Mechanics Machine Co., Rockford, Ill.	1	1	.2
Muncie Gear Works, Muncie, Ind.	1	1	.2
Savage Arms Corp., Sharon, Pa.	1	2	.4
Warner Gear Co., Muncie, Ind.	7	14	3.1
	151	359	78.2
Listed as own make	29	70	15.3
Not listed or doubtful	12	30	6.5
Totals	192	459	100.0

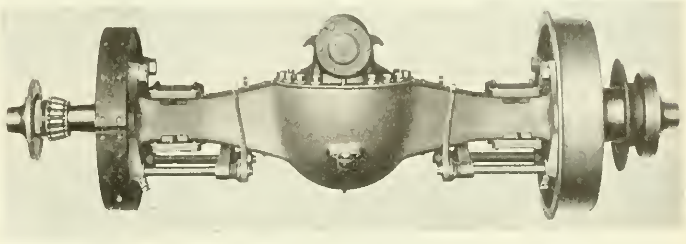
TYPES OF GEARSETS USED ON 1920 GASOLINE TRUCKS

Type	No. of Models Supplied	Per Cent of Models Supplied
Selective	388	84.5
Individual-clutch	20	4.4
Progressive	10	2.0
Planetary	1	.2
Friction	1	.2
Not listed and other types	39	8.7
	459	100.0

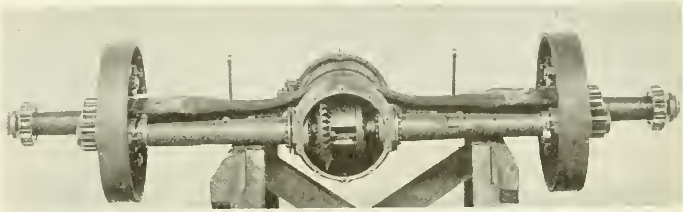


A typical Fuller truck gearset for light-capacity trucks employing a unit power-plant of engine, clutch and gearset

85.9 Per Cent of 1920 Truck Chassis Employ Bought Rear Axles



The Timken worm-driven axle for 5-ton trucks. The center housing is cast in one piece for rigidity of mounting and oiltightness. Note the mounting of the brake support rods and the attached spring pads



One of the Torbensen line of internal-gear-driven axles. Note the relative position of the live and dead members and the type of roller wheel bearings

MAKES OF REAR AXLES USED ON 1920 GASOLINE TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

Rear Axle Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Chicago-Standard Axle Co., Chicago	4	6	1.3
Clark Equipment Co., Buchanan, Mich	16	44	9.6
Columbia Axle Co., Cleveland, Ohio	1	1	0.2
Flint Motor Axle Co., Flint, Mich	1	2	0.4
Russel Motor Axle Co., N. Detroit	13	19	4.1
Pern Auto Parts Co., Peru, Ind	1	1	0.2
Salisbury Axle Co., Jamestown, N. Y	1	1	0.2
Sheldon Axle & Spring Co., Wilkes Barre, Pa	26	85	19.0
Timken-Detroit Axle Co., Detroit	53	150	32.6
Torbensen Axle Co., Cleveland, Ohio	21	42	9.1
Wisconsin Parts Co., Oshkosh, Wis	6	15	3.2
Kenosha (Winther Motor Truck Co., Kenosha)	1	2	0.4
	144	368	
Listed as own make	30	65	14.1
Not listed or doubtful	7	26	5.6
Totals	181	459	100.0

TYPES OF REAR AXLES USED ON 1920 GASOLINE TRUCKS

Type	No. of Models Supplied	Per Cent of Models Supplied
Bevel	14	3.0
Chain	23	5.0
Double-reduction	6	1.3
Internal gear	116	25.4
Worm	296	64.5
External-gear	2	0.4
Not listed	2	0.4
	459	100.0

REAR truck axles, in some respects the most important unit in truck design, are made by parts concerns for no less than 85.9 per cent of all the 459 models of trucks offered on the 1920 market. This means that only 14.1 per cent of the models produced by all truck makers are equipped with axles made by the truck makers themselves. As shown in the accompanying table, 368 models are furnished with bought rear axles, leaving sixty-five models with axles made by truck makers and twenty-six models on which the correct data is missing. Most of the models with the rear axle listed as of the makers' own make are chain-driven trucks, so that the percentage of models which use some form of complete enclosed drive rear axle is really larger than the 85.9 figure.

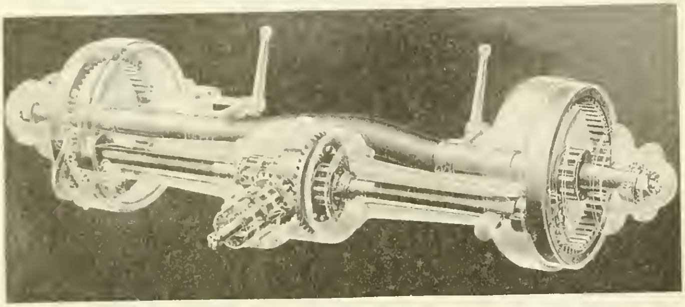
The specifications of gasoline motor trucks as published in The Commercial Vehicle, for November 1, 1919, show no startling change in the use of the different types of rear axles. While the double-reduction axle used on the 3- and 5-ton White trucks has increased the number of models employing that form of drive, the percentage increase has been very small. Chain drive continues to lose ground with the worm and internal-gear forms of drive making up for that loss.

Compared in Two Ways

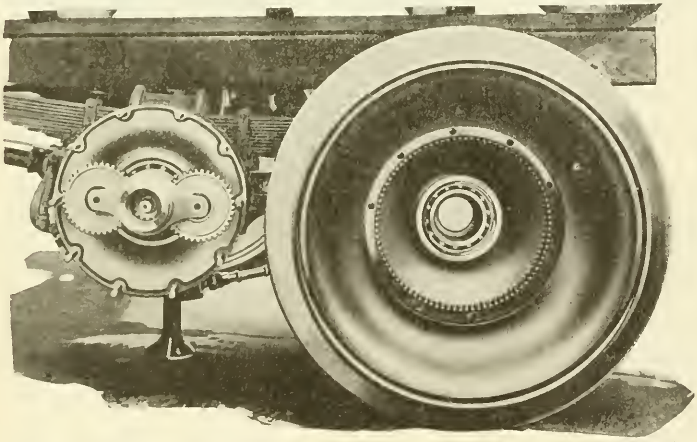
In any discussion of the types of final drive employed on motor trucks, it is wise to make comparisons on two bases. First of all, the comparison should be made on the number of models offered with each different form of drive. Secondly, the comparison should be made on the basis of the number of trucks produced with each form of drive. When this is done, a better analysis is had of the final drive situation than would be the case if only one basis were considered.

While we are concerned in this issue only with the number of models offered, tables on the final drive situation from both the models offered basis and the trucks produced basis were published on pages 248 and 249 of The Commercial Vehicle for November 1, 1919. The same infor-

One of the large sizes of the Sheldon worm-driven line, showing the method of mounting the worm housing; the brake rod supports and the dual brakes



Phantom view of the Clark internal-gear-driven axle showing how the power is transmitted from the propeller shaft to the large internal gear rings on the rear wheels



The new Edwards internal-gear axle now offered for use on gasoline trucks. It is featured by the use of idler gears and was previously used on Walker electric trucks

mation on the percentage of final drive on the models offered as was told pictorially in one of the charts just mentioned, is also shown in figures in the small table at the bottom of this page. This table indicates that 296 of the 459 models offered on the 1920 market are equipped with worm-driven rear axles. This is equivalent to 64.5 per cent of the total number of models offered. Next in order comes the internal-gear drive, which is specified on 116 or 25.4 per cent of the total number of models offered.

Although there are fewer number of models offered on the 1920 market than in 1919, worm drive has fallen off slightly.

Bevel drive and chain drive have also decreased in the number of models offered for 1920. In the bevel drive classification, the twenty-three models offered with that form of drive in 1919 have been reduced to fourteen models in the 1920 listing. Similarly the forty-three models of chain-driven trucks offered at the beginning of 1919 have been reduced to twenty-three models for 1920. This is a loss of 3.75 per cent.

Worm Gains and Losses

While the use of worm-driven rear axles has decreased 2 per cent when comparing the 1920 and 1919 truck on the basis of the number of models offered, it has increased 1¼ per cent on the basis of the number of trucks produced using that form of drive. In making comparisons of this kind, it must be borne in mind that there is a difference of 1 year in the periods covered by the two comparisons, because it is necessary to use the actual truck production of the present year instead of the estimated production of the coming year. When this is done, the table showing the percentage of final drive by truck production as given on page 249 of THE COMMERCIAL VEHICLE for November 1, 1919, shows that in 1918, 51.75 per cent of all the trucks produced employed worm drive and 53 per cent during the year 1919. This small percentage increase really means a much larger gain in the actual number of trucks produced. With 250,000 trucks turned out during 1918, 51.75 per cent of that total means approximately 129,000 with worm drive. Similarly, 53 per cent of the 307,000 trucks produced during 1919 indicates a production of approximately 162,000 worm-driven trucks during this year. This shows an increase of approximately 33,000 worm-driven trucks in 1919 over 1918.

Similarly with internal-gear drive, the number of trucks equipped with that form of drive has increased in 1919 as compared with 1918, even though the 1919 percentage of 22 is less than the 22.25 per cent of 1918. Of the 250,000 trucks produced in 1918, 22.25 per cent indicates that approximately 55,000 internal-gear-driven trucks were made in 1918. Figuring the 22 per cent of the 307,000 trucks produced in 1919, gives a total of approximately 67,000 trucks with internal-gear-drive produced in 1919, or 12,000 more than in the year previous.

Aside from the new Edwards truck axle which is an adaptation of the internal-gear-driven axle used on Walker electric trucks for many years past, there have been few mechanical changes in the fundamental principles of either the worm, internal-gear, bevel or double-reduction axles.

Steering Gears on 375 Chassis Supplied by Seven Makers

STEERING gears on 377 or 81.7 per cent of the 459 truck models offered on the 1920 market are made by concerns which specialize in the manufacture of steering gears. Nineteen makers claim to make their own steering gears for fifty-one models and fourteen makers do not list the makes of steering gears as used on thirty-one additional models.

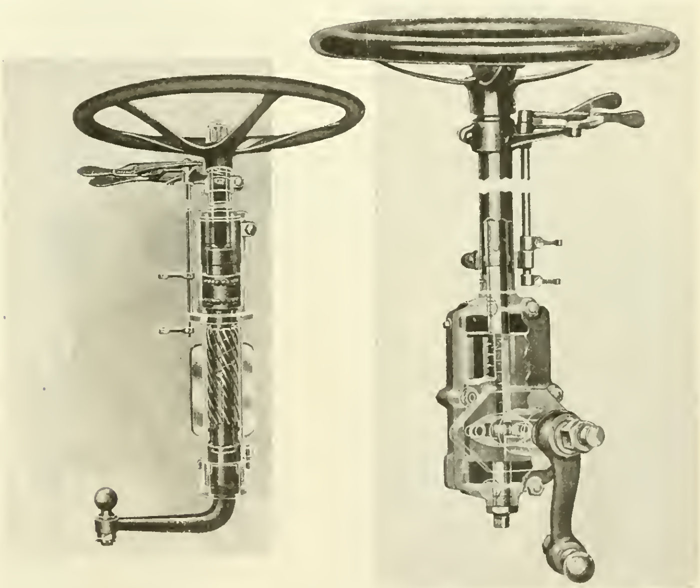
Considerable improvement in the way of refinement has been made in the steering gears as fitted on the 1920 trucks. The principal of these improvements has consisted of using larger bearings, so fitted that the wear can be taken up and adjustments made without dismantling the entire unit. Those types using worm gears with either split-nut or gears have had the wearing surface of the working parts enlarged to produce a unit of longer life by the reduction in the unit pressure on the working parts. The Wohlrab gear is characterized by having the working parts operating in oil instead of grease. Another tendency in the design in all steering gears has been toward simplification and the attachment of removable cover plates on the gear housing to permit of the examination of the interior parts without removing the gear from the truck frame.

It is gratifying to the fleet owner that these improvements have been so consistently carried on from year to year, in view of the fact that the steering gear is one of the most important parts in the truck construction. The life of the driver is dependent perhaps more upon the steering gear than any other of the truck parts with the exception of the brakes. The breaking of a steering gear while the truck is in motion is liable to mean the loss of the life of the driver as well as the destruction of the truck and its load.

In design, the steering gears offered on the 1920 trucks are of both the fore-and-aft and cross-steering types. They are operated by means of a single- or double-thread screws with one piece or split-nuts; by worm and split-nut or by worm-and-gear.

The arrangement of the spark and throtte control levers on several of the 1920 models are optional, it being possible to place them on top of the wheel or below it according to the design desired by the truck maker. Wood hand wheels continue to be almost universally employed and are mounted on either inserted or screw-on types of metal spiders.

A further study of the steering gear table on this page as prepared from the specification data published in the November 1, 1919, issue of THE COMMERCIAL VEHICLE, shows that Ross gears are employed on the 1920 trucks to a greater extent than any other make. The specification data indicates that Ross gears are furnished on 233 of the 459 models offered for next year. This number of models is equivalent to 50.8 per cent of the total, so that Ross gears are furnished on more than half of all the 1920 chassis. The next most generally used gear is the Lavine which is used on fifty-six models, or 12.2 per cent of the total. However, both of these percentages are subject to revision to a slight degree one way or the other, in view of the fact that thirty-one of the models offered for 1920 do not have the maker of steering gear specified.



At the left, a typical Ross gear of the cross type and at the right, a Lavine gear with the controls placed below the wheel

MAKES OF STEERING GEARS USED ON 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Steering Gear Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
C. A. S. Products Co., Columbus, Ohio	3	3	0.7
Ditweiler Mfg. Co., Galion, Ohio	3	3	0.7
Gemmer Mfg. Co., Detroit	22	56	11.3
Jackson-Church-Wilcox Co., Saginaw, Mich	10	24	5.2
Lavine Gear Co., Milwaukee, Wis	27	56	12.2
Ross Gear & Tool Co., La Fayette, Ind	76	233	50.3
Wohlrab Gear Co., Racine, Wis	2	6	1.3
	143	377	
Listed as own make	19	51	11.1
Not listed or doubtful	14	31	7.2
Totals	176	459	100.0

Cast Radiators and Tube Cores Show Gain

THE specifications of 1920 trucks show that the use of cast radiator cases and tubular cores have increased perceptibly over those specified on 1919 trucks. For example, with only forty-five models listed as doubtful, 325 of the total of 459 truck models on the 1920 market are fitted with cast case radiators. This is equivalent to 70.8 per cent as compared with only 58 per cent for the 1919 trucks. The use of pressed steel for radiator tank construction has also increased considerably and no less than thirty-four models of the 1920 trucks are equipped with radiator cases made of that material. Sheet metal for radiator cases on trucks has lost in favor. Only fifty-five of the 459 models for 1920 have sheet metal cases as compared with 130 for 1919 trucks.

Tube Cores Gain

There is of course a good reason behind the increased use of pressed steel and cast radiator tanks and the falling off of sheet metal tanks. The former have greater strength and are less liable to leak due to the vibration set up in truck chassis mounted on solid tires. While fifty-five of the 1920 models still retain sheet metal radiator cases, these are mostly mounted on light delivery vehicles equipped with pneumatic tires.

The trend in the type of core employed on truck radiators and shown in the table at the bottom of this page, indicates an increase for the tube design and a decrease for the cellular or honeycomb type. For example, 298 or 64.9 per cent of the 459 models offered on the 1920 market are equipped with radiators having tubular cores. Of the 1919 trucks, only 271 models or 55.4 per cent were similarly equipped. The use of cellular cores has decreased from 142 models in 1919 to 116 models on the 1920 trucks.

Here, again, there is a good reason behind the trend in design toward some form of tubular radiator. When tubes are damaged they may be taken out and replaced by new tubes without affecting the undamaged part of the radiator.

Cores and Cases

One of the outstanding facts indicated by the radiator tabulations on this and the opposite page is that in many instances, the radiators used are made up of cores purchased from one concern and tanks from another. It was because of this condition that separate tables were prepared for the core and case maker. The table on radiator case makers indicates that forty models of trucks have Long cases; thirty-five, Chicago cases; thirty-three, Feeders cases and twenty-six McCord cases. Then looking at the table of core makers, it is seen that sixty models have Long cores;

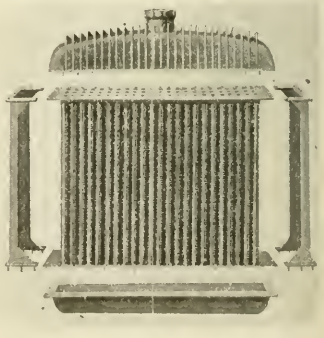
MAKES OF RADIATOR CORES USED ON 1920 TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

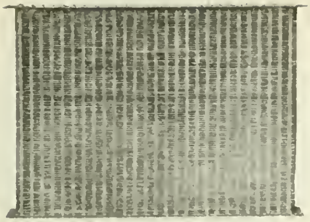
Radiator Core Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Bremmer Mfg. Co., Chicago	4	21	4.6
Bush Mfg. Co., Hartford, Conn	12	33	7.2
B. & W. Mfg. Co., Chicago	1	2	0.4
Candler Radiator Co., Detroit	3	5	1.1
Chicago Mfg. Co., Chicago	15	52	11.3
Eureka Auto Parts Mfg. Co., St. Louis, Mo	2	2	0.4
English & Mersick, New Haven, Conn	2	4	0.9
Fedders Mfg. Co., Buffalo, N. Y	11	34	7.4
Flexo Auto Radiator Mfg. Co., Chicago	1	5	1.1
G. & O. Mfg. Co., New Haven	12	36	7.9
Harrison Radiator Corp., Lockport, N. Y	1	4	0.4
Ideal Sheet Metal Wks., Chicago	4	11	2.4
Jackson Auto Radiator Wks., Chicago	2	3	0.7
Kuntz Radiator Co., Jackson, Mich	1	1	0.2
Livingston Radiator Corp., New York	1	2	0.4
Long Mfg. Co., Detroit	26	60	13.5
McCord Mfg. Co., Detroit	14	40	8.7
Marlin-Rockwell, New Haven	3	6	1.3
Modine Mfg. Co., Racine, Wis	6	14	3.1
National Can Co., Detroit	2	3	0.7
Perfex Radiator Co., Racine, Wis	6	15	3.3
Rome-Turney Radiator Co., Rome, N. Y	5	10	2.0
Shotwell-Johnson Co., Minneapolis, Minn	1	3	0.7
Sparks-Withington Co., Jackson, Mich	1	1	0.2
Standard Radiator Co., Springville, N. Y	2	2	0.4
	138	369	
Listed as own make	16	42	9.2*
Not listed or doubtful	21	48	10.5
Totals	175	459	100.0

TYPES OF RADIATOR CORES USED ON 1920 GASOLINE TRUCKS

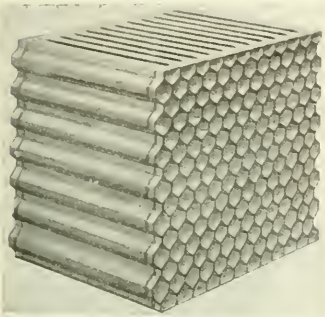
Core Type	No. of Models Supplied	Per Cent of Models Supplied
Cellular	116	25.3
Tube	298	64.9
Not listed or doubtful	45	9.8
	459	100.0



A typical finned-tube, cast-case radiator such as predominates on the 1920 motor trucks. That shown is of Fedders manufacture



A McCord truck radiator with vertical tubes and continuous horizontal fins



A typical honeycomb type radiator as made by the Fedders company

fifty-two, Chicago cores; forty, McCord cores and thirty-six G. & O. cores. Typical radiator cases and cores of the tubular and honeycomb type are shown in the illustrations on this and the opposite page.

MAKES OF RADIATOR CASES USED ON 1920 TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Radiator Case Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Bremmer Mfg. Co., Chicago	1	2	0.4
Bush Mfg. Co., Hartford, Conn	11	25	5.5
Candler Radiator Co., Detroit	3	5	1.0
Chicago Mfg. Co., Chicago	12	35	7.6
Eurkea Auto Parts Mfg. Co., St. Louis, Mo	1	1	0.2
English & Mersick, New Haven, Conn	1	2	0.4
Fedders Mfg. Co., Buffalo, N. Y	9	33	7.2
Flexo Auto Radiator Mfg. Co., Chicago	1	5	1.0
G. & O. Mfg. Co., New Haven, Conn	5	8	1.8
Harrison Radiator Corp., Lockport, N. Y	1	4	0.9
Ideal Sheet Metal Wks., Chicago	3	6	1.3
Jackson Auto Radiator Wks., Chicago	1	2	0.4
Kuntz Radiator Co., Jackson, Mich	1	1	0.2
Livingston Radiator Corp., New York	1	2	0.4
Long Mfg. Co., Detroit	19	40	8.9
McCord Mfg. Co., Detroit	10	26	5.7
Marlin-Rockwell, New Haven, Conn	2	2	0.4
Modine Mfg. Co., Racine, Wis	4	6	1.3
National Can Co., Detroit	2	3	0.7
Perfex Radiator Co., Racine, Wis	6	14	3.1
Rome-Turney Radiator Co., Rome, N. Y	1	1	0.2
Sparks-Withington Co., Jackson, Mich	1	1	0.2
Standard Malleable Co. (Mutual)	1	1	0.2
Youngstown Pressed Steel Co	1	1	0.2
	98	226	
Listed as own make	60	189	41.2
Not listed or doubtful	18	44	9.6
Totals	176	459	100.0

RADIATOR CASE TYPES USED ON 1920 GASOLINE TRUCKS

Case Type	No. of Models Supplied	Per Cent of Models Supplied
Cast	325	70.8
Sheet metal	55	12.0
Pressed steel	34	7.4
	414	
Not listed or doubtful	45	9.8
	459	100.0

Use of Metal Wheels Is Doubled for 1920

THE number of metal wheels specified as standard equipment on 1920 trucks is almost double the number similarly specified on 1919 trucks. Of the 459 truck models offered on the 1920 market, the type of wheel was not listed on only thirty-one models, thus leaving 428 models on which either metal wheels or wood wheels were specified. Of these, 106 models are furnished with metal wheels as compared with only sixty-one models for 1919. This shows a gain of forty-five models which is equivalent to a percentage increase of from 12.5 in 1919 to 23.3 in 1920.

This increase in the use of metal wheels has taken place principally on the larger models of trucks or those from 3- to 5-ton capacity. Both the disk and spoke types have shared in this increase. Both types are castings, the pressed steel wheel not having been developed as yet as to come into as general use in the motor truck field as is the case with passenger cars on account of the greater loads which have to be sustained on trucks.

While the increased use of metal wheels on the trucks of the heavier capacities indicates a trend in that direction, the resume of wheel statistics as given in the top table on page 364 indicates that 321 out of the 459 models offered on the 1920 market are still furnished with wood wheels as standard equipment.

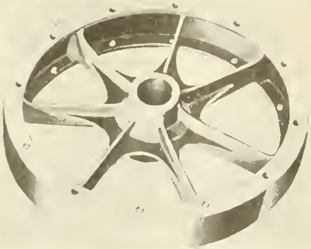
During the year the metal wheel makers have devoted much of their time to improvements in manufacturing facilities; to making castings with fewer rejections and with less cost.

Standards Work Continues

The wheel situation as a whole has seen considerable improvement during the year, especially in the standardized work being carried out by the combined efforts of the wheel makers and the Society of Automotive Engineers with a view of reducing the great number of wheel sizes. This work was begun in 1918 by the coordinated efforts of the War Industries Board; the Society of Automotive Engineers; The Wood Wheel Manufacturer's Assn., and the Solid Tire Division of the War Service Commitee of the Rubber Industry of America.

As an example of the standardization work which can be carried out in connection with motor truck wheels, one company in 1918 produced no less

The new West steel spoke wheel designed for use with giant pneumatics



Another type of West cast steel wheel. The hub is cast integrat

TYPES OF WHEELS ON 1919 AND 1920 GASOLINE TRUCKS

Type	1919 No. of Models Supplied	1919 Per Cent of Models Supplied	1920 No. of Models Supplied	1920 Per Cent of Models Supplied
Wood	368	75.2	321	70.0
Metal	61	12.5	106	23.3
	429	87.7	428	93.3
Not listed or doubtful	60	12.3	31	6.7
	489	100.0	459	100.0

MAKES OF WOOD WHEELS USED ON 1920 GASOLINE TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

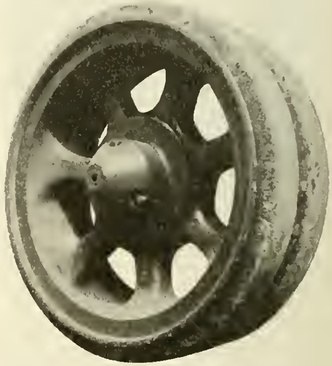
Wood Wheel Maker	No. of Models Supplied	Per Cent of Models Supplied
Archibald Wheel Co., Lawrence, Mass	14	4.4
Auto Wheel Co., Lansing, Mich.	5	1.4
Bimmel Spoke & Auto Wheel Co., Portland, Ind.	57	17.7
Crane & MacMahon, St. Marys, Ohio	27	8.4
Eberly & Orris Mfg. Co., Mechanicsburg, Pa.	8	2.5
Hayes Wheel Co., Jackson, Mich.	7	2.2
Hoopes Pro. & Darlington, West Chester, Pa.	17	5.3
Phineas Jones & Co., Newark, N. J.	8	2.5
Kelsey Wheel Co., Detroit, Mich.	1	0.3
Mutual Wheel Co., Moline, Ill.	1	0.3
Prudden Wheel Co., Lansing, Mich.	33	10.6
Royer Wheel Co., Aurora, Ind.	5	1.4
Salisbury Wheel Co., Jamestown, N. Y.	1	0.3
Schwarz Wheel Co., Philadelphia, Pa.	49	15.3
Standard Wheel Co., Terre Haute, Ind.	5	1.4
Waterhouse & Lester Co.	5	1.4
Wayne Wheel Co., Newark, N. Y.	23	7.5
	266	
Wood but no maker listed	55	17.1
Totals	321	100.0

MAKES OF METAL WHEELS USED ON 1920 TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

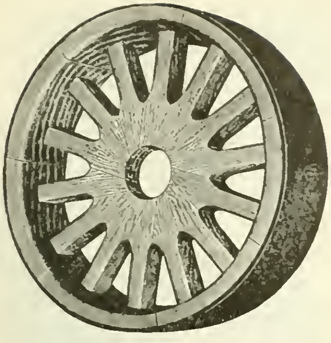
Metal Wheel Maker	No. of Models Supplied	Per Cent of Models Supplied
Budd Wheel Corp., Philadelphia, Pa.	1	0.9
Clark Equipment Co., Buchanan, Mich.	15	14.2
Dayton Steel Foundry Co., Dayton, Ohio	10	9.5
Detroit Pressed Steel Co., Detroit, Mich.	2	1.9
Massillon Steel Castings Co., Massillon, Ohio	1	0.9
Indestructible Steel Wheel Co., Lebanon, Ind.	1	0.9
Smith Wheel, Inc., Syracuse, N. Y.	60	56.6
	90	
Metal, but no maker listed	16	15.1
Totals	106	100.0
Not listed, either wood or metal	31	

The Clark steel disk wheel for giant pneumatic tires. Note the provision made for the valve stem to permit of easy tire mounting

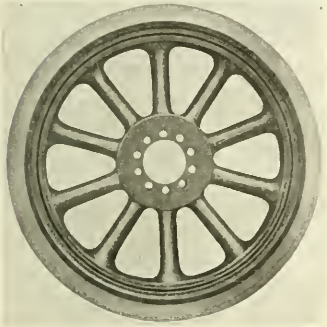


The Dayton steel wheel which is characterized by the flaring or easy curves of the inside and outside ends of the spokes

than forty-three different sizes of truck wheels in quantities of over 100. Later the same company reduced this number to twenty different sizes and expects to reduce this number still further to twelve standard sizes. This standardization work, now that the war is over, is being carried on by a special committee of the Society of Automotive Engineers. It is essential that in this work, the standardization be carried on with the co-operation of both the solid and pneumatic tire manufacturers so that changes will not be made in the wheels that will conflict with the tires and thus render the problem more intricate rather than simplified. The use of giant pneumatic tires has set up new problems, since these tires cannot be pressed into place under hydraulic pressure as is the case with solids. This holds true particularly in emergencies where giant pneumatic tires have to be changed on the road. Sev-



A Schwarz heavy truck wood wheel, showing how the inner ends of the spokes are dovetailed to form the base of the hub



The Smith metal wheel of the spoke type which is specified on more than half of the 1920 trucks listed with metal wheels

eral of the metal wheel manufacturers have met this condition by providing a deep slot in the wheel rim, so that the difficulty of getting the tire valve through the rim is greatly lessened.

In the field of special wheels, the Sewell cushion wheel, having a serrated ring of rubber inserted between the conventional felloe and another placed between it and the hub to carry the outer ends of the spokes, has gained much attention and is used on a large number of trucks to help protect the driving mechanism by absorbing some of the shocks transmitted to it by the road. The Jacox is another special type wheel in which six or seven circular blocks or rubber are inserted between the felloe and a special hub so that the rubber units or cushions tend to absorb the shocks transmitted from the conventional tire around the usual felloe band. The contact between the rim of the wheel and the axle is through the rubber cushions only.

Through the increased use of

(*Continued on page 367*)

MAKES OF SPRINGS USED ON 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Spring Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Alloy Steel Spring Co., Jackson, Mich	2	2	0.4
Betts Spring Co., San Francisco, Cal	1	6	1.3
Canton-Cleveland Co., Canton, Ohio	1	1	0.2
Champion Auto Spring Co., St. Louis, Mo	2	2	0.4
Delaney & Sons, Newark, N. J	1	3	0.7
Detroit Steel Products Co., Detroit	19	51	11.1
Higgins Spring & Axle Co., Racine, Wis	1	3	0.7
Garden City Spring Works, Chicago, Ill	2	10	2.2
Harvey Spring & Forging Co., Racine	1	3	0.7
Iron City Spring Co., Pittsburgh, Pa	5	13	2.8
Kalamazoo Spring & Axle Co., Kalamazoo, Mich	1	5	1.1
Mather Spring Co., Toledo, Ohio	25	81	17.7
Merrill Spring Co., New York City	7	30	6.5
National Spring Co., New Castle, Ind	1	4	0.9
Perfection, Standard Parts Co., Cleveland, Ohio	24	66	14.4
Penn Spring Works, Baldwinsville, N. Y	1	1	0.2
Philadelphia Spring Works, Philadelphia, Pa	1	1	0.2
Rowland, William & Harvey, Philadelphia	3	5	1.0
Sheldon Axle & Spring Co., Wilkes-Barre, Pa	17	55	12.0
Spring Perch Co., Bridgeport, Conn	4	13	2.8
Standard Steel Spring Co., Coraopolis, Pa	2	5	1.1
Tuthill Spring Co., Chicago	17	34	7.4
U. S. Spring Co., Los Angeles, Cal	2	10	2.2
	140	404	
Listed as own make	2	5	1.1
Not listed or doubtful	19	50	10.9
Totals	161	459	100.0

TYPES OF FINAL DRIVE USED ON 1920 GASOLINE TRUCKS

Type	No. of Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Hotchkiss Drive	96	253	55.1
Other forms of drive	54	158	34.4
Not listed or doubtful	17	48	10.5
	167	459	100.0

MAKES OF GOVERNORS USED ON 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Governor Make	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Continental Motors Corp., Detroit, Mich	8	9	2.0
Duplex Engine Governor Co., Brooklyn, N. Y	23	58	12.6
Hinkley Motor Corp., Detroit, Mich	1	1	0.2
McCanna, Detroit Lubricator Co., Detroit, Mich	2	8	1.8
Monarch Governor Co., Detroit	20	48	10.5
Pharo Mfg. Co., Detroit	4	11	2.4
Pierce Governor Co., Anderson, Ind	56	144	31.3
Ruggles, Republic Motor Truck Co., Alma, Mich	1	1	0.2
Simplex, Duplex Engine-Governor Co., Ind., Brooklyn, N. Y.	5	12	2.6
Waukesha Motor Co., Waukesha, Wis	10	21	4.6
	130	313	
Listed as own make	10	36	7.8
Not used	37	61	13.3
Not listed or doubtful	21	49	10.7
Totals	198	459	100.0

TYPES OF GOVERNORS USED ON 1920 GASOLINE TRUCKS

Type	No. of Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Centrifugal	96	284	61.9
Hydraulic	1	2	0.4
Loose-ball	4	5	0.7
Suction	27	65	14.2
Not used	35	60	13.1
Not listed or doubtful	16	43	9.7
	179	459	100.0

MAKES OF IGNITION SYSTEMS USED IN 1920 TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

Ignition System Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
American Magneto Co., Toledo, Ohio	1	1	0.2
Atwater-Kent Mfg. Works, Philadelphia, Pa.	8	13	2.8
Auto-Lite, Electric Auto-Lite Corp., Toledo, O.	3	5	1.0
Ericsson Mfg. Co., Buffalo, N. Y.	5	13	2.8
Bosch Magneto Co., New York City	49	136	29.8
Connecticut Telephone & Electric Co., Meriden, Conn.	4	4	0.9
Delco, Dayton Engineering Laboratories Co., Dayton, O.	1	2	0.4
Eisemann Magneto Co., Brooklyn, N. Y.	66	202	44.1
North East Electric Co., Rochester, N. Y.	1	2	0.4
Remy Electric Co., Detroit, Mich.	1	1	0.2
Simms Magneto Co., East Orange, N. J.	6	9	1.9
Splitdorf Electrical Co., Newark, N. J.	9	37	8.0
Sumter Electric Co.	1	2	0.4
Westinghouse, E. Pittsburgh, Pa.	1	2	0.4
Wagner, St. Louis, Mo.	2	3	0.7
	158	432	
Listed as own make	0	0	
Not listed or doubtful	11	27	6.0
Totals	169	459	100.0

MAKES OF CARBURETERS USED IN 1920 GASOLINE TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

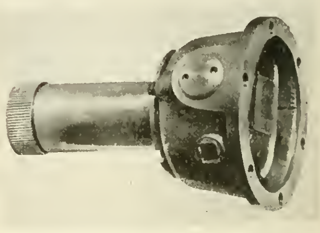
Carbureter Make	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Buick Motor Car Co., Flint, Mich.	1	1	0.2
Ball & Ball (Riker truck)	1	2	0.4
Carter Carbureter Co., St. Louis, Mo.	4	7	1.5
Ensign Carbureter Co., Los Angeles, Cal.	1	4	0.7
Detroit Lubricator Co., Detroit, Mich.	1	1	0.2
Holley Kerosene Carbureter Co., Detroit	1	1	0.2
Johnson Co., Detroit	2	2	0.4
Marvel Carbureter Co., Flint, Mich.	2	9	1.9
Master Carbureter Co., Los Angeles	3	15	3.3
Miller Mfg. Co., Los Angeles, Cal.	1	5	1.1
Rayfield, Beneke & Kropf Mfg. Co., Chicago	7	22	4.8
Stromberg Motor Devices Co., Chicago	73	194	42.2
Schebler, Wheeler-Schebler Carbureter Co., Indianapolis	16	42	9.2
Wilcox-Bennett Carbureter Co., Minneapolis, Minn.	1	4	0.7
Zenith Carbureter Co., Detroit	38	114	24.7
	152	423	
Listed as own make	5	20	4.3
Not listed or doubtful	9	16	3.4
Totals	166	459	100.0

MAKES OF UNIVERSALS USED IN 1920 GASOLINE TRUCKS

Based on specifications published in The Commercial Vehicle *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* The Commercial Vehicle *office.*

Universal Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Acme Universal Joint Mfg. Co., Kalamazoo, Mich.	2	5	1.1
Arvac Mfg. Co., Anderson, Ind.	13	27	6.0
Blood Brothers Machine Co., Allegan, Mich.	14	34	7.4
Francke, Smith-Serrell Co., N. Y.	1	2	0.4
Hartford Automobile Parts Co., Hartford, Conn.	17	47	10.2
Kinsler-Bennett Co., Hartford, Conn.	1	2	0.4
Merchant & Evans, Philadelphia, Pa.	4	10	2.2
Peters Machine & Mfg. Co., Cleveland, Ohio	4	10	2.2
Spicer Mfg. Corp., South Plainville, N. J.	57	177	38.5
Sterling Bearing Co., Lancaster, Pa.	4	9	2.0
Thermoid Rubber Co., Trenton, N. J.	6	9	2.0
Universal Machine Co., Bowling Green, Ohio	10	18	3.9
Universal Products Co., Detroit, Mich.	10	19	4.1
	143	369	
Listed as own make	18	49	10.7
Not listed or doubtful	15	41	8.9
Totals	176	459	100.0

Truck Frames, Universals and Starters



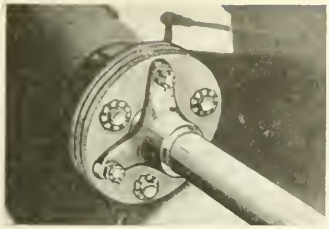
The Arvac metal universal joint of the double-yoke type. It has a self-adjusting grease retainer which automatically keeps a wiping bit on the ball of the yoke

PRESSED steel frames are employed on 65.8 percent or 302 of the 459 motor truck models offered on the 1920 market. This is a gain of 5 per cent as compared with 1919 trucks, when only 297 out of 489 models were equipped with that type of frame. The semi-flexible type of construction similarly has held its own, with 47.5 per cent or 218 models furnished with that type. Flexible frame construction has also gained slightly with the rigid type falling off to make up for the gains with the other two types of construction.

While the pressed steel frame of the semi-flexible type has the advantages of lightness with strength, the fact that each such frame is made from a particular die does not make it possible to increase the length of such frames for long wheelbase types with the same ease as when some form of commercial I-beam or channel is employed. Again, inability to procure pressed steel frames in the required quantities during 1919 as a result of the labor disturbances, has forced many makers to employ the commercial form of scantling.

Electric Equipment

In the matter of electrical equipment, there has been some small gain in the use of electric lights and starters. Three of the six ½-ton trucks have starting, lighting and ignition equipment as standard. In the ¾-ton classification, five of the ten models have starting and lighting as standard equipment. In the 1-ton size, only one of the twenty-two models has starting and lighting units as standard equipment although it may be had at extra cost on the others. In the



The Thermoid-Hardy fabric type of universal which is principally used between the clutch and gearset where there is no permanent shaft angularity

1½-ton size fifteen of the ninety models offered have electric lighting furnished as standard equipment on four models. Seven additional models have starting and lighting as standard equipment. In the 2-ton classification, three models have electric lighting as standard and four others, electric starters as standard equipment. Twenty-eight of the sixty-two models in the 2½-ton size are offered with starters and lighting with seven as standard. Seventeen 3½-ton models have electric lights with three as standard. Nineteen models of 5-tonners may be had with electric lights, with two furnished as standard. No 5-ton truck is fitted with a starter as standard equipment.

Fabric Joints Gain

The use of fabric universad joints has increased slightly, particularly when employed between the engine and the gearset where there is no permanent angularity to the driveshaft. The main claims of the fabric joint are its cheapness and the ease of maintenance, since it requires no lubrication. The increased number of trucks using the gears mounted amidships has been responsible for the increased use of such joints.

Wheels on 1920 Trucks

(Continued on page 365)

motor trucks in road building work, several companies offer plain tread metal wheels to be employed without the use of rubber tires. One of the manufacturers which most recently brought out a wheel of this type is the Clark Equipment Co., Buchanan, Mich.

From the table shown on this and the opposite page, Bimmel wheels are furnished as standard equipment on more models than any other make. In all, fifty-seven models are specified with Bimmel wheels, followed by forty-nine models with Schwarz wheels and thirty-three models with Prudden wheels.

MAKES OF FRAMES USED IN 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Frame Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
A. M. Castle Co., Chicago	1	1	0.2
O. A. Chapper (L. M. C. truck)	1	1	0.2
Dunbar Mfg. Co., Bristol, Conn.	1	1	0.2
Detroit Pressed Steel Co., Detroit	10	22	4.8
Hydraulic Pressed Steel Co., Cleveland, Ohio	4	10	2.2
F. C. Mason & Co., St. Johns. Mich.	1	2	0.4
Parish & Bingham, Cleveland. Ohio	34	82	17.9
Parish Mfg. Co., Reading, Pa.	20	44	9.7
Savage Arms Corp., Sharon, Pa.	14	39	8.5
Smith Corp., A. O., Milwaukee, Wis.	13	46	10.0
Russel Car & Foundry Co., Detroit, Mich.	1	2	0.4
	100	250	
Listed as own make	52	152	33.1
Not listed or doubtful	17	57	12.4
Totals	169	459	100.0

TYPES OF FRAMES USED IN 1920 GASOLINE TRUCKS

Frame Material	No. of Models Supplied	Per Cent of Models Supplied
Rolled channel	125	27.1
Pressed steel	302	65.8
Rolled I-beam	7	1.5
Not listed or doubtful	25	5.6
	459	100.0

Frame Construction	No. of Models Supplied	Per Cent of Models Supplied
Flexible	96	20.9
Rigid	78	16.9
Semi-flexible	218	47.5
Not listed or doubtful	67	14.7
	459	100.0

MAKES OF ELECTRIC SYSTEMS USED IN 1920 GASOLINE TRUCKS

Based on specifications published in THE COMMERCIAL VEHICLE *for November 1, 1919, from information furnished by each truck maker. The original signed specification sheets are on file in* THE COMMERCIAL VEHICLE *office.*

Electric Starting System Maker	No. of Truck Makers Using	No. of Models Supplied	Per Cent of Models Supplied
Auto-Lite, Electric Auto-Lite Corp., Toledo, Ohio	8	12	2.6
Allis-Chalmers Mfg. Co., Milwaukee, Wis.	1	1	0.2
Bijur Motor Lighting Co., Hoboken, N. J.	5	19	4.2
Bosch Magneto Co., New York City	1	3	0.7
Carleton Co. (Elmira truck)	1	1	0.2
Delco, Dayton Engineering Laboratories Co., Dayton, O.	2	2	0.4
Dyneto Electric Corp., Syracuse, N. Y.	5	12	2.6
Exide Electric Storage Battery Co., Philadelphia	1	2	0.4
Gray & Davis, Boston, Mass	4	9	2.0
Eisemann Magneto Co., Brooklyn, N. Y.	12	37	8.1
Leece-Neville Co., Cleveland, Ohio	2	14	3.1
Nichols Electric & Mfg. Co.	1	5	1.0
North East Electric Co., Rochester, N. Y.	4	12	2.6
Remy Electric Co., Detroit	4	7	1.5
Splitdorf Electrical Co., Newark, N. J.	1	5	1.0
Vesta Accumulator Co., Chicago, Ill.	6	15	3.3
Wagner Electric Mfg. Co., St. Louis, Mo.	2	3	0.7
Ward-Leonard Co., Mt. Vernon, N. Y.	1	2	0.4
Westinghouse Electric & Mfg. Co., New York City	24	76	16.6
	85	237	
Listed as own make	0	0	
Not listed, none or doubtful	91	222	48.4
Totals	176	459	100.0

HOW TO

Double The Driver Staff

to Handle Department Store Peak Loads

Double Pay During Rush Periods and Help From Inside the Store Assist the Delivery Superintendent

ORGANIZING and handling the human element or the staff of drivers and helpers on delivery trucks during the peak load period, is one of the urgent problems to be faced by delivery superintendents of department stores all over the country as the Christmas season approaches. Both drivers and helpers must be familiar with the routes. They must be trustworthy, well-trained men. And the staff available must be sufficient to man the greatly augmented fleet and handle the tremendously increased traffic. On the other hand, to maintain such a staff all the year round just because they will be vitally necessary at the peak load period would be bad economics, for it would mean maintaining a certain number of comparatively idle employes during three-quarters of the year.

How to combine the highest possible efficiency with economy of method or how to obtain and organize a greatly augmented and capable staff at short notice each year, is the problem which again faces the department store delivery superintendent at this time. How the problem can be solved is shown by the system which Louis Crispin, delivery superintendent for John Wanamaker, has, after many years of experience, installed in his department.

From February to October inclusive, the Wanamaker store maintains a delivery staff of about 250 men aside from garage superintendents, mechanics and so forth. Of these 250, about 100 are regular drivers and the remainder helpers. These men constitute the permanent truck delivery staff and are retained all the year round. About the first of November, or a little earlier, according to circumstances, Mr. Crispin begins to augment this staff, adding a few men each day until the peak is reached just before Christmas. At this time the delivery staff numbers about 525 men all told, of whom 200 are drivers and the remainder helpers.

From these figures it will be seen that the number of drivers maintained by the firm during the peak load period is double the number on the books during the remainder of the year, and the number of helpers a little more than double the number at ordinary times. In the matter of hiring outside helpers during the peak load period. the problem is a simple one, for there is always a floating population of unemployed, unskilled labor sufficient to supply the number of extra helpers required. But as every experienced delivery superintendent knows, efficient drivers for delivery trucks are very difficult to find. It is just this problem that the Wanamaker system has solved, and solved in the most efficient and economical way. In the first place, although the number of drivers maintained by the firm during the peak load period is double the number maintained during the remainder of the year, not all these additional hundred drivers are hired from outside. At least fifty of the permanent staff of helpers are selected each year as being the most promising potential drivers. These men are known as Cadet Chauffeurs, and from about October 1 until the end of January, they act as drivers and are paid a full driver's salary, their places as helpers being taken by new men hired from the outside. These Cadet Chauffeurs are trained throughout the year at convenient times in handling a truck, and as drivers they are always placed on routes with which they have been able to grow familiar as helpers. However, in order to obtain the full number required, about fifty drivers must still be hired from the outside and these men are obtained in the following manner:

Wanamaker 3-ton Hurlburt loaded with furniture leaving the main store garage. The truck is not backing out as there is ample room to turn inside the garage. Note the smart appearance of the truck, the handsome garage entrance and the driver and helper in the Wanamaker uniform

Getting Outside Drivers

Hundreds of men apply to Mr. Crispin for positions as drivers in the course of a year. Of these, it is necessary to turn down about 75 per cent as inefficient. But of the remainder, Mr. Crispin takes down the addresses of about two to four men a day throughout the year and when the rush period comes. these men are written to and a number are obtained in this way. Very occasionally also an advertisement is inserted in the press, but this means is seldom resorted to, as the class of men who answer such advertisements are not, as a rule, the best for the work. Moreover, drivers, mechanics and garage men generally have their own news service, and nine times out of ten a good driver who happens to be temporarily out of a job, will know that Wanamaker's take on extra drivers at the peak load period and will apply for a position without being advertised for. Lastly, there are a certain number of men who are experienced drivers but who are working as private chauffeurs during the summer months. During the winter months their employers shut up their country homes and garage their cars for the winter. A certain number of such chauffeurs go to Wanamaker's every year as peak load drivers, and they have the additional advantage of being familiar with the Wanamaker routes through past experience.

Double Pay During Rushes

The first method mentioned above, that of keeping a full record of applications made for positions as drivers, has an additional advantage. It enables the delivery superintendent to lay his hands on an efficient driver at any time to replace one of his regular drivers who, for any reason, may not be available or who may have been dismissed. About fifty men are hired as drivers each year by this system, and of these about a third are replacements.

In addition to drivers, a number of helpers return to Wanamaker's each year to serve through the peak load period. These men come from all classes, many of them being men from inside jobs such as wholesale houses and who have been laid off during the wholesaleman's slack period, and others waiters, attendants, boatmen and so forth from the summer resorts. This system of hiring the same men year after year has the great advantage of obviating the necessity of training them. It means that at the peak load period the staff of helpers is automatically augmented by a number of men who understand the delivery system of the store, who know how to load a truck in the most efficient way and who are familiar with the Wanamaker delivery routes.

During the peak load period, Wanamaker drivers and helpers get double pay, a system which serves the double purpose of securing the return each year of good drivers and helpers who are free at this time and who have worked for Wanamaker's in other years, and of stimulating the whole staff to put their backs into it and handle the peak loads with the utmost possible efficiency and enthusiasm. Although this method increases the expense of the system, the increase is inconsiderable compared to the expense of maintaining the entire peak load staff all the year round, and it tends to give the best possible service to customers at the Christmas season, which the other method would not accomplish.

While the general system outlined above will prove an excellent one for maintaining an efficient and sufficient staff of helpers and drivers during the peak load period, other methods of handling the increased burden laid on the delivery department at this time should not be neglected. There are three other methods in vogue at Wanamaker's, all of which contain valuable suggestions to delivery superintendents generally. Of these the first tends to lighten the strain on the delivery department and the other two are important factors in handling the added burden. These are:

Helping on the Inside

1—Interior methods on the part of salespeople to get customers to carry their own parcels.

2—Garage organization calculated to bring the entire fleet to the highest efficiency just at the peak load period.

3—Special routing at the peak load period and graduating the number of parcels carried per truck accordingly.

Taking these in turn, the system in vogue at Wanamaker's is as follows:

1—Throughout the whole store organization, the psychological principle of the "power of suggestion" is applied to every problem that comes up. It is called into service in a hundred ways, such as in meetings held by the buyers; by the aisle-men and by others, reports of which are sent to the management. It is also employed in the store school itself where new salespeople and others are trained, and in the case in point, it is applied to the customers themselves. For instance, signs throughout the store suggest that parcels be carried home by the customers, and the usual salesperson's formula: "Shall I send this for you, Madame?" is altered during the peak load period to "Will you take this with you, Madame?" and the parcel held out invitingly toward the customer. The easiest answer to either question is, "Yes," and the results obtained from this change in formula have proved a large factor in relieving the strain on the delivery department.

2—The Wanamaker fleet making deliveries for the New York store is split up as follows: Attached to the main store there are fourteen electrics, twelve 3-ton gasoline trucks and fifty-six 3-ton gasoline trucks. At the Mount Vernon substation there are seven 1½-ton gasoline trucks and seven ¾-tonners. At Hackensack there are three ¾-ton gasoline trucks; at Staten Island, seven ¾-ton horse wagons; at Long Branch, two ¾-ton gasoline trucks; at Rockaway, one ¾-ton gasoline truck; and at Newark, five 1½-ton trucks and seven ¾-tonners.

All these and wagons are overhauled, repaired and painted during the summer months when some of them can be spared from the fleet without increasing the work of the

(*Continued on page* 382)

The Wanamaker driving staff of the main store garage, taken some years ago, when neither fleet nor driving staff were as large as they are at present. Mr. Crispin, now in charge, was in charge at that time also, and the operating system, uniforming of drivers and fleet composition were much the same then as now, though on a smaller scale

This Article Is of Interest to Contractors

Keeping Track of Truck Work by SIX FORMS

New York Contractor Evolves Simple System Which Also Stops Serious Stockroom Leaks

KEEPING track of his trucks, drivers, fuel, oil, and parts, is one of the chief problems faced by every fleet owner. The man at the desk who is responsible finally for the efficient operation cannot be certain whether the fleet is being operated efficiently or not unless some record is kept of these five items.

Take for example, the unique position of the driver. Unlike the workman in the shop or the clerk in the office, the truck driver does nine-tenths of his work away from the supervision of his employer. He is to a large extent free from supervision which business men have found it necessary to maintain over their employes wherever possible. When the driver is out of sight, who knows whether he is keeping his truck busy or not? Daily drivers' reports, etc., come to the aid of the truck owner in this difficulty, and show him a way by which he can keep a record of the movements of his trucks almost as well as he could by sitting on the seat beside the driver. In the same manner, the truck owner is able to keep tab of his fuel and oil supply as well as the purchase and use of his parts.

Jacob Fradus, a large contractor in New York City, operating nine Mack 7-ton tractors and twenty-five 7½-ton Mack dump trucks, has perfected a system of keeping record of his trucks, etc., which will be of interest to fleet owners in the contractor's field. One of the peculiarities in the contractor's field is the fact that occasionally the trucks will be working on several contracts at one time. This results in the splitting up of the fleet and lessens the opportunity for one-man supervision. Fradus has solved this problem of supervision by the employment of a time keeper at each working place. A special form is filled out by the timekeeper each day, giving a record of the number of trips, loads, and the materials hauled by each truck, as well as the time consumed on each trip. This form is marked D on the opposite page. On every trip each driver is given a ticket, signed by the timekeeper. These tickets, which are handed in nightly to the foreman at the garage, help in verifying the number of trips recorded on the driver's report.

The Timekeeper's Report

The timekeeper's report also gives a record of the work done by outside trucks, which have been rented to help out on the contract. The column headed by the word Owner is for the insertion of the number of any one of Fradus' trucks or the name of the concern helping out on the contract.

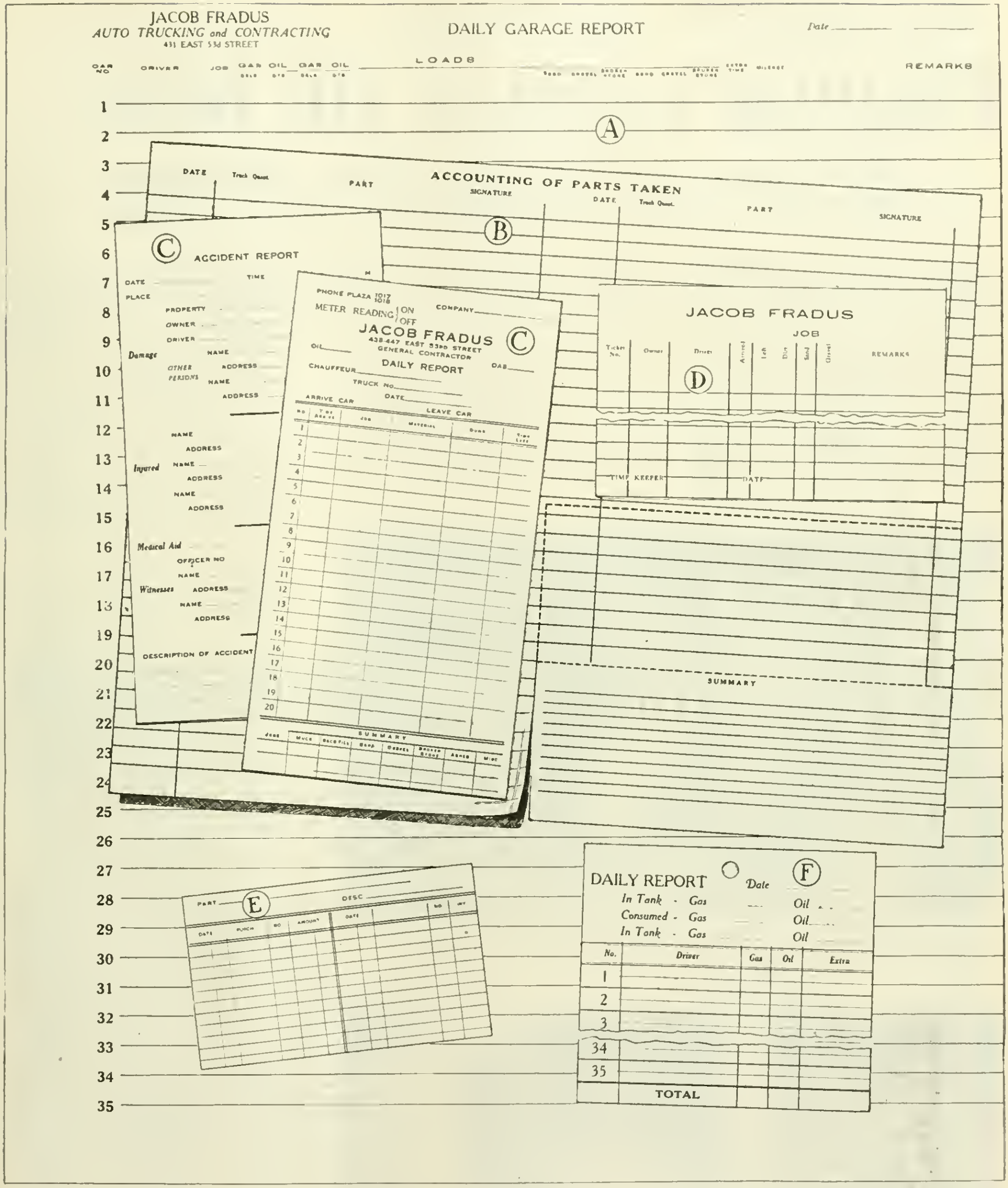
The driver's daily report, shown as C, goes hand-in-hand with that of the timekeeper because it records the same information. In this way, any inaccuracies can be checked up. In addition to this information, the driver must also report the amount of gasoline and oil received and the contracts on which he is working. A record of his time while out on the road is also kept. The dump he goes to is written out on the report, as well as the time he leaves that place and the time he arrives back at the excavation. This information gives an excellent opportunity for time study on any contract to ascertain the number of days, months, etc., in which a particular piece of work can be finished.

F. B. Whitney, foreman of the truck garage operated by Jacob Fradus, a New York City subway contractor

Provision has also been made on the other side of the driver's report for recording full particulars during an accident. When a truck has been in a smashup or has injured someone, the date and place of the accident, together with the time of the day, are written down. If another vehicle has been damaged, the name of the vehicle, together with that of the owner and driver, is recorded on the report. The names and addresses of other persons in the vehicle are also taken. When a person has been injured, his name and address is obtained. The report also records the names and addresses of witnesses, the hospital or place where medical aid was given the injured; the officer's name and station and a description of the accident.

A form, statement A, serving as a final entry for the day's work done by each truck, is kept by the bookkeeper, who takes the driver's reports and those of the time-keepers and copies them in what is called a Daily Garage Report. There is a special column across this report for each truck, giving the driver's name; the job on which he worked; gasoline and oil consumption; the number of trips made; the material hauled; extra time spent on the work; the mileage for the day, and any additional information that the driver may want to report. It will be noticed that there are two separate columns for gasoline and also for oil. One pair of these columns is for a record of what has been taken from the garage and the other for any gasoline and oil that has been bought by the driver outside of the garage. Occasionally a truck will work at two or more places during the day. In order to keep an accurate account of the number of trips made at each place, six columns under the heading, Loads,

(Continued on page 382)



JACOB FRADUS
AUTO TRUCKING and CONTRACTING
431 EAST 53d STREET

DAILY GARAGE REPORT

Date

CAR NO. DRIVER JOB GAS OIL GAS OIL LOADS EXTRA TIME MILEAGE REMARKS

ACCOUNTING OF PARTS TAKEN

DATE Truck Quant. PART SIGNATURE DATE Truck Quant. PART SIGNATURE

SUMMARY

ACCIDENT REPORT

DATE TIME
PLACE
Damage PROPERTY OWNER DRIVER
OTHER PERSONS NAME ADDRESS NAME ADDRESS
Injured NAME ADDRESS NAME ADDRESS NAME ADDRESS
Medical Aid OFFICER NO. NAME
Witnesses ADDRESS NAME ADDRESS
DESCRIPTION OF ACCIDENT

PHONE PLAZA 1017 1018
METER READING ON OFF
COMPANY
JACOB FRADUS
438-447 EAST 53RD STREET
GENERAL CONTRACTOR
OIL GAS
DAILY REPORT
CHAUFFEUR
TRUCK NO.
DATE
ARRIVE CAR LEAVE CAR
SUMMARY

JACOB FRADUS
JOB
Ticket No. Owner Driver REMARKS
TIME KEEPER DATE

PART DESC.

DAILY REPORT Date
In Tank - Gas Oil
Consumed - Gas Oil
In Tank - Gas Oil

No.	Driver	Gas	Oil	Extra
1				
2				
3				
34				
35				
	TOTAL			

Six Forms to Keep Track of Truck Work and Spare Parts Used

The six forms used by Jacob Fradus to keep track of the work done by his fleet of trucks and trailers and the fuel and oil used by each as well as the spare parts inserted during repair work. All of the forms and the special purpose for which they were devised are discussed in the article on the opposite page. Special attention is called to the perforated flap at the lower right corner of the form B as indicated by the dotted line. This flap is folded back during the month, so that it is free from the dirt and grease of the shop foreman's hands at the end of the month when the summary is made out

Truck Deliveries Speeded by PROPER LAYOUT OF BINS

Philadelphia Seed Merchant Finds Whitewashed Bins With Large Labels Eliminate Interior Delays

A GOOD layout of roomy, light and well-labeled bins is of inestimable value to the dispatching division of any industrial concern's transportation department. A business house having its own fleet of trucks, or hiring general and local express trucks, where frequent short trips out for deliveries and pickups are made, once having adopted such a plan, always clings to it. The remarkable thing is that many concerns employing numerous other devices to promote truck efficiency, neglect the bin arrangement and have their wares piled up helter-skelter on a platform, or even on the sidewalk. Such houses are the very ones to complain loudly if there is delay through the mixing of parcels or packages.

With proper bin arrangement, the shipping clerk or driver can lay his hands at once on any package desired. Taking it from the driver's standpoint alone, good bin distribution in a shipping or dispatching division affords him these advantages:

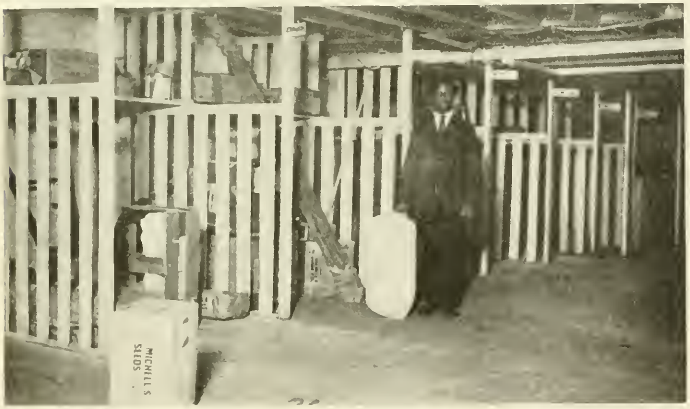
1—He knows where to find his packages, or other wares at any time of starting.

2—The bins being separated, one from the other, there can be no confusion, or mixing of goods.

3—The bins being properly labeled, even a driver working at the place for the first time, knows the location of what he is to take out.

4—Where a company hires outside trucks, either regularly, or in emergencies only, the strange driver knows exactly where to go and what to do, being guided by the labels on the bins.

5—The chances for mistake being largely eliminated and all hands not having to hesitate, or hunt around for the package to load on the trucks, the vehicles get under way and deliveries are made much sooner than otherwise.



The arrangement of the drivers' route bins in the shipping deparment of the Henry F. Michell Co., seed dealers in Philadelphia. Note the flag- like route signs on each bin

This iron spiral chute is much faster and cheaper than elevators for sending heavy packages and bundles from the fifth floor of the Michell buliding to the ground floor where they are placed into route bins for the delivery trucks

One of the best bin arrangements noted in Philadelphia is that of the Henry F. Michell Co., wholesale and retail dealer in seeds. The house also deals in garden hardware and incubators. The Michell Co. operates within a 17-mile radius from its headquarters and owns a fleet of five G. M. C. trucks and hires no less than ten local express companies with trucks to help out on deliveries. The smallest truck of the company-owned fleet is a ¾-ton, panel body Vim for immediate deliveries and the largest is a 5-tonner with an express body with wire sides. Packages range from very small bundles or bags of seeds up to large bushes and plants. Many small crates are also carried. The express companies employed have trucks of many varieties, most of them, however, being the wire-side type of 2-ton capacity.

The company has a garage on a street about 1½ miles away from headquarters. Each driver has a key and lets himself in when he has to. No repairs are made there, the company relying on the local G. M. C. service station.

At headquarters, the shipping and transportation departments are on the ground floor, the bins being arranged in similar manner along the side of each of two large rooms. In the main shipping room, used by the company drivers to collect for loading and by constantly employed local express companies, there are eleven delivery bins, each 6 ft. across and 9 ft. deep. The bins are formed of whitewashed slats, and are kept pure white to facilitate finding everything in the way of small packages and to locate most easily those in the darker portion of the room.

At the height of 5 ft., a broad shelf is arranged at the inmost recess of each bin, there being an absence of slats at this height, from the outer edge of the shelf to the front of the bin, for convenience in slipping in, turning, or taking out, long packages to be placed on the shelf.

On the central post of each bin section, near the top of each bin, is a large, stenciled label, extending out after the manner of a flag, indicating in some instances the route and in others the express line to take the merchandise. There are certain delivery days for certain sections of the city and suburbs, as deliveries at some of the outlying points are not made daily. For instance, deliveries to Chestnut Hill and West Philadelphia by the company's own trucks are made on Wednesday and Friday and general deliveries in the city are made on Monday and Wednesday. In the seed business there is not, ordinarily, the problem of daily deliveries in exactly the same localities as in the case of the more vital commodities.

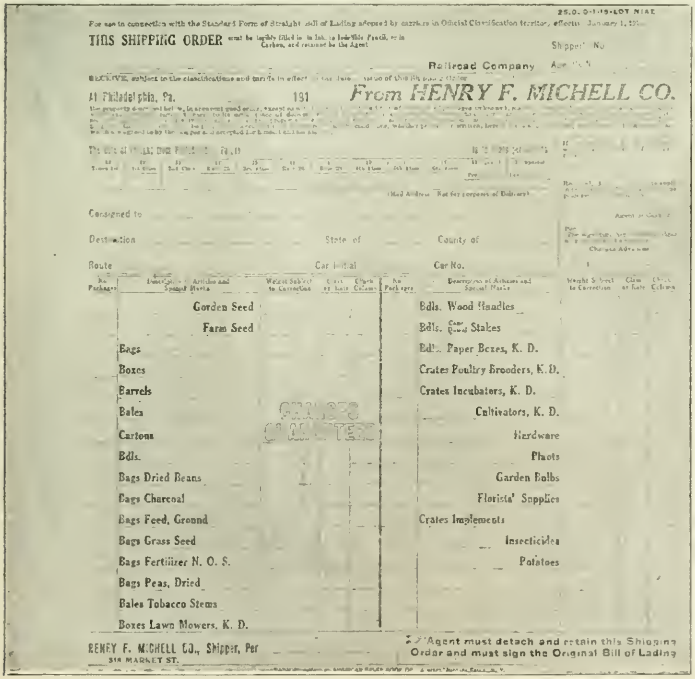
In the second room used by this department, across a hallway, are arranged in like manner the bins for the miscellaneous express companies handling Michell's wares. These are concerns which may, or may not be employed daily. But each line or route, has its bins, all the same. There are ten bins in this section.

No matter how many return trips are made, in each case the transportation department sees to it that the packages and bundles are waiting in the proper bins, ready to load onto the trucks. The drivers and helpers do not know what they are to haul until they get their packing memorandum, or receipt, a yellow duplicate, the original of which is filed in the office of the transportation department. A shipping order has its duplicate, a straight bill of lading. All driver's slips are checked in the office by a route delivery sheet, the order number in each case being the same. All express slips are filed alphabetically in the office and are posted in a special book.

Large packages are done up on the fifth floor and a great aid in getting them ready for the bins is a spiral iron chute which slides the packages to the first floor. Small packages are done up in the basement, an ordinary escalator taking them up to the first floor, when ready for the bins. There is also an elevator of 3 tons capacity running from the top of the building to the basement, on which especially bulky packages from the fifth floor may be carried to the first.

White Service for Wilmington

Wilmington, Del., Nov. 22.—The White Co. will erect a sales and service station in this city. A site, comprising 27,000 sq. ft. of space has been obtained. The building which will be located on Market and 31st streets, is expected to be completed by Jan. 1, next.



For use in connection with the Standard Form of Straight Bill of Lading adopted by carriers in Official Classification territory, effective January 1, 19

THIS SHIPPING ORDER must be legibly filled in, in Ink, in Indelible Pencil, or in Carbon, and retained by the Agent

Shipper's No.

Railroad Company

From HENRY F. MICHELL CO.

At Philadelphia, Pa. 191

(Mail Address—Not for purposes of Delivery)

Consigned to

Destination State of County of

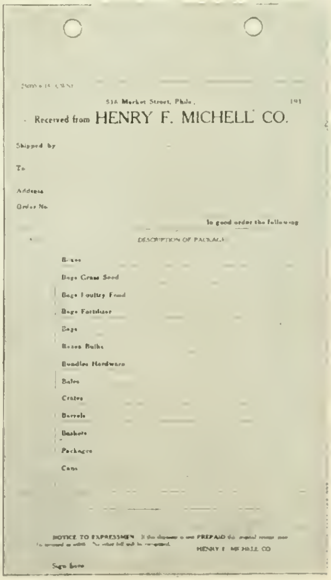
Route Car Initial Car No.

No. Packages	Description of Articles and Special Marks	Weight Subject to Correction	Class or Rate	Check Column	No. Packages	Description of Articles and Special Marks	Weight Subject to Correction	Class or Rate	Check Column
	Garden Seed					Bdls. Wood Handles			
	Farm Seed					Bdls. Cane Stakes			
	Bags					Bdls. Paper Boxes, K. D.			
	Boxes					Crates Poultry Brooders, K. D.			
	Barrels					Crates Incubators, K. D.			
	Bales					Cultivators, K. D.			
	Cartons					Hardware			
	Bdls.					Plants			
	Bags Dried Beans					Garden Bulbs			
	Bags Charcoal					Florists' Supplies			
	Bags Feed, Ground					Crates Implements			
	Bags Grass Seed					Insecticides			
	Bags Fertilizer N. O. S.					Potatoes			
	Bags Peas, Dried								
	Bales Tobacco Stems								
	Boxes Lawn Mowers, K. D.								

HENRY F. MICHELL CO., Shipper, Per
518 MARKET ST.

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading

The shipping order which is also made out in duplicate, the carbon copy being a straight bill of lading. Note how special notations are made to avoid writing as much as possible



518 Market Street, Phila., 191

Received from HENRY F. MICHELL CO.

Shipped by

To

Address

Order No.

In good order the following

DESCRIPTION OF PACKAGE

Boxes
Bags Grass Seed
Bags Poultry Food
Bags Fertilizer
Bags
Boxes Bulbs
Bundles Hardware
Bales
Crates
Barrels
Baskets
Packages
Cans

NOTICE TO EXPRESSMEN [illegible] PREPAID [illegible]

HENRY F. MICHELL CO

Sign here

The driver's memorandum or receipt, the original of which is filed in the office of the Michell shipping department

Five Departments Take Care of the Shults Maintenance

Three of these departments are shown above. To the extreme left is the engine department. The adjustment department is in the center and the machine shop department at the extreme right. Trucks that come in for repairs or overhauling are parked in the adjustment department to ascertain any wear or tear. While the mechanics are going over the trucks, the men in engine department are also working on the power plants

Maintaining BREAD TRUCKS

Careless Operation Caused by Salesmen Drivers Makes Overhauling Necessary Every 6 Months

INEFFICIENT driving has doubled the duties of the repair department of the Shults Bread Co., which operates 165 trucks in New York City and the surrounding territory. The drivers are also salesmen because they sell bread to the company's customers. Naturally, it is to their advantage to make all of the deliveries possible, since they are paid a salary plus a commission on the amount of bread sold. In their eagerness to do so, little thought is given to careful driving. The trucks are run at as high rates of speed as possible so that every customer will be visited. It is stated that a large number of the trucks make from 90 to 100 miles a day. When it is figured that this mileage is covered day in and day out, all during the week, it is natural that the wear and tear on the trucks will be considerable.

As a result of this wear and tear, the maintenance department of the Shults company is forced to overhaul its trucks every six months, instead of only once a year. That company has endeavored to teach its drivers the rudiments in careful driving, but with little success. They have been told to shift to second gear when descending a long hill, so that the use of the brakes will not be excessive. Instead of heeding this advice, the drivers will stick to third gear, necessitating the use of the brakes under abnormal conditions and the consequent wear and tear. Relining of the brakes is, therefore, one of the biggest time consuming operations in the Shults repair shops. Broken spring repairs and tightening up of loose parts as the result of fast driving over poor roads are other repair operations that keep up maintenance costs in these shops.

The Shults Bread Co. has its main office in Brooklyn, N. Y. Fourteen bakery plants are operated throughout the 150 square miles of territory served. Four of them are located in Brooklyn, four in New York City, three in Hoboken, N. J.; one in Mt. Vernon, N. Y.; one in Jamaica, N. Y.; and one in West New Brighton, Staten Island, N. Y. These are widely separated so as to cover the entire territory.

Work Is Specialized

Nine of these plants use trucks for the bread delivery. The five remaining plants take care of a business that is limited to their particular districts within a radius of 6½ miles, the deliveries being made by horse vehicles. One Brooklyn plant uses thirty-two Ward electrics; one Lippard-Stewart; one Ford and an Autocar. Another Brooklyn plant uses a Ford and three Autocars, and the third Brooklyn plant, thirteen Fords. One Hoboken plant uses nine Lippard-Stewarts, three Fords and nine Autocars. The plant at Mt. Vernon uses one Lippard-Stewart, ten Fords and seven Autocars. The Jamaica plant uses thirteen Lippard-Stewarts, two Fords and eleven Autocars. The West New Brighton plant, recently built, is equipped with a fleet consisting of three Fords and eight Autocars. The Macks have been used in the haulage of building materials and supplies to the Staten Island plant.

The Shults Bread Co. has six plants under its own name, located respectively in Brooklyn, Hoboken, Mt. Vernon, New York City, Jamaica and West New Brighton. Five of the six Shults plants have specially-built garages which are separate from the bakery plants. The Brooklyn plant, which uses the thirty-two Ward electrics, stores the trucks in the same building occupied by the plant. Facilities for charging the batteries have also been installed at that plant. Instead of repairing the trucks at one point, this work is done at two service stations located at the Hoboken and Jamaica garages. These two service stations are completely equipped, being able to take care of all of the heavy repairs needed on the 165 trucks.

With a fleet of trucks operating in widely separated places, as in the case of the Shults Bread Co., it is natural that in order to keep tabs on the maintenance and operation, there must be a centralized system of supervision of these two departments. This supervision is divided into three main departments. The first, or main, department is the executive committee, which buys the trucks, designs the bodies and purchases equipment. Under the supervision of this executive committee come the general manager and the garage superintendent. The general manager supervises the operation of the trucks and horse wagons through individual plant managers. The garage superintendent supervises the maintenance of the trucks through each garage foreman.

These two men make the rounds of the plants each week to see that the operation and maintenance work are up to the required standards. Each day the garage foremen send in their reports to the plant manager, giving all information as to what work has been done on the trucks; the amount of fuel and oil consumed, etc. At the end of the month, the plant manager sends his report to the main office. As each truck is numbered, there is an individual sheet for noting its performance, etc. In the same manner, the main office keeps the performance records of each truck, noting the total cost of maintenance and operation for each month.

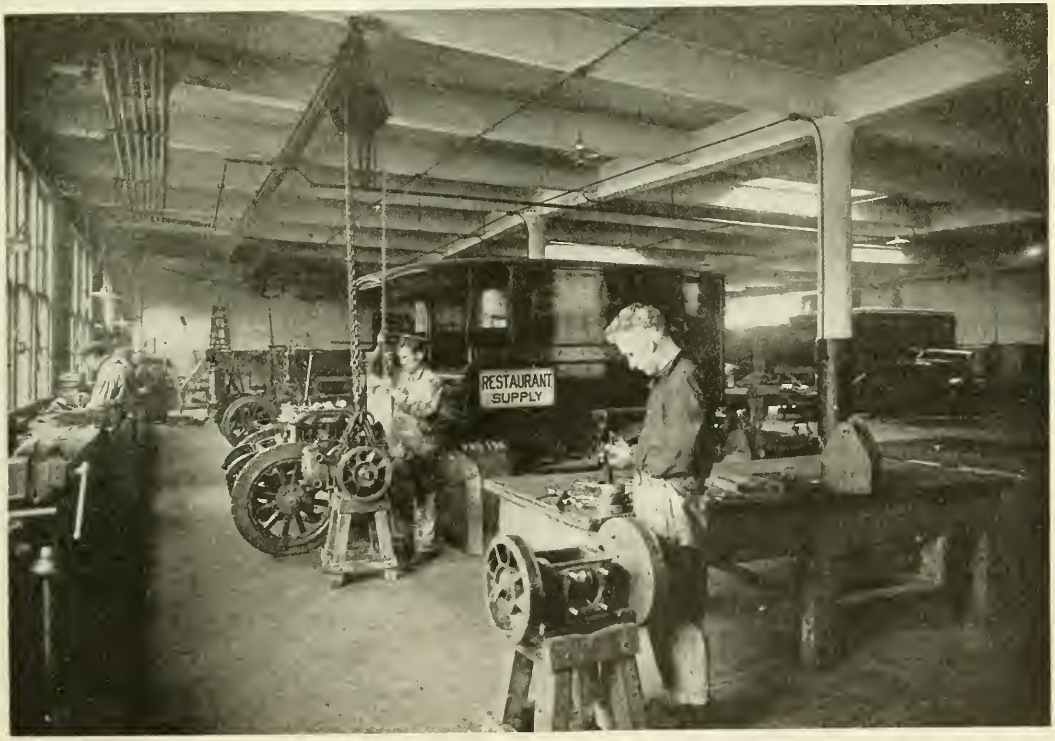
Departmentizing the Work

As stated before, all major repairs are taken care of at the Jamaica and Hoboken garages. All light repairs are taken care of at the other garages. The overhauling of the trucks takes from 2 to 3 weeks. The trucks are completely torn down and practically rebuilt. The bodies are also repaired and painted, when needed. As the Hoboken garage is the larger of the two, this story will deal with the functioning of its repair shop only.

The Hoboken garage is in a two-story building, the first floor of which is used for storage purposes only and the second floor for the repair work. The building is 75 ft. deep and 100 ft. wide. There are two entrances, one leading to the first floor and another leading to the second floor. The latter is reached by means of a 10-ft. wide ramp, whose entrance is at the right side of the building on the outside, running to the ramp in the rear. The ramp runs up on the outside of the rear end of the building to the entrance on the second floor. As the ramp is at a 30-deg. angle, it is necessary at times to use a hand windlass to haul broken-down trucks to the repair shop.

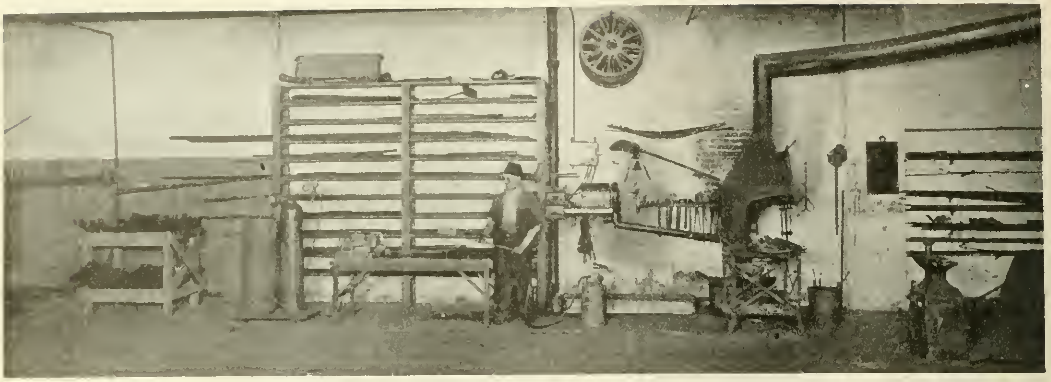
The repair shop is complete in every detail. All parts are kept in a large stockroom, the value of the parts carried on hand being placed at $20,000. The stockroom clerk in charge, keeps tab on every part and tool that is taken out, and at the end of the month makes a report to headquarters on everything that has gone out.

E. B. Bianchi, the foreman in charge of the garage, has divided the repair-



Little Time Is Wasted in Moving Engines

The trucks are lined up under a 60-ft. track on which is run a chain hoist. The engines are lifted out of the chassis and are then run to the engine deparment where they are dropped onto stands, as shown above



All Heating and Welding Work in One Department

This department is equipped to take care of most any heating or welding work. When frames need straightening, a kerosene torch is used on account of its flame spread. Spring steel is also heated with this device preparatory to being bent into shape. The oxy-acetylene outfit comes in handy for welding small parts while on the truck and the forge and anvil for small parts that must be bent

work into five parts. The first one is the engine department; the second is the adjustment department; the third, the machine shop work; the fourth, the heating and welding department; and the fifth, the body repair department.

The engine, adjustment and machine shop departments occupy in the order named the space along the front side of the building, where lighting facilities are excellent. All trucks to be repaired are parked, as shown in the accompanying illustration, in front of the adjustment department with its wall bench. As soon as a truck comes in, the foreman first ascertains what should be done to the truck in the way of repairs. If only adjustments are needed, the mechanics in that department are instructed to take care of that work. If the engine needs overhauling, the mechanics in the engine department to the left are put to work. The machine shop is at the service of both departments.

The Shop Equipment

The engines are lifted out of the frames by means of a Peerless 4,000-lb. hand hoist running on an overhead track. This overhead track is 60 ft. long and is located in the space occupied by the adjustment department. One end of it extends into the engine department and the other into the machine shop. As a result, when an engine is to be lifted out of the truck frame, all that is necessary is to run the truck directly under the track, attach the hoist and then run the hoist to the engine department. When the engine arrives there, it is dropped onto a stand, as shown in one of the accompanying illustrations.

E. B. Bianchi, foreman in charge of the Hoboken service station of the Shults Bread Co.

The engine department personnel consists of two mechanics, both specially trained as engine men. These men take care of all of the bearing repairs, etc., and make all road tests. All cylinder reboring is done at the Jamaica plant.

Two mechanics work in the adjustment department. They take care of all small repairs and adjustments, as directed by the foreman.

One machinist operates the machine shop equipment, which consists of an 18-in. swing lathe made by the Rahn-Larmon Co., Cincinnati; a power hacksaw made by the Millers Falls Co., Millers Falls, Mass.; a drill press made by Manning, Maxwell & Moore, New Yory City; a grinder, and an arbor press made by George Pfaff, New York City.

All heating and welding work is taken care of by one mechanic, the department for this work being placed along the side wall leading to the entrance. The equipment in this department consists of an oxy-acetylene welding outfit, a forge made by the Buffalo Forge Co., Buffalo, and a kerosene torch made by the Hauck Mfg. Co., Brooklyn. Frame straightening, etc., which needs a large flame for heating, is taken care of by the kerosene torch, which has a flame 3 in. wide. The forge is used for making springs, etc.

The body department work is taken care of by two carpenters. When the trucks come in for overhauling, their bodies are first gone over by the carpenters for needed repairs and painting. If body repairs are needed, the trucks are backed under a hoist attached to the ceiling, and the bodies are then taken off and placed on portable wooden stands mounted on castors. This department takes care of the body work of the whole fleet.

One Man for Greasing

Particular attention is paid to the engine lubrication and the greasing and oiling of all parts that are most apt to wear. A man has been hired to take care of all of that work. His particular job is to oil and replenish the fuel supply of every truck. The grease cups are turned down every second day and the oil cups every third day. The oil in the crankcase is cleaned out every 2,000 miles.

The trucks are washed every day. This work is accomplished during the afternoon and night when all of the trucks are in. Instead of washing the trucks while standing in their parking places, they are rolled to another place in the garage and then washed. This washstand, which is specially designed

Trucks Reach Repairshop by a Ramp

Instead of using an elevator to convey the trucks to the repairshop, a 30-degree ramp is employed to convey the trucks to the repairshop on the second floor. When the truck cannot negotiate this grade, a hand-operated windlass is used

for such work, will be of particular interest to fleet owners. The floor slants to a drain in the center. An overhead washing device is used which enables the cleaner to get at the truck with ease. Trucks standing next to the washing place are protected from splashing by a 2½-ft. wall. In order that the cleaner may get at the top of the body more easily, a wooden stand is utilized to enable him to get at the inaccessible places.

Harvey Price Increases

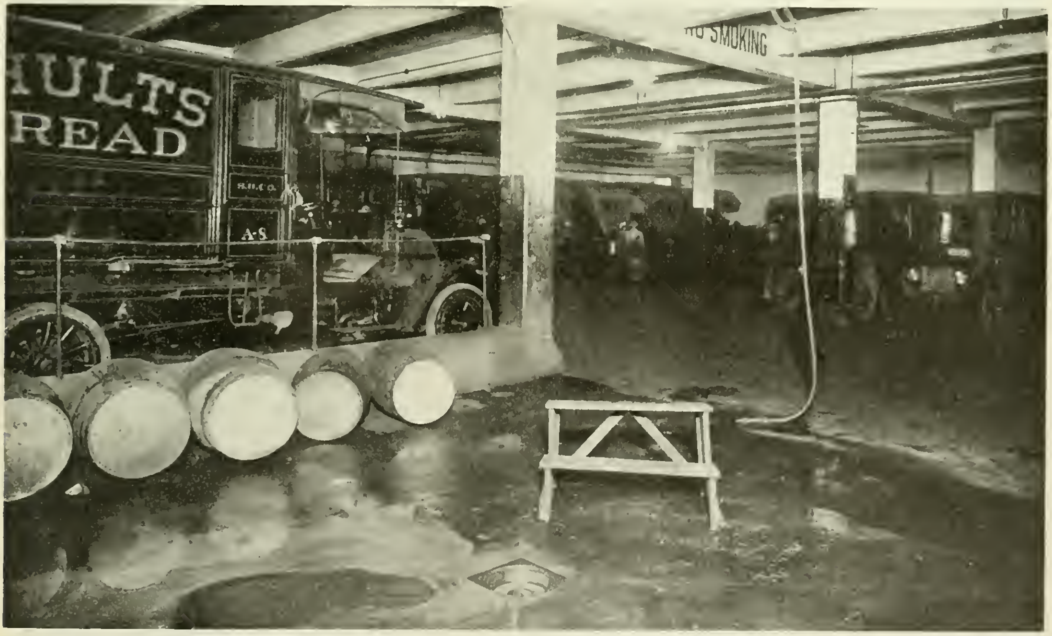
HARVEY, ILL., Nov. 27—The Harvey Motor Truck Co. has increased the prices of its 2½ and 3-ton trucks as follows:

Tons cap.	Old price	New price
2½	$3,000	$3,300
3½	3,900	4,300

The prices of the 1½, 2, and 5-ton models remain unchanged, respectively as follows, $2,350, $2,850, and $5,000.

Ohio Trailer Changes Name

CLEVELAND, Nov. 24.—The Ohio Trailer Co. has changed its name to the Ohio Motor Vehicle Co. and will build a passenger car as well as trailers. The same management and directorate will continue.



One Part of the Garage Is Used for Washing

A section of the garage, fitted out with a drain and an overhead washing device, is used for washing the trucks. In this way, the trucks are protected from splashing, etc., which usually occurs when the vehicles are washed when standing at their parking place. The truck which stands next to the washing place is protected by 2-ft. concrete skirt. In order to get the best of lighting facilities during night washing, a line of electric lights has been installed

The Advantages of TRAILERS in the Retail Lumber Industry

New Type of Jack-knife Frame for Semi-Trailers and Four-Wheeled Trailers Gives Improved Dumping Gear

LUMBER dealers have found that the use of four-wheeled trailers and semi-trailers doubles or triples the work which one truck driver can do with no more effort on his part. The two most important economies of the trailer for the lumber dealer are the saving of loading and unloading time and the reduction of idle standing time of the truck itself.

These savings of time are made both in the yard of the dealer and on the delivery trips to the customers. In addition, trailers and semi-trailers are of particular value in handling large, bulky loads which cannot be carried readily on the conventional motor truck chassis because of the great overhang of long lengths of lumber about the truck's rear axle. All of these advantages have been secured by Church E. Gates & Co., New York City lumber dealers operating four four-wheeled Trailmobile trailers and four Trailmobile semi-trailers.

The layout of the lumber yard has an important bearing upon the use of trailers or semi-trailers. The Gates company has found it can use four-wheeled trailers to advantage because the passageways in the yard are wide. Four-wheeled trailers with carrying capacities up to 2 tons are of such light draught that they can be easily rolled around a yard by hand for the collection of lumber, providing the lanes between the piles of lumber are wide enough for maneuvering. In such work, four-wheeled trailers have been found more desirable than two-wheeled semi-trailers for the reason that the four-wheeled trailers are complete units in themselves while the semi-trailers have to be jacked up when removed from the pulling vehicle or tractor.

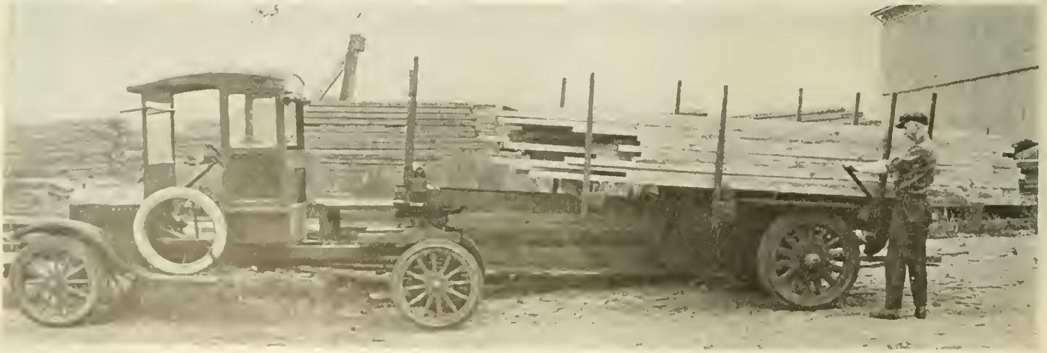
Yard Layout Important

Of course, semi-trailers can be employed for the collection of lumber in the yard provided some form of two-wheeled dolly is used to support the forward end. Unless such a dolly is used, the semi-trailer must be held stationary at the point from which it is disconnected from the tractor, and lumber carried to it from the pile. With a four-wheeled trailer, however, the trailer may be moved direct to the pile and the lumber loaded unto it.

In the use of trailers outside of the yard, the municipal laws will sometimes determine whether a semi-trailer or four-wheeled trailer may be used to the best advantage. Some cities prohibit the dumping of lumber on the street or on the sidewalk. When this is the case, the lumber dealer is forced to choose between keeping his truck idle while it is being unloaded or using some form of trailer which can be disconnected and unloaded while the truck or tractor goes back to the yard to pick up another load.

In cases where lumber is hauled between two fixed points, as between the main yard and a secondary yard, lumber dealers have found it best to use three trailers or semi-trailers in connection with one truck or tractor. When this is done, the truck or tractor's idle standing time is reduced to a minimum for while one trailer is being loaded, one is in transit with the towing vehicle and the other being unloaded at the point of delivery.

Both types of trailers — four-wheeled and semi-trailers—have their advantages and disadvantages for the fleet owner in the retail lumber in-



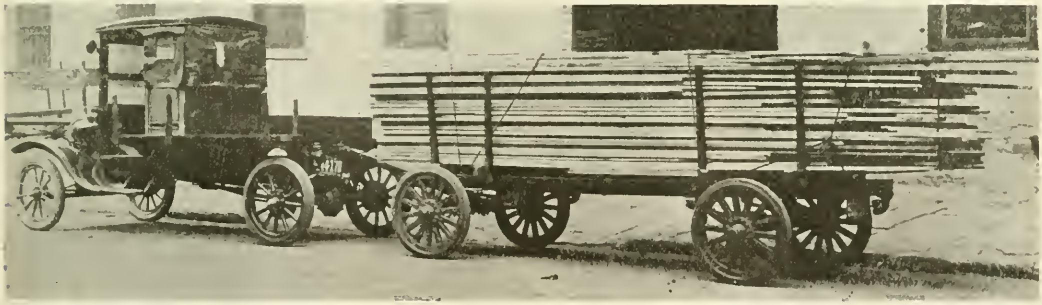
One of the Trailmobile semi-trailers used by Church E. Gates& Co., New York City lumber dealer. The lumber is rolled off, as shown above, the rear roller being roughened so that the lumber may be more easily unloaded. One of the advantages of the semi trailer is the comparative ease with which it is maneuvered.

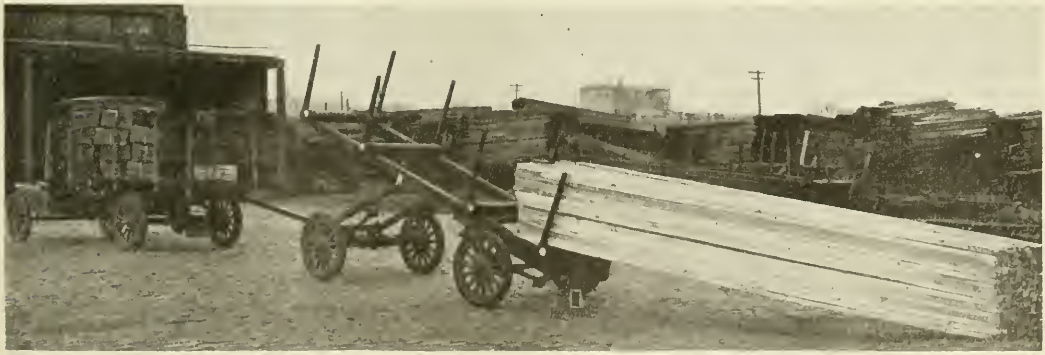
dustry. The semi-trailer, with its load distributed over the four wheels of the tractor and its own two wheels, gives a six-wheeled vehicle with a shorter wheelbase than is the case when the same weight of load is carried in a conventional truck carrying a portion of the load and a four-wheeled trailer carrying the remainder of the load. Ordinarily, there is less side sway with a semi-trailer than with one of the four-wheeled type. In most cases the semi-trailer can be more easily maneuvered in traffic.

In the early types of semi-trailers, much time was wasted in coupling the trailer to its tractor. This was caused by the need of extreme accuracy in getting the upper half of the fifth-wheel on the underside of the trailer directly over the lower half of the fifth-wheel on the tractor, so that the king pin connecting the two might be inserted without a whole series of backings and fillings to give an accurate register. This drawback has been eliminated in the use of semi-trailers by the Gates company by the employment of a Trailmobile semi-trailer with a special form of fifth-wheel with which it is not necessary to spot the truck accurately to make a connection. The truck can back in under the semi-trailer from the side or from any angle. It does not have to back in from directly in front. Furthermore, the semi-trailer may be disconnected from the trailer by simply pulling a lever at the driver's side.

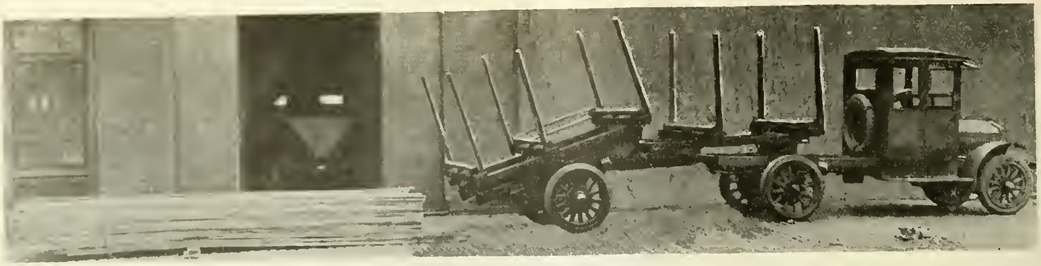
The automatic coupling properties of the Trailmobile fifth-wheel are se-

Elimination of lost motion during loading is one of the advantages of the four-wheeled trailer. Four-wheeled trailers up to 2-ton capacities are of such light draught that they may be easily pulled by hand during the spotting of the lumber.





Above, the new Trailmobile, four-wheeled trailer with the jack-knife frame as used by Church E. Gates & Co. The top view shows the load in place. Below, the forward part of the frame has a jack-knife lift which allows the tilting of the frame to facilitate unloading of the lumber and to bring it nearer the ground at the rear end. With this device the load is rolled back until the center of the load is slightly past the rear axle. The frame then breaks and the load rolls off as the truck pulls the trailer away. Due to the easy discharge, the pile does not scatter.



A new Trailmobile semi-trailer with a tilting rear end. With this device, the load is rolled back until the center of load is slightly past the rear axle. The rear section of the frame then tilts and the load rolls off. The load, being nearer the ground as it comes off the body, is more easily discharged and the pile does not scatter.

cured by making the two halfs in the form of castings. The lower casting is in the form of a letter V. The upper casting is a circular plate with a large pin in the center mounted on a rocker shaft and springs. The lower fifth-wheel plate slants downward toward the rear which allows for the pick-up of the semi-trailer without jacking, even though the jacks may have sunk into soft ground. At the apex of the V of the lower plate is a jaw arrangement similar to that employed in the railroad freight car coupler. This jaw arrangement engages the pin on the upper plate and snaps it into place as the tractor is backed in under the semi-trailer. In disconnecting the trailer, the fifth-wheel pin is released from the jaws of the engaging device by the operation of a lever at the side of the driver's seat.

When disconnected from the tractor, the trailer is held upright by means of two props or jacks which are carried permanently on the underside of the semi-trailer platform. These jacks are shown in the illustration at the bottom of page 378. They are each operated by a ratchet on the side. Both jacks may be manipulated at once if the ground on which the semi-trailer is to be left is level, or they can be operated separately if the ground is uneven.

Ease in Maneuvering

The four-wheeled trailer has one inherent advantage in being a complete vehicle which can be moved from place to place or left standing without the use of any additional equipment. When the loads are so large as to make it impossible to carry them on a semi-trailer unless equipped with metal tires, the use of a four-wheeled trailer helps to solve the lumber dealer's problem.

Both the four-wheeled trailer and the semi-trailer of light capacities can be hauled in emergency behind the light salesman's passenger cars generally employed by the large lumber companies. Either type of trailer is suitable for this work when the loads are light. One of the Ford 1-ton trucks used by the Gates company for loads up to 2 tons is shown in connection with a Trailmobile semi-trailer in the illustration at the bottom of page 378.

By building up the support of the fifth-wheel on the rear deck of the tractor frame, the framework of the two-wheeled semi-trailer is usually slanted toward the rear and helps to provide a more rapid unloading of the lumber than is the case with the four-wheeled trailer with a horizontal frame.

This condition has been overcome, however, in most cases by mounting the rollers on the four-wheeled trailer on a special built-up framework, so that the forward roller is several inches higher than the one at the extreme rear.

While this practice assisted in unloading lumber more rapidly from four-wheeled trailers, the Gates company is using a new type of Trailmobile four-wheeled trailer from which the lumber may be unloaded even more rapidly. This new type of trailer has what is termed a jack-knife frame. It is really two frames in one. The regular framework is attached to the rear axle in the usual manner, but is not attached to the front axle. Instead, a shorter framework attached to the front axle has its two side members pivoted to the side members of the main frame a short distance ahead of the transverse center line of the main frame. When lumber is placed upon the trailer, the main frame folds down upon the secondary frame attached to the front axle and rests directly upon it. As shown in the illustration at the bottom of page 379, the main trailer frame has four crosswise rollers mounted directly. These rollers are all at the same level.

New Jack-Knife Trailer

To unload the trailer, the lumber is rolled backwards by means of a ratchet device on the rearmost roller until the center of gravity of the load is slightly past the rear trailer axle The forward end of the main frame, thus relieved of its load, swings upward about the rear axle, so that the rear end of the trailer frame is nearer the ground than when the framework is horizontal. The second frame opens like a jack-knife as shown in the picture at the bottom of page 379. As the tractor is moved forward, the load is slid off so that there is only a drop of about 2 ft. from the front end of the lumber onto the ground. This is very desirable, as it permits the entire load to be deposited in one pile without scattering.

This new type of trailer marks a big advancement in the use of such vehicles in the lumber industry and is worthy of full investigation by other lumber concerns which have discarded horse wagons in favor of the more modern truck equipment.

When four-wheeled trailers are employed, it is customary to carry a portion of the load on the pulling vehicle in order to secure sufficient traction for the driving wheels. In cases such as that of the Gates company where small Ford 1-ton trucks are employed, the comparatively small body on the Ford may be utilized to carry bundles of shingles such as shown in the illustration at the bottom of page 379. The use of four-wheeled trailers with equipment of this kind also permits the lumber dealer to more adequately solve his peak load problem. When business is slack, the small truck may be used as a separate unit and the trailer attached when the rush sets in or when loads of lumber and shingles have to be delivered to the same destination.

COLD-WEATHER HINTS

In Truck Operation

Care of Cooling and Lubricating Systems Is of Greatest Importance for Successful Operation. Methods That Will Save the Fleet Owner Much Worry, Time and Money

No. 5—COLD-WEATHER CARE OF AUTOCAR TRUCKS

> THIS is the fifth of a series of articles pointing out some of the best methods which fleet owners may follow in the maintenance and operation of their trucks in freezing weather. Some of the methods apply particularly to the Autocar truck, while others apply equally well to all makes of trucks. The next article in the series will appear in an early issue.

THE prevention of the freezing of the engine cooling system on the two-cylinder horizontal engine of the Autocar is perhaps the most important cold weather task to which the Autocar owner has to attend. With this in view, the Autocar Co., Ardmore, Pa., sends out to all Autocar owners at the approach of winter weather a series of two notices calling their attention to the need of the use of a suitable anti-freezing solution. Both notices are alike, so that the second is merely a reminder of the first. The Autocar Co. further points out in each notice that unless some suitable anti-freezing solution is used, cracked cylinders and a damaged radiator may result, causing considerable delay and expense.

Instead of leaving it to the truck operator to determine just what is a suitable anti-freezing solution, The Autocar Co. recommends one which is made in the following manner:

Fill the radiator with water as usual; then drain off 6 quarts of water through the pet cock in the bottom of the radiator. Then pour 6 quarts of denatured alcohol into the radiator. This solution will prevent freezing down to 5 degrees below zero. Should the temperature fall below that point, replace 7½ quarts of water by an equal amount of alcohol. As the alcohol evaporates faster than water, new alcohol must be added daily to keep the mixture up to its full strength. The total capacity of the Autocar cooling system is 18 quarts.

If the truck engine should stop while on the road when no anti-freezing solution is employed, the water should be drained immedeately while the driver is making repairs or waiting for assistance. To drain off all the water, open the pet cocks under each cylinder at the bottom of the radiator inlet pipe and under the water pump and radiator. Be certain that these pet cocks are free from obstructions and that the water flows freely.

The Engine Lubrication

The lubrication of the engine and the other power-transmitting parts should also be given particular attention during freezing weather because of the tendency of the oil to solidify under low temperature. In starting the engine it should never be raced until it has had sufficient time to warm up and permit the oil to retain its full fluidity. The engine lubricator should be filled every morning, the motor started and, while running, the oil should be observed in the sight glass on the top of the lubricator before the truck is taken out for the day's run.

This feed is adjusted by means of a stem which projects down through the top of the lubricator. The lubricator is provided with a screen at the bottom to collect any dirt and foreign matter which may be in the cylinder oil. If the oil apparently does not feed fast enough, it should be slightly warmed instead of removing or puuching holes in the screen under the filler cap. The lubricator feeds through one pipe direct to the crankcase from which the various parts of the motor are lubricated by splash. Consequently, the quantity of oil in the crankcase is just as important a factor as the proper feed through the lubricator.

At the bottom of the crankcase there is a pet cock which should be opened to test the oil level inside. The opening on the inside of the crankcase leading to this pet cock is at the height of the lowest proper oil level. Consequently, on testing, a stream of oil should flow through it if there is sufficient oil in the crankcase.

The gearset and the rear axle should be cleaned every few months, washed out with gasoline and new oil inserted. The gearset should be filled with a non-fluid or heavy gear oil to the level of the counetrshaft. Polarine grease, grade B or BB; Mobiloil C or CC or Dixon graphite 677 are recommended. Whenever any of the roller bearings are removed they should be cleaned carefully before replacing.

The rear axle should be kept filled with a non-fluid oil to the level of the small plug just above the drain plug. The same oil as recommended for the gearset may be employed to good advantage in the rear axle.

Keeping Farm Trucks Busy All Year

(*Continued from page* 348)

be imagined. Hence the need for the sheet iron protection. The iron was originally bent in the shape to fit the truck body, but this coincidence need not make other truck owners think such floorings cannot be devised from any sort of sheet iron.

Handling Department Store Peak Loads

(*Continued from page 369*)

remainder. During the summer period about 40 per cent of the gasoline trucks are inoperative. These are laid off anyway, as they are not needed, but this 40 per cent is taken in rotation from the entire fleet and every gasoline truck in the fleet is overhauled and repaired or painted, or both, at this time. The electrics are repaired whenever it is necessary but they are always overhauled one or two at a time just before the Christmas rush begins.

3—Up above Mr. Crispin's desk is a big map of Manhattan cut up into irregular segments by means of heavy black lines. This is a complete map of the store's routes in Manhattan, *and it is based on the peak load period.* The peak load period presents the big delivery problem and it is on the peak load period that all Wanamaker's delivery calculations are based. Each route is numbered and during the rush each route is served by one, two or three trucks, and in the case of certain routes near the store or close to substations, these trucks make two, three or even four trips a day. By this means it is possible to make as many as twelve deliveries to a single address close to the store during one day and the customers' appreciation of such a service can readily be estimated. Loading is graduated according to the number of trips which a truck can make in a day, which is of course based on the distance of the route from the store. Trucks making more than one trip usually carry from 150 to 175 parcels per trip during the rush season, or less if the truck makes more than two trips per day.

In the case of trucks on distant routes where only one trip a day is possible, the average number of parcels carried is about 350. A simple calculation will show that this allows just over two minutes for each delivery in a 12-hr. day, and is the maximum possible delivery for a single truck on a single trip.

There are about ninety routes altogether during the peak load period. When the rush is over and the staff of drivers and helpers is cut down again, two and in some cases three of these routes are combined into one, and the whole route served by one truck making only one trip per day as a rule. In the summer months, all city trucks make two trips a day when required and trucks on more distant or suburban routes make one trip a day. Moreover, from February to October, the average number of parcels carried by one truck on one trip is about 150, which allows four minutes per delivery in a 10-hr. day. Delivery superintendents everywhere should obtain valuable hints from a routing system as complete, as readily adjustable and as easily applied as this one has proven itself to be.

Ousting Horses in Handling Flowers

(*Continued from page* 351)

All loading is done at the curb and by hand, no loading platform being necessary because of the lightness of the goods handled.

In the rush season around Christmas and Easter, when the business is nearly fifteen times as great as at other seasons, Mr. Stumpp hires five large extra trucks to help him handle his deliveries.

Mr. Stumpp maintains one driver for each of his trucks. No helpers are employed, but the boys at the store assist in loading when not not out on delivery trips themselves. In order to foster and stimulate a spirit of competitive efficiency among his drivers, Mr. Stumpp presents a single cash prize of $100 each Christmas. This prize goes to the driver who has made the best showing throughout the year as regards the condition of his truck, his running record, his delivery record and the amount of gasoline his truck has consumed, taking into consideration the size and make of his truck and the mileage covered. Mr. Stumpp has found that this cash prize system yields excellent results.

Keeping Truck Records by Six Forms

(*Continued from page* 370)

have been inserted in the report, generally sufficient for one for each piece of work under way.

A necessary adjunct to the fleet owner's garage is the stockroom. Here are kept spare parts, repair material, etc. And here occur the most serious leaks in the operation of the garage. The mechanic comes to the supply room for parts and material. Sometimes he is in urgent need of a part, and takes it without waiting to notify the stock clerk. The driver in need of gasoline secures 5 gals. and leaves a scribbled memorandum which blows away and is lost. At the close of business, the inventory fails to check. Fradus has stopped these leaks in the stockroom by making each employe sign for every part or gallon of gasoline taken, not on a slip of paper, but on a more permanent record kept by the stockroom clerk. He is supplied with a monthly report sheet for keeping a record of the parts taken out of the stockroom.

In the lower right corner of this report, space is set aside for a summary of all the parts taken out of the stockroom. Fradus has adopted a novel scheme in regard to this summary in which fleet owners will be interested. Instead of allowing the space set aside for the summary to be exposed to the dirt and grime usually found on reports that have been handled by the shop men, this space is folded under the sheet during the month. When the summary is made, the stockroom clerk has a clean sheet to work on and the bookkeeper is greatly facilitated in his cost keeping.

Sorting Orders in the Butcher Business

(*Continued from page* 346)

boxes; the shelve trucks and hamper trucks for light baskets and small light parcels, such as braces of game birds, etc.; and the Bartlett platforms for heavy meat baskets, which can be piled one upon another. Each device is the one best adapted to the work in which it is used; and the labor, time and energy saved by these different types of hand trucks, plays an important part in the success of the shipping or sorting room system which the company has installed.

The sorting room is paved with cement and the walls are in white tiles. It is furnished with a number of water taps and can be cleaned and sluiced down at frequent intervals. It is the object of the company to hand its deliveries over to the hotels and restaurants it serves in spotless condition, for the sake of appearances almost as much as for sanitary reasons. To arrive in this condition they must leave the store in this condition; and to insure this, the company sees to it that all goods are collected and sorted in as nearly as possible spotless surroundings. This feature, too, has had much to do with the success of the business.

CUT OUT

THE TWO FOLLOWING PAGES

HAVE YOU

IDEAS

If you have ideas on new and better ways to repair trucks, send your ideas to the Repairshop Shortcut Editor. He will pay you $1 for each idea accepted.

$1 EACH FOR IDEAS

Better Truck Repair and Maintenance

No. 44—Simple Tongs to Lift Storage Batteries

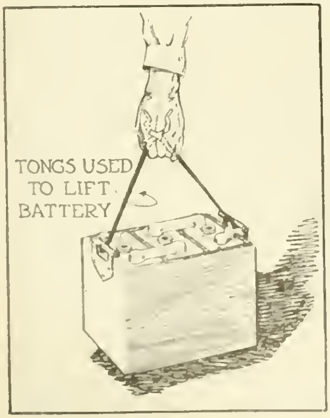
HEAVY storage batteries may be easily lifted for transference from the truck chassis to the battery room by the use of a simple pair of tongs. These tongs may be made of light 3/8-in. or 1/2-in. round with the lower ends formed into hooks to be inserted in the handles usually provided at each end of the battery case. By squeezing the upper ends of the tongs together during the lifting operation, the lower ends are prevented from becoming disengaged and allowing the battery to drop to the floor.—Motor World, J. L. HORNEY, Clinton, Ind.

No. 45—Method to Find Gasoline Tank Leaks

AN easy method to locate leaks in the gasoline fuel tanks of motor trucks is by filling the tank with compressed air. This can be most conveniently done by soldering or otherwise fastening an ordinary tire valve onto an old tank cap which will fit the filling plug of the leaking tank. When this cap with its tire valve is screwed into the tank, the latter can be put under pressure by the use of an ordinary foot pump. If the leak is so small that it cannot be found by the noise of the escaping air, the tank can be immersed in water, and the bubbles will show the location of the leak—Motor World, C. BROWN, Sandy Spring, Md.

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks, The Commercial Vehicle prints on these pages better methods of maintaining trucks and the latest ideas in making quick repairs.

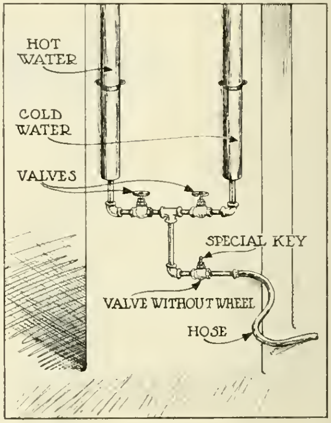
THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.


TONGS USED TO LIFT BATTERY

No. 44

No. 46—Washing Trucks With Warm Water

WHEN washing the highly-polished panel bodies as are fitted on retail delivery trucks such as are used by department stores and the like, it is best to use luke warm water. The heat in the water tends to soften the dirt on the body so that it does not scratch in being removed. Unfortunately, water as piped in a garage is either too hot or too cold. To mix the two in the proper proportions to give a luke warm fluid, a simple pipe and valve outfit as shown in the accompanying sketch, will give good results. The outfit consists of two ordinary globe valves, one placed at the lower end of the hot water pipe and the other at the lower end of the cold water pipe. The two valves are joined together by two short nipples and a tee. The bottom opening of the tee is provided with a vertical nipple; an elbow and another short nipple to a tapered valve provided with a special key and corresponding slot. The key is kept by the garage superintendent or one of his assistants, so that the warm water cannot be turned on indiscriminately and used for other purposes than washing the vehicle bodies. —GEORGE HERON, Chicago.



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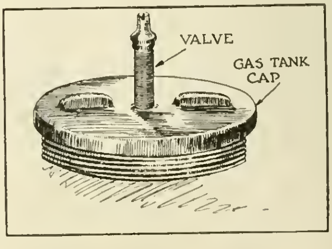

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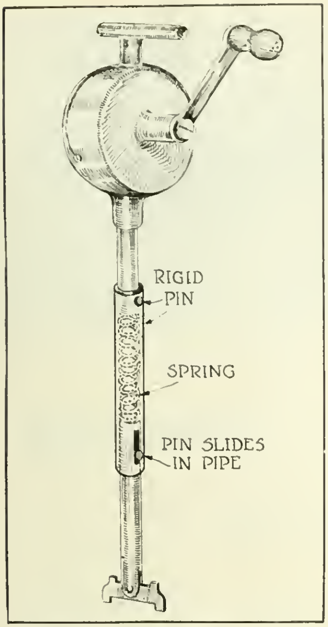

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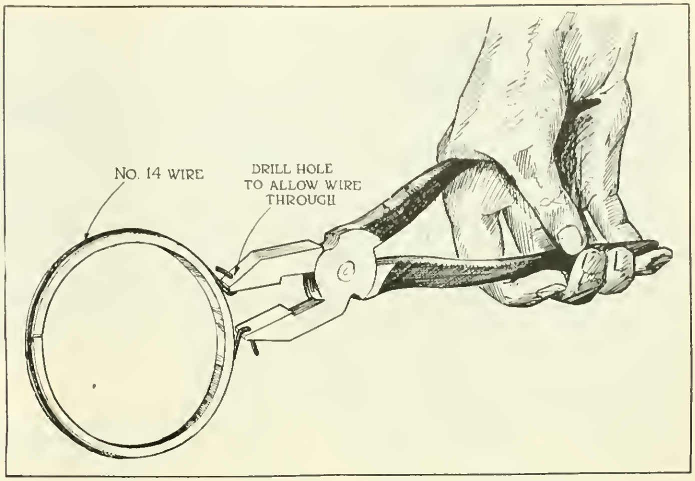


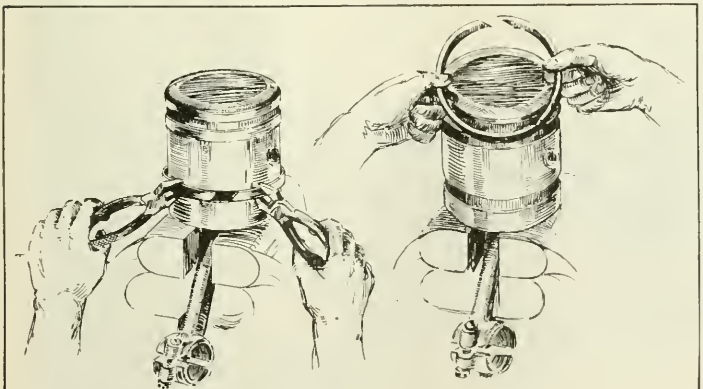
No. 49

No. 47—Device to Make Valve Grinding Easier

WHEN truck engine valves are ground by mechanical grinders, the valves sometimes chatter during the operation, thus preventing a proper seating. This may be overcome by the use of a special device in which a coil spring is employed to provide a certain amount of vertical motion in the shank of the valve grinding tool. The apparatus is made from a piece of ¼-in. iron pipe. The valve grinder shaft is usually of ⅜-in. stock and about 10 in. long. About 7 in. of this shaft is cut off and the end remaining inserted into the upper end of the ¼-in. pipe where it is held by means of a pin inserted through a hole drilled through the pipe and the shaft. The end of the original valve grinding shaft with the connector for gripping the valve is then inserted in the lower end of the pipe in contact with the spring inside. A pin is placed in the upper end of the lower portion of the grinder shaft and works up and down in a slot cut in the lower end of the pipe. —Motor World, Mable Roberts Mulberry Grove, Ill.

No. 48—Easy Way to Take Out Piston Rings

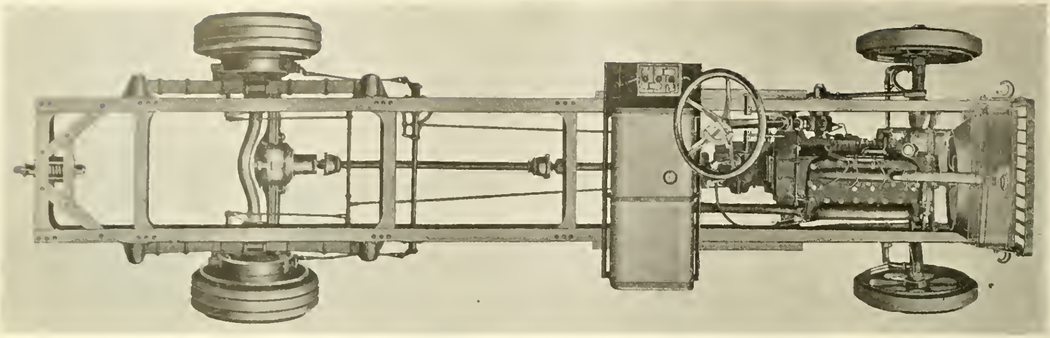
PISTON rings can be easily removed or replaced in their grooves by catching the ends of the ring with two pairs of pliers and exerting a very slight outward pull and lifting at the same time. The lifting pull on the pliers is exerted when the rings are to be removed. In replacing a ring, the ends are caught in the same manner but are slipped into the groove by a quick downward pressure as shown in the accompanying illustration—Motor World, Frank Ryan, New Orleans, La.



No. 48

No. 49—Simple Device For Holding Piston Rings

A SIMPLE device to compress piston rings of any size can be made from a piece of heavy copper wire with the ends bent over at right angles. These ends are inserted through special holes drilled in the jaws of a pair of pliers and the wires bent over still further to prevent them jumping out of the holes. Then, if the wire is placed around a ring and the jaws of the pliers pushed together, the ring will be contracted so that it can be fitted into the cylinder with the piston.—Motor World, W. E. Gehrs, Milwaukee, Wis.



Plan view of Jumbo 3½-ton chassis, showing frame construction, layout and equipment features.

New Jumbo 3½-Tonner Featured By Complete Equipment

JUMBO SPECIFICATIONS

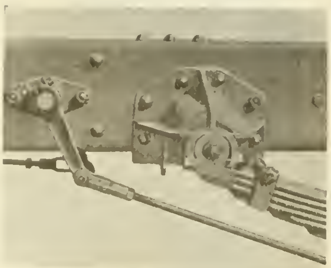
Capacity, tons	3½
Price	$4,000
Wheelbase, in.	165*
Tires, front	——
Tires, rear, solid	36x10*
Bore, in.	4.5
Stroke, in.	6.0
N. A. C. C. hp.	32.4
Speed, r. p. m.	——
Speed, m. p. h.	13
Gear ratio in high gear	10 to 1
Final drive	Int. Gear

*Optional

THE careful selection of material and more complete equipment which is going into the newer trucks is very clearly brought out in the new Jumbo Model 35, a 3½-ton truck made by the Nelson Motor Truck Co., Saginaw, Mich. The truck rating is 7,000 lbs., maximum capacity on solid tires, and 8,000 lbs. on pneumatics. The truck is provided in two wheelbase lengths, these being respectively 165 and 183 in. It is an internal-gear driven unit on 36 by 10-in. rear solid tires as standard, or 36 by 5 dual solid as optional equipment. The pneumatic equipment on the rear is 44 by 10-in

A number of new features in design have been incorporated in the truck, one of particular interest being the straight line drive which is secured by mounting the engine at an angle of 2 deg. and 20 min. on its base This allows the crankshaft and the propeller shaft to be on a straight line when the truck is under load. This mounting of the engine has been worked out with the sanction of the engineers of the Buda Motor Co., and represents a gain in efficiency in the drive due to the elimination of angularities at the universal joints. The lubrication of the Buda engine being of the full force-fed type, is not affected by the tilted position.

Another new feature which is unusual in Jumbo trucks is in the incorporation on the four-speed Brown-Lipe gearset of an extended countershaft and special apertures for power take-off installations so that a winch, hoist and tire pump can be mounted on the same chassis and all operated off the transmission. This is unusually complete, as previous installations have simply provided either a winch or hoist, while the Brown-Lipe Jumbo type allows of all three simultaneously.



The front end of the Jumbo rear spring, showing how the second leaf is also wrapped around the pin as a safe-guard in case of breakage

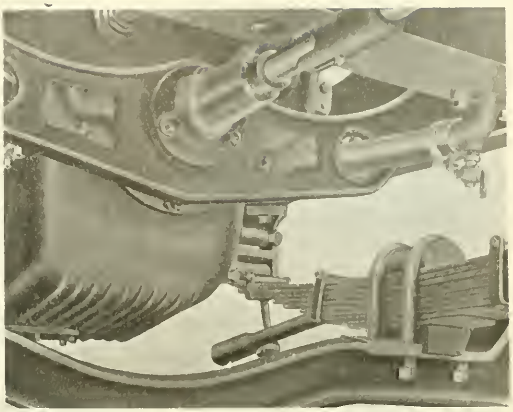
Another new feature in truck design is in connection with the springs. At the front or driving end of the rear spring, the first leaf forms the driving eye and the second leaf is wrapped around the eyebolt to provide for safety should the top leaf break. Sufficient clearance is provided to allow freedom from the main leaf when the spring is deflected. Thus no additional stress and no division of the work is caused by this exterior wrapping of the second eye, but in case of the breakage of the main leaf, an auxiliary mounting is provided to bring the truck home in safety.

Among the other unusual features of the equipment are radiator shutters which are manually controlled from the driver's seat, this being in connection with a Motometer to put in the driver's hands a complete temperature control. The fan is designed with a shroud so that air is drawn uniformly through the whole surface of the radiator, utilizing all of the radiator space.

Protection of the radiator is afforded by a radiator guard mounted independently and set 6 in. ahead and braced diagonally to the frame, providing safe-guard to the radiator in case of collision. A touch of wartime practice is shown in the provision of a spring drawbar at the rear of the chassis. The engine, being of excess power, permits the truck to be well adapted to the use of the four-wheeled trailer, and this installation provides a strong and substantial spring drawbar supported in diagonal braces to transmit the stresses to the longitudinal members. The re-enforcement for the drawbar also acts as a brace on the frame to prevent wracking.

Throughout, the truck is lubricated by the Alemite system, the 5-lb. grease gun and hose necessary for this system being provided in the tool equipment. Pig tail towing hooks are mounted on the front of the frame corners for use in pulling other trucks out of holes or any other emergency purposes, thus eliminating the necessity for overstressing the front axle or springs, which often causes the front wheels to be thrown out of line.

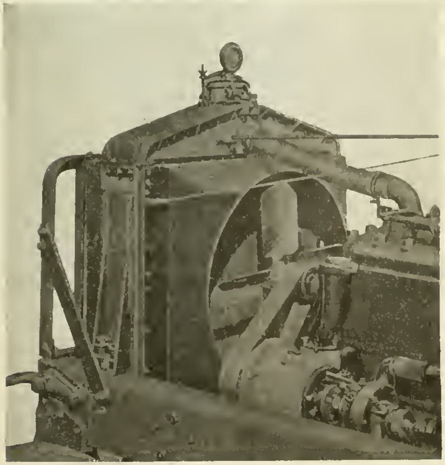
In mounting the gasoline tank, a steel sub-frame is bolted to the main frame through the web of the channel instead of through the top flange. This eliminates weakening of the side members and provides a mounting for the 30-gal. gasoline tank. This is of irregular shape mounted on the sub-frame by means of steel straps attached to adjustable anchor bolts. On this same frame is mounted the steel cab which is standard equipment with the chassis. The feature of the cab is the foredoor arrangement with curtains mounted on a frame which slides like a sedan window into panels provided in the doors. The cab is steel with the exception of the top which is of wooden framework to eliminate noise and vibration. A rain-vision windshield and glass set in rubber is provided. Also, as part of the equipment are electric head and taillights with the headlights mounted on the dash and fitted with dimming devices. There is an independent generator, ammeter and storage battery.

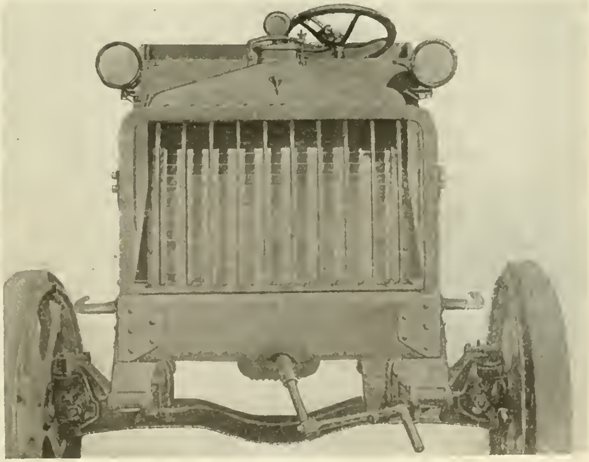

The pilot support for the front end of engine, showing the I-beam construction of the crosspiece with one of the lightening holes utilized to carry the pipe from the cylinder block to the bottom tank of the radiator. One of the front springs and the base of the crank case are clearly shown

The four-cylinder, 4½ by 6, power-plant employed is a Buda YTU model, this being of the new Buda series with removable cylinder head. It is mounted as a unit powerplant with three-point suspension. The engine bracket is original in that it is of I-beam construction and so shaped that by loosening a few bolts the front motor support may be lifted with the engine. The front end of the engine is supported in a pilot bearing which allows for the twisting motion in the frame and prevents any tendency to distort the crankcase.

This new design of truck is the first of a series of Jumbo models which will include by December 15 a full line of sizes, all embracing this similar design and features of equipment. When completed, the line will include trucks having 3,000-, 4,000-, 5,000-, 7,000- and 8,000-lb. capacities. The weight of the 3½-ton chassis is 6,400 lbs., with a body allowance of 2,000 lbs.

In addition to the units previously mentioned, the rear axle is the Clarke Equipment Co. type with internal-gear providing an axle reduction of 10 to 1. The engine is so governed as to provide a speed on solid tires of 13 m. p. h. in high, and on pneumatics of 14½ m. p. h. The track is 70 in. The front axle is made by the Standard Parts Co.; the magneto is an Eisemann equipped with impulse starter and the gearset a Brown-Lipe. The tentative price of the chassis is $4,000.


The fan shroud used on Jumbo 3½ tonner


The radiator shutters and guard on new Jumbo

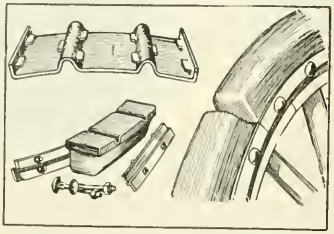
No Changing of Wheels Necessary With Edwards Sectional Tire

Duplex Compression Tester—Motor-Master Governor—Hilton Tire Gage—Union Tool Chest—Allen Radiator Cover

A SECTIONAL cushion truck tire is bidding for the attention of fleet owners. Though the tire is of the sectional type, it has the appearance and contour of the average endless tire. The chief advantage claimed for it, as compared with an endless solid rubber tire, is that if any one of the twelve sections of the tire becomes damaged, it can be readily repaired or replaced. The sectional feature insures non-slipping and non-skidding qualities, and a high mileage is claimed for the product. No changing of wheels is necessary when repairs are needed. Each section is separate and distinct from another, being fastened to the wheel rim by means of sectional side plates and bolts. The bolts pass through grooves in the bottom plate and pass either through the tire or through the rim.

A hard rubber base is firmly attached to the bottom plate by vulcanizing through, under and around the anchors, making a separation between the metal and rubber impossible. To the hard base is annealed the resilient rubber section.

Endless or pressed-on tires frequently become injured, the rubber tread cracking or what is commonly called chipping and in which case there is a tendency for this chipping to follow the periphery of the tire for its entire circumference. Often these injuries reach across the tire breadth and down to the rim, rendering it unserviceable and making it necessary to remove the wheel, take it to a hydraulic press, have the tire pressed off and a new one pressed on. The Edwards sectional tire eliminates all of this trouble. When injuries do occur, only a single section will be affected, or one-twelfth part of the tire. If the injured section becomes so bad that it cannot be used, the wheel is placed in a convenient position, two nuts are loosened and the section drops off. An unused section, carried as a spare, is then taken and cut down to the same height as those on the wheel, put in place and the tire is repaired.



Anyone of the sections in the Edwards sectional tire can be readily replaced without the need of taking off the wheel.

Added to the above features is the fact that a considerable increased resiliency is produced due to the distance between the sections, this permitting the proper displacement of the rubber in all directions.

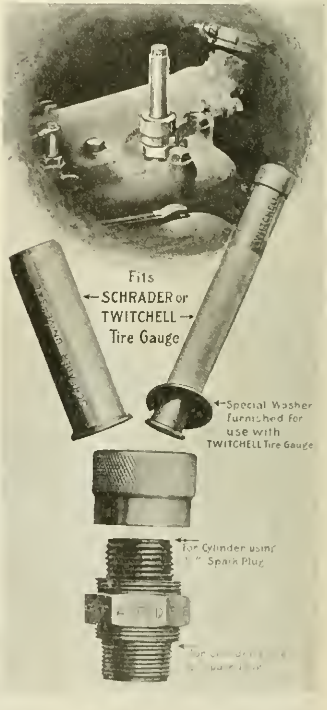
The maker of this tire is the Edwards Rubber Co., Akron, Ohio. Two sizes, 36 by 3½ and 36 by 4 are at present being made. The price of the 36 by 3½-in. size is $39.30, and that of the other is $45.50. The single sections cost $3.25 for the 36 by 3½-in. tire and $3.70 for the larger size. The cost of twelve sections without the side plates or bolts is $35.30 for the smaller size and $41.50 for the larger. The side plates each cost 30 cents and the bolts 7½ cents. Other sizes will be ready in the near future. The only change to fit the tires necessary to the wooden felloes of the regular S. A. E. wheels, is to bore holes ½-in. in diameter and ½-in. deep into the felloe and under the wheel band.

The proposition of applying these to steel wheels has not been thoroughly worked out. The Edwards tires are guaranteed for 8,000 miles when used on gasoline trucks, provided they are consumed within 13 months from date of application. On electrically-driven trucks, a 10,000-mile guarantee is given, provided the tires are used within 21 months from the date of application.

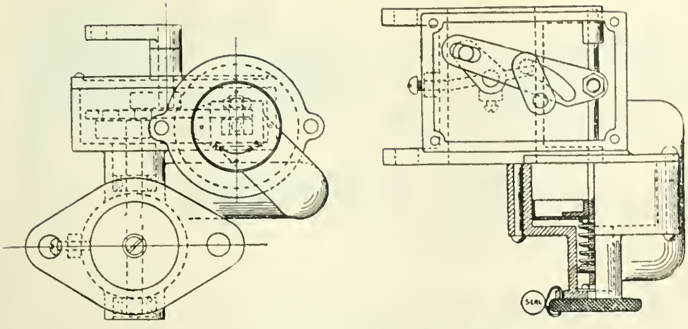
Duplex Compression Tester

THE latest device on the accessory market is a compression tester that will tell a fleet owner whether his engine trouble is due to low compression, and in that way whether his valves need grinding, his piston rings or cylinders do not fit tight or if his gaskets are leaking in one or more cylinders. The Duplex cylinder compression tester, as it is called, is made to fit any cylinder using a ½-in. or ⅞-in. spark plug. It is used with a Schrader or Twitchell tire gage.

By taking out the spark plug and inserting the tester, the compression



The Duplex compress tester points out the weak cylinder



Sectional views of the Motor-Master governor which provides for an automatic throttle control for motor truck engines

is registered by turning the engine by hand with a swinging stroke. This test can be quickly made on all the cylinders, and the weak one, if there is one, instantly detected. The list price is $1 and the maker is the Casey Hudson Co., Chicago.

Motor Master Governor

FLEET owners whose truck engines are not equipped with governors will be interested in the Motor-Master governor, now being put on the market by the United Parts Co., Milwaukee, Wis. This governor, besides limiting the speed at which the engine can be run, provides for an automatic throttle control under all driving conditions.

It is operated by suction of the intake and differs from the conventional type of suction governor in that it takes the suction from below the throttle, preventing sluggishness and assuring its constant relation to the speed of the engine. It is not affected by the sudden rise of suction when the throttle is closed.

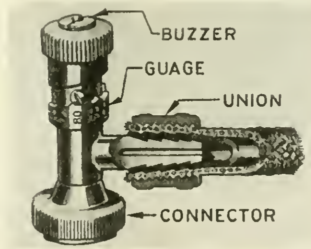
The Motor-Master has only three moving parts running in ball bearings entirely enclosed and inaccessible. It is sealed and requires no oiling. Racing or stalling of the engine and clashing of the gears is prevented, the load on the engine being suddenly applied or removed advances or retards the throttle automatically.

No driving mechanism or pipe connection is needed. To install, the carburetor is removed and the governor is clamped on between the manifold and carburetor flange.

Hilton Tire Gage

TIME is too valuable to waste it in repeatedly removing the hose when pumping up a tire in order to test the pressure. With the Hilton safety tire gage, fleet owners whose trucks are equipped with pneumatic tires, can avoid these delays. This is accommplished by attaching the gage to the pump hose where it can be set at the pressure desired, the range available being from 50 to 120 lbs. When the pressure set is reached, the gage buzzes loudly and no more air can enter the tire, thus preventing overinflation.

The device embodies an accurate gage; a connector and an indestructible union combined in a single compact unit, as shown in the illustration. No adapter is needed and one gage suffices for all the tires. It is sold for $1.50 by the Mead Engineering Co., New York City.



The Hilton tire gage prevents overinflation

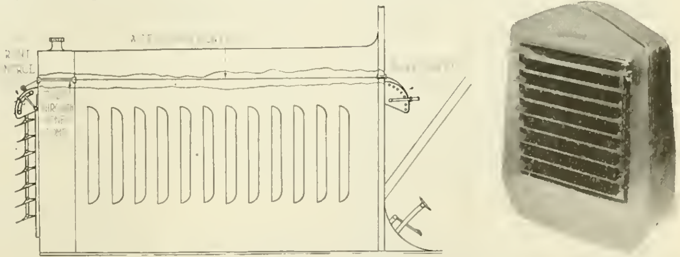
One of the new types of tool chest put on the market by the Union Tool Chest Co., Rochester, N. Y.

Union Tool Chest

A NEW type of repairman's tool chest, called the Utility, has recently been put on the market. It comes in two sizes, 16 or 19 in., and in either leather or oak. The corners are locked, with top of cover and bottom rabetted in, glued and nailed. The tray is automatically raised as the cover is opened, thus leaving contents or both tray and chest easy to reach. The handle is leather, steel cored and the trimmings nickeled and polished. The leather covered chests are made the same as the oak, although basswood is used in some instances for the body. The large and small sizes sell in oak, for $7.25 and $7.50, respectively, while for the same sizes in leather covered variety, the prices are $8 and $8.40.

Allen Radiator Cover

THE Allen Auto Specialty Co., New York City, has put on the market a radiator cover with a shutter, which is controlled from the driver's seat. The shutter can be held rigidly in any desired position and when the truck is left in a cold place for any length of time they may be closed to keep the heat in the engine. The cover is simply slipped in place over the radiator, a hole being provided for the filler. The price is $16.50.



The Allen radiator cover is provided with shutters which are controlled from the driver's seat

The Editor's Viewpoint

Unit System for Repairs

MANY sets of truck cost figures published in this magazine have shown that the yearly cost of operation is in many cases considerably in excess of the initial cost of the truck, its body and equipment. This fact has in itself an important lesson for every large fleet owner. Besides the items of driver, fuel and tires, the cost of repairs influences the total cost to a large extent. With the wages of the driver fixed by a union scale or by precedent in any given locality; with fuel and oil selling at fixed price and the cost of tires remaining fairly constant no matter what the make, it is in the item of repairs that there is the greatest fluctuation. This fluctuation is justified in many instances by the great variance in the work which trucks in different industries are called upon to do.

Too often, however, the variation in the cost of repairs is far too great, even when the trucks are of the same make and size and engaged in the same kind of work in the same territory. This is due to a good and poor system of repairs.

The unit system of repairs as discussed elsewhere in this issue offers many good ideas to fleet owners whose repair costs are too high. The system as explained has been worked out by a man who makes his living solely out of truck transportation and who has staked his success upon the idea. With him, truck operation is not a mere incident to his business, it is his entire business. Consequently, his idea is worthy of the most serious consideration which other fleet owners can give it.

When any system can reduce the number of truck repair days per year from thirty-nine to ten and give the same or better service to the truck user, that system surely must have sufficient merit to warrant the closest attention from other truck owners in all parts of the country.

It is very important, however, in analyzing this system, to bear in mind that it costs considerable in an initial outlay of equipment to properly carry the idea through to a successful conclusion. It can be no half-way job. The fleet owner must go the limit or not at all—for the best results.

Fighting Freezings

IF the radiator of your truck should happen to freeze while it is out on its route, do not try to get home without first thawing it out. If you do try to run home to the garage in the hope that it may thaw out before you get there, serious damage may result. In fact, one competent truck operator offered the opinion last year that more cylinders were cracked during the extremely cold weather of early 1918 as a result of the lack of circulation in the cooling system than by actual freezing.

If the truck radiator should freeze while out on the route, one of two things should be done. First of all, run the truck to the nearest heated garage. If it takes too long to thaw it out by simply letting the truck stand in the warm air, the cooling system may be freed by pouring hot water over the top and bottom radiator tanks and over the cylinders. When this is done, great care should be taken to prevent any of the water poured over the cylinders from getting onto and short-circuiting the ignition apparatus.

In any event, it will pay in the end to spend one hour or so in thawing out the system the moment it is discovered. Waiting for it to work itself free while running is a dangerous practice which may result in a repair bill many times the value of the time lost in thawing it out in the first place.

The Fleet Owners' Forum

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

The Principle of Drawbar Pull Explained

To the Editor, Commercial Vehicle:

Please give us the engineering reason why a 1½-ton truck will carry a load of 4 tons on a semi-trailer.—W. B. D., Newark, N. J.

The reason why a 1½-ton truck will carry on a semi-trailer a load approximately double its rated load capacity as a four-wheeled vehicle, is its latent drawbar pull which is only brought into action when the vehicle is required to pull rather than to carry a load. Perhaps this principle can best be explained by stating the well-known fact that a horse can pull more in a wagon than it can carry on its back. A similar condition is also found in the railway locomotive which pulls a train many times its own weight and again in the case of the harbor tug which can pull many times its own weight on loaded scows.

In starting a loaded four-wheeled truck, the force required to put the vehicle in motion is directly proportional to that portion of the load concentrated over the rear wheels, other conditions of weight distribution over the front and rear wheels and road conditions as to type of pavement and degree of grade, being equal.

Under these conditions the power transmitted from the engine to the rear axle is sufficient to start the load by means of the proper gear reduction between the engine and the rear wheels. This gear reduction is generally made low enough to start the truck under full load in low gear under the worst possible conditions which may be met in average running.

When a semi-trailer is employed, the major portion of the load is generally concentrated over the trailing wheels so that that portion of the load concentrated over the rear truck wheels is less than is the case in a four-wheeled vehicle used as a truck alone. This reduction in the weight concentrated over the rear wheels does not require the full engine power to start the load and the difference between the power used under this condition and that required to start the load when carried on the truck itself is converted into drawbar pull to tow the major portion of the load carried on the trailing wheels. As the power required to pull a load is less than that required to carry it, the power required to move the load over the trailer wheels can be obtained from the engine without overloading it.

Another question of drawbar pull as applied to trucks pulling four-wheeled trailers instead of semi-trailers was well treated of by means of a chart printed on pages 56 and 57 of the November 1, 1918, issue of The Commercial Vehicle. Unfortunately that issue is entirely out of print, but it can be reviewed from the bound volumes of The Commercial Vehicle which may be found in the public libraries of any large city.

White Invents an Electric Vaporizer

To the Editor, Commercial Vehicle:

In a recent issue of the *Herald-Examiner*, published in this city, we noticed a news item concerning an electric vaporizer designed to take the place of both the spark plug and carburetor on passenger car and motor truck engines. The newspaper item stated that one passenger car equipped with the device made 63 miles on 1 gal. of gasoline and another vehicle similarly equipped made 90 miles on 1 gal. of gasoline. Kindly advise us if you have any information regarding the device mentioned. We should like to know whether or not the device is on the market and by whom it is manufactured. Will you also please give us any information you have regarding the tests conducted with the apparatus?—George E. Martin, Chicago, Ill.

We have found that the device mentioned is the invention of Clyde B. White, who is employed by the Rome Brass Works, Rome, N. Y. We know nothing further regarding the merits of the device and suggest that you communicate with Mr. White direct.

Use of Pneumatic Tires as Standard Equipment

To the Editor, Commercial Vehicle:

Will you please tell us what trucks offered on the 1920 market are fitted with pneumatic tires as standard equipment?—A. L. J., Worcester, Mass.

Below is a list of truck makes which are furnished with pneumatic tires as standard equipment. As determined from the 1920 gasoline truck specifications, published in The Commercial Vehicle for November 1, 1919, the following makes of trucks have the pneumatic tires in front and solids in the rear as standard equipment.

	Size in Tons
All-American, All-American Truck Co., Chicago, Ill.	1
Apex, Hamilton Motors Co., Grand Haven, Mich.	½
Belmont, Belmont Motors Corp., Lewiston, Pa.	1½
Ford, Ford Motor Co., Detroit, Mich.	1
Grant, Grant Motor Car Corp., Cleveland, Ohio	1½-2
Inland, Inland Motor Truck Co., Evansville, Ind.	1½
Kimball, Kimball Motor Truck Co., Los Angeles, Cal.	2

Since the specifications above mentioned were published, the Ford company has replaced the solid tires usually fitted on the rear wheels of its 1-ton truck by pneumatics, so that the truck is now mounted on pneumatics all around.

Arranged according to capacity the following makes of trucks are fitted with pneumatic tires as standard equipment on all four wheels:

UNDER ½-TON

Pony, Minnesota Machine & Foundry Co., Minneapolis, Minn.

½-TON

Champion, Direct Drive Motor Co., Pottstown, Pa.
Elmira, Elmira Commercial Motor Car Co., Inc., Elmira, N. Y.
Seneca, Seneca Motor Truck Co., Fostoria, Ohio.
Vim, Vim Motor Truck Co., Philadelphia, Pa.
Loyal, Loyal Motor Truck Co., Lancaster, Ohio.

¼-TON

Belmont, Belmont Motor Corp., Lewiston, Pa.
Conestoga, Conestoga Motor Truck Co., Lancaster, Pa.
Economy, Olds Motor Works, Lansing, Mich.
G. M. C., General Motors Trucks Co., Pontiac, Mich.
Kearns, Kearns-Dugnie Motor Car Co., Beavertown, Pa.
Kissel, Kissel Motor Car Co., Hartford, Wis.
Old-Hickory, Kentucky Wagon Mfg. Co., Louisville, Ky.
Rainier, Rainier Motor Corp., New York City.
Reo, Reo Motor Car Co., Lansing, Mich.
Stewart, Stewart Motor Corp., Buffalo, N.Y.
White, White Co., Cleveland, Ohio.

1-TON

Briscoe, Briscoe Motor Co., Jackson, Mich.
Douglas, Douglas Motors Corp., Omaha, Neb.
Federal, Federal Motor Truck Co., Detroit, Mich.
Fulton, Fulton Motor Truck Co., Farmingdale, L. I.
Gabriel, Gabriel Auto Co., Cleveland, Ohio.
Hal-Fur, S. W. Hal-Fur Motor Truck Co., Cleveland, Ohio.
Loyal, Loyal Motor Truck Co., Lancaster, Ohio.
Moreland, Moreland Motor Truck Co., Los Angeles, Cal.

1½-TON

Commerce, Commerce Motor Car Co., Detroit, Mich.
Defiance, Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
Rock Falls, Rock Falls Mfg. Co., Sterling, Ill.
Service, Service Motor Truck Co., Wabash, Ind.

2-TON

Defiance, Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
Kimball, Kimball Motor Truck Co., Los Angeles, Cal.
Mutual, Mutual Truck Co., Sullivan, Ind.

3-TON

Rowe, Rowe Motor Truck Co., Lancaster, Pa.

3½-TON

Winther, Winther Motor Truck Co., Kenosha, Wis.

List of Makers of Lumber Dump Bodies

To the Editor, COMMERCIAL VEHICLE:

Please advise me where I can secure a complete list of all concerns manufacturing lumber dump bodies.—J. DAVIS, Detroit, Mich.

We do not know whether you desire a list of concerns making dumping bodies made of wood or special roller devices which may be fitted to an ordinary platform truck body to discharge loads of lumber in one pile and so we give you below a list of wooden dump body makers and also the names of several concerns who use special roller devices to be fitted on a platform body.

American Trailer & Body Works, Houston, Tex.
American Truck Body Co., Martinsville, Va.
Archer Iron Works, Chicago.
Auglaize Motor Car Co., New Bremen, Ohio.
Auto Truck Steel Body Co., Chicago, Ill.
Bruder, Lawrence, Cincinnati, Ohio.
Columbian Steel Tank Co., Kansas City, Mo.
Commercial Auto Body Co., St. Louis, Mo.
East Iron & Machine Co., Lima, Ohio.
Ell-Kay Mfg. Co., Kansas City, Mo.
Fitz Gibbon & Crisp, Trenton, N. J.
Graves Co., L. O., Springboro, Pa.
Hebb Motors Co., Lincoln, Neb.
Heil Co., Milwaukee, Wis.
Horizontal Hydraulic Hoist Co., Milwaukee, Wis.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lally Commercial Body Co., Everett, Mass.
Lee Loader & Body Co., Chicago, Ill.
Motor Truck Body Co., Detroit, Mich.
New Ideal Wagon Works, New York, N. Y.
Press Sons, Jacob, Chicago, Ill.
Providence Body Co., Providence, R. I.
Redenhausen's Excelsior Wagon Works, Philadelphia.
Shadbolt Mfg. Co., Brooklyn, N. Y.
Simple Mfg. Co., Conneautville, Pa.
Sior & Son, Heinrich, Brooklyn, N. Y.
Truck Engineering Co., Cleveland, Ohio.
Truck Service Co., Cedar Rapids, Ia.
Winser Gravity Dump Body Co., Detroit, Mich.
Wood Hydraulic Hoist & Body Co., Detroit.
Woonsocket Wagon Mfg. Co., Woonsocket, R. I.
Wright Co., Thomas, Jersey City, N. J.

The roller devices are made on special order and can probably be made by your local body maker.

A few concerns which now use such devices include the following:

Keystone Lumber Co., Pittsburgh, Pa.
Montgomery Bros. & Co., Buffalo, N. Y.
Mullens Saw Mill, Seattle, Wash.

Forms Used in Package Deliveries

To the Editor, COMMERCIAL VEHICLE:

We are now in the course of preparing printed forms for use by the Motor Dispatch Service, Inc., Duluth, Minn. Knowing that you are familiar with such forms as used by fleet owners throughout the country, we ask that you kindly give us information which you have on this subject and if possible send us copies of such forms as you have reproduced in past issues of THE COMMERCIAL VEHICLE. The Motor Dispatch, Inc., gathers merchandise including C. O. D. packages from department stores for distribution and also moves trunks and freight from homes of customers to the railroad depots and *vice versa.* Individual report sheets for the truck drivers' reports of the work done and the action taken in each case are required.—CHRISTIE LITHOGRAPH & PRINTING CO., Duluth, Minn.

Forms such as you inquire about were published in the following issues of THE COMMERCIAL VEHICLE.

1—Daily drivers' forms as used by the Parcel Delivery Co., Savannah, Ga. The Parcel Delivery Co. delivers packages from all of the department stores in Savannah and the forms used provide for the name of the store; the names and addresses of the persons to whom the packages must be delivered; the number of packages, whether C. O. D. or paid; the time delivered and the signature of the person to whom the package is delivered. The complete story about the method of operation of the Parcel Delivery Co. and the forms mentioned were published on pages 43, 44 and 45 of THE COMMERCIAL VEHICLE for November 1, 1918.

2—A driver's paid sheet; C. O. D. sheet and delivery call tag as used by the Gus Blass Co., a department store in Little Rock, Ark., were reproduced on page 8 of THE COMMERCIAL VEHICLE for December 1, 1918. The paid and charge packages are recorded on different sheets. The paid sheet has spaces for the department from which the package was purchased; the sales number; the consignee's name and address and the signature of the consignee. The C. O. D. sheet gives the names of the customer; his address; the amount of the C. O. D.; the amount paid and the amount received and returned to the store together with a blank column for figures and a space provided at the bottom for the total amounts to be collected and actually collected during the day and the total amount turned in by the driver.

3—Paid and C. O. D. forms as used by the Kerr Dry Goods Co., Oklahoma City, Okla., were reproduced on page 8 of THE COMMERCIAL VEHICLE for January 15, 1919. These forms are very similar to those employed by the Gus Blass Co. mentioned in No. 2.

4—A form for goods picked up; a form to indicate what is loaded on the truck and a receipt, all as used by the Motor Freight Lines, Inc., handling goods between Forth Worth and Dallas, Tex., were published on page 8 of the March 15, 1919, issue of THE COMMERCIAL VEHICLE. The truck contents form gives the shipper's name; the consignee's name; the destination of the articles carried; their weight; the war tax; the charges, whether paid, collect or C. O. D., and a space for the signature of the consignee to indicate that the goods were received in good condition.

5—The freight bills as used by the Progressive Transfer Co., St. Louis, Mo., and the manner in which these freight bills were made in triplicate were shown on page 31 of THE COMMERCIAL VEHICLE for July 1, 1919. One of the forms goes to the driver; one to the consignee and the other for the record files of the Progressive company. Each form has spaces for the number of packages; a description of the articles; their weight; the rate; the total transportation charges and a space for the war tax.

6—If the Motor Dispatch Service, Inc., should handle any considerable amount of freight, the standard bill of lading for overland haulage companies as worked out by the Bureau of Markets, of the United States Dept. of Agriculture and as published on pages 116 and 117 of THE COMMERCIAL VEHICLE for September 1, 1919, would prove of interest. Both front and reverse sides of this standard bill of lading were reproduced. Particular attention should be paid to the conditions covering the handling of the goods as printed on the reverse side of the form.

Data on Forming an Overland Haulage Company

To the Editor, COMMERCIAL VEHICLE:

We are about to start a motor truck business to carry on an overland haulage business and would like to have answers to the following questions:

1—If you regard dump truck work as more profitable than general hauling, what could we haul in winter in dump bodies when building work is slack?

2—What size units would you suggest that we secure for the work you suggest and what form of body?

3—Regarding the use of trailers, for light weight bulky material on long distance work, is there any limit by law to how many trailers you may use?

4—The new Pennsylvania law of 26,000 lbs. per truck means the weight of truck itself, not including trailer, does it not?

5—What articles have you published in back issues of your magazine that might be of particular interest to us—new to the hauling game—and can we secure these back issues from you?

Please give us an expression of your opinion on the essential features of the tentative plans we have laid out for our organization.—C. F. W., Philadelphia, Pa.

The answers to your questions in the order given are as follows:

1—Trucks used in contracting work in the summer can very profitably be used to deliver coal in the winter. If you do decide to install dump body trucks for contracting work in the summer and intend to use them for coal delivery in the winter, a type of combination body with side stakes should be adopted. The Olin J. Stephens Co., Inc., one of the largest coal dealers in New York, does this very thing. The story of how that company co-operates with the local contractors is told on pages 197, 198 and 199 of THE COMMERCIAL VEHICLE for October 15, 1919.

2—Five-ton trucks with dump bodies are most suitable for general haulage work.

3—The new Pennsylvania law regarding the use of trailers states:

> "No motor vehicle or trailer, except hook and ladder trucks and water-towers, shall be registerable, that exceeds an outside over-all length of three hundred thirty-six (336) inches, or width of ninety (90) inches, or that exceeds a gross weight, including chassis, body and load, of twenty-six thousand (26,000) pounds; provided, that the restriction as to length shall not apply to motor vehicles registered or contracted for prior to the passage of this act.
>
> "Any person intending to use a truck or trailer for special hauling, gross weight of vehicle and load combined or of length in excess of the specifications hereinbefore mentioned, shall apply to the State Highway Commissioner for permission so to do upon a blank in such form as the State Highway Department shall prescribe. Such application shall set forth the location of the roads over which it is proposed to haul, the counties, townships and municipalities in which such roads are located, the weight and length of truck and its registration number, the number of trailers to be used, the maximum capacity of such trailers, the weight of each when empty, the kind of materials to be hauled and the date at which said hauling will be completed."

4—The new Pennsylvania law, which limits the total weight of a commercial vehicle to 26,000 pounds does not include the weight of a four-wheeled trailer. The law on this point follows:

> "No motor vehicle or trailer shall be operated upon any public highway having a gross weight of vehicle and load combined in excess of twenty-six thousand (26,000) pounds, or in excess of nineteen thousand five hundred (19,500) pounds on any axle, or in excess of eight hundred (800) pounds on any one wheel for each nominal inch of width of tire on such wheel, or that exceeds an over-all length of vehicle of three hundred and thirty-six (336) inches, except hook and ladder trucks and water towers, or an over-all width of vehicle or load of ninety (90) inches. All commercial vehicles or trailers, the chassis of which weighs more than two thousand (2,000) pounds, registered under this statute shall have painted on a conspicuous place on the outside and on both sides of said motor vehicle or trailer, the maximum weight limit of said vehicles or trailer, including chassis, body and load, in figures three (3) inches high. Any person or persons carrying on any motor vehicle or trailer, a load in excess of the maximum carrying capacity as so fixed by the manufacturer or any person or persons who remove or disfigure said signs shall be guilty of a misdemeanor and upon conviction thereof shall be subject to a fine of not less than twenty-five (25) dollars or more than one hundred ($100) dollars, or imprisonment not exceeding six (6) months or both at the discretion of the court, and the clerk of the court in which such conviction is held shall certify such conviction to the State Highway Commissioner of Pennsylvania, who may forthwith revoke the license of any licensee so convicted."

5—The following articles were published in recent issues of THE COMMERCIAL VEHICLE. Perhaps the most important of these articles to you would be that on "How to Organize a Motor Truck Company for Overland Haulage," as printed on pages 5 to 7 of the April 15, 1918, issue:

Freight Being Hauled Sucessfully Between New York and Philadelphia by Trucks, pages 5 to 9, January 15, 1918. This article gives a good deal of information regarding the size of truck, the rates charged, the route followed and the method of operation.

Akron to Cleveland by Truck, pages 24 and 25, March 1, 1918. This article deals with the development of motor trucking between the two centers mentioned and gives some examples of the cost charged for the work with different classes of goods.

Twice a Week Truck Service From Boston to New York, pages 15 and 16, March 15, 1918. This article tells of the service installed by one company operating two trucks each week from each end of the route between Boston and New York. It gives the rates charged and the method of operation.

Cleveland Overland Truck Haulage Concern Serves Sandusky, Akron and Canton, pages 5 to 9, April 1, 1918. This article tells how the Ohio Freight Delivery Co., Cleveland, Ohio, serves Sandusky, Akron and Canton. A cost estimate for one of the 3½-ton trucks in operation is given, together with the charge scale of the company.

How to Organize a Motor Truck Company for Overland Haulage, pages 5 to 7, April 15, 1918. This article recommends a complete plan which may be followed in the organization of a company for overland haulage.

Day Rates for Overland Haul Trucks In Buffalo, page 25, April 15, 1916. This article tells a little of what Buffalo did to help relieve railroad congestion by introducing trucks. It also gives some rates per hour for hauling material as given by the J. F. Kulp & Sons Co., Buffalo, N. Y.

Trucks Give Express Service Between Cleveland and Akron, pages 5 to 9, July 1, 1918. This article tells how the Knutsen Motor Trucking Co., Cleveland, Ohio, has found it more practical to haul by truck between Cleveland and Akron. That company operates mostly on a contract basis.

Reliability and Quick Delivery Insure Success of Kansas City Truck Transfer Co., August 15, 1918, pages 25 to 27. The Suburban Motor Transfer Co., Kansas City, Mo., operates its trucks daily to points within a 25-mile radius, delivering milk, livestock, etc.

Cleveland Truck Company Delivers Steel, Meat and Groceries When Railroads Fail, September 1, 1918, pages 16 to 19. This article tells of the service which the Highways Motor Transport Co., Cleveland, Ohio, is giving between Conneaut, 65 miles distant on the east, and Sandusky, 55 miles west of Cleveland, and intermediate points on both routes.

All of these issues are unfortunately out of print at this time, but may be seen either at the office of THE COMMERCIAL VEHICLE in New York City, or in the bound volumes of THE COMMERCIAL VEHICLE, which can be found in the Philadelphia Public Library.

Closed Cabs for Two Makes of Trucks

To the Editor, COMMERCIAL VEHICLE:

Will you kindly inform us as to the name and address of the manufacturer who makes winter closed cabs ready to be installed on the Pierce-Arrow and Packard Trucks?—PROSPECT HILL BOTTLING CO., Somerville, Mass.

We are advised by the Pierce-Arrow Motor Car Co., Buffalo, N. Y., that it manufactures its own closed cabs at its Buffalo factory.

The H. H. Babcock Co., Watertown, N. Y., furnishes closed cabs for all models of Packard trucks at a set price of $230.

$1.000.000 Express Co. Formed in Kansas

Kansas Concern Will Transport Farm Produce to Cities and Supplies to Farms

KANSAS CITY, KAN., Nov. 17.—The Patriot Motor Express Co. is the first $1,000,000 organization of its kind. The company has already begun operation on its first routes, which are between Atchison and Kansas City via Leavenworth and other intermediate points, and St. Joseph and Kansas City. Trains of two large motor trucks each will make daily trips regardless of weather conditions. In the cities, the trucks will stop at the loading docks and warehouses of wholesale concerns for their goods and will pick up grain, livestock and other farm products from farmers along the routes. The company, which is located at Kansas City and Wichita, Kan., is at present running one line between Atchison and Kansas City, a 75-mile run, and two lines between St. Joseph and Kansas City, a 25-mile run.

The three lines now in operation are but a few of the many the company contemplates starting. Within the next 6 months it will establish freight and express lines operating between all of the principal cities in Kansas, Nebraska and Missouri, and will use about 250 large trucks.

Because of the large tonnage continuously being moved, the company will erect or secure large, fireproof, modern freight and express warehouses in the larger cities of these three states.

Hartford Truck Show

HARTFORD, CONN., Nov. 24.—Trucks will be displayed at the thirteenth annual show of the Hartford Automobile Dealers' Assn. The show will be held in the State Armory, Jan. 17 to 24, under the auspices of the First Regiment, Connecticut State Guard.

Alarming Gasoline Situation

WASHINGTON, D. C., Nov. 21.—"There are no known commercial substitutes for gasoline or lubricating oils. The domestic output of these does not meet the present consumption. Of the original available petroleum supplies underground we have consumed 40 per cent." These statements, made by Van. H. Manning, Director of the Bureau of Mines, Department of the Interior, have been made public to emphasize the great need in the petroleum industry for extensive and unremitting research.

"It is true," Mr. Manning says, "that there are vast oil resources in foreign countries which can probably meet demands for 10 years. But predictions beyond that period are not safe. Our efforts must be turned toward obtaining perfection in processes and mechanical equipment."

Philadelphia Truck Show

PHILADELPHIA, PA., Nov. 16.—The board of governors of the Motor Truck Assn. of Philadelphia has appointed a committee to confer with the show committee of the Philadelphia Automobile Trade Assn., relative to the date for holding the motor truck show.

While no date has been definitely fixed for the motor truck show, it is regarded as highly probable that it will be held the week after the passenger car show, which is to take place the week of January 10-17. The motor truck show will be held under the joint auspices of the Philadelphia Automobile Trade Assn., of Philadelphia.

New Equipment on Macks

NEW YORK CITY, Nov. 27.—The International Motor Co. is prepared to furnish AB chassis with Overman cushion tires. These tires are guaranteed for 20,000 miles, and are supplied at the following net additional prices:

Model	Front	Rear	Both
1½	36x6—$185	36x3½—$345	$530
2	36x6—$185	36x4 —$380	$565

The company is also prepared to mount a single-cylinder pneumatic tire pump on the AB chassis, with full necessary equipment and driven from the transmission extension shaft. The price is $65. On the AC chassis, a double-cylinder pump is used, the price being $65.

In addition to the above equipment the company quotes the following additional net prices on Dayton metal wheels for AB worm and chain-driven and AC chain-driven chassis:

Tonnage	Front	Rear	Price
1½	36x4	36x3½	$35
2	36x4	36x4	$35
3½	36x5	40x5	$50
5½	36x6	40x6	$50
7½	36x7	40x7	$50

Franklin 1-Tonner to Be Produced

Truck With Air-Cooled Engine to Be on Market in About One Year

SYRACUSE, N. Y., Nov. 18.—The Franklin Manufacturing Co., will make a 1-ton Franklin truck in about a year. It will be built in a plant separate from the present passenger car factories here.

The company will specialize in the 1-ton truck because its officers believe the widest field is offered this type of vehicle. They have in mind the use of trucks by farmers and the Franklin, with its air-cooled engine and its adaptability to country highways is expected to supply a big demand.

Many details remain to be completed. Light weight and extremely economical operating costs are among the features claimed for the first truck to be placed on the market by this passenger car maker.

New Republic Control

DETROIT, Nov. 15.—Details of the purchase of control of the Republic Truck Co., Alma, Mich., and its subsidiary, the Torbensen Axle Co., Cleveland, By John N. Willys, F. W. Ruggles and William J. Baxter, were made public, following a meeting of the directors. At the same time it was emphasized that the Willys-Overland Co. was not concerned in the deal, nor was the purchase outright, the Willys-Ruggles-Baxter combination simply acquiring control. Complete control of the Republic company is vested in F. W. Ruggles.

School for Truck Drivers

WILMINGTON, N. C., Nov. 19.—W. D. MacMillan, Jr., who is the Wilmington agent for the Packard and Dodge Bros. trucks, is contemplating the installation of a night school for truck drivers. The scheme is in embryo as yet but the general idea as contemplated at present will be to hold a school of driving and other instruction for the benefit of the firm's patrons who are owners of motor trucks. Classes will probably be held one night in each week and the course cover about 10 weeks in all.

Modern Road System for Pennsylvania

New Roads in Keystone State will Be Made of Concrete and Will Be Permanent

HARRISBURG, PA., Nov. 23.—A complete system of roads connecting all of the important cities and county seats of Pennsylvania with each other and with the outside world is now in course of construction. This system will be called the primary system and will be constructed to last the state as long as the Appian way has lasted Rome and her inheritors. When completed, there will not be an inch of permanent road missing in the whole great system. The system will connect up county seats and principal cities into one unit within the state, so that it will be possible to go from any important point to any other on a good road. It will also provide exits and entrances onto this route to the main trunk roads of adjoining states, so that it will be possible to go from any important point in Pennsylvania into an adjoining state, or *vise versa,* on a good road.

From the important points which are the objectives of this primary system, there will be a system of local feeders, which are called the secondary system. By this latter system, when completed, the dwellers in the smaller places will have good roads to get them onto the primary system. There will even be a third system, which will consist of roads corresponding to the township roads at present, which will feed into the secondary system and thence into the primary.

Certain states have experienced a great outcry for good roads and to meet it have rapidly built roads of various surfaces hastily thrown together. These roads did good service for a year or two and then began to melt away. In Pennsylvania at present, for example, the cost of upkeep on the road surfaces is enormous, and it is almost impossible to make a satisfactory job of the work of this class that is being done.

Concrete, on the other hand, though it costs a great deal more originally to put down, costs very little to keep in good condition after it is once down. The experience of this country during the war has shown that a system of roads through a state that will stand up under the hardest kind of wear is a necessity, if the cost of bringing food and supplies to the homes of the people is ever to be reduced.

There is a stretch of test road being built outside Harrisburg. Here there are twenty-one different strips of 70 ft. long each, in which varying proportions of concrete material are being used. This test is being conducted particularly with a view to cheapening road construction in concrete. Materials dug from various parts of the state are put in there and carefully observed. Those that pass the test are then available in different sections of the state for use on local roads, thus providing materials ready to hand, with comparatively small cost of haulage, which is generally a big item in the cost. Moreover, the state has a group of trained prospectors constantly touring the state to find available beds of the right kind of sand, gravel and other road building materials.

Service Truck Prices Raised

WABASH, IND., Nov. 28.—Effective Dec. 5, 1919, prices for Service motor trucks will be increased as follows:

Model	Capacity Tons		
220	1		$2,245.00
31	1½		2,785.00
36	1½	Special	3,215.00
51	2½		3,245.00
71	3½		4,085.00
76	3½	Special	4,285.00
101	5		5,145.00

New Oshkosh Branches

OSHKOSH, WIS., Nov. 28.—The Oshkosh Motor Truck Mfg. Co. has opened a factory branch at Jacksonville, Fla., in order to facilitate the delivery of trucks and replacement parts to its customers in the southeastern states. A factory branch will also be established in Minneapolis as soon as a suitable location can be obtained by the company.

New Department Store Garage

DETROIT, Nov. 29.—Parking space for 150 delivery trucks and an up-to-date service station, repair department and stockroom will be included in a new garage to be erected for the Crowley Milner & Co., a department store, here. The building will be of brick and tile with steel frames and sashes and will contain 50,000 sq. ft. of floorspace.

Drastic Jitney Laws in Massachusetts

Omnibus Lines Hard Hit By Edict of Bay State Railway Officials

BOSTON, Nov. 22.—An ultimatum has been served upon a number of cities and towns in eastern Massachusetts notifying officials that they must take their choice now between electric street railway service or jitneys. The eastern Massachusetts street railway which serves all the territory outside of Greater Boston has delivered the mandate to the city and town fathers.

There has been no mincing of words. A definite date, Dec. 1, has been set to accept the ultimatum. The jitneys are not asked to be turned off on to side streets. The license of every one of these vehicles must be revoked, thereby putting out of business hundreds of such vehicles.

Already the mandate was carried out in some places and the street car lines were discontinued so that the residents found that it was not merely a threat but a reality. The Public Service Commission was asked to bar competition, but it found that it could not do so, as it was up to the city and town authorities. When the request was turned down the railroad officials then got busy and made their decision.

As the Eastern Massachusetts Street Railway is being operated by public trustees appointed by the legislature, thereby making them practically state authorities, they have the power to do as they please and the city and town authorities cannot override them.

Three of the big cities, Brockton, Lynn and Lawrence, have been ordered to discontinue jitneys. The two former are big shoe cities and the latter a big mill city. There are other cities on the list, too.

In Boston, for the past 3 or 4 months the owners of buses who have been blocked by the city council, which requires $25,000 bonds and will not accept anything except cash or its equivalent, thereby tying up six or seven companies with some thirty buses, while the people are paying a 10-cent fare.

In the cities where the Eastern Massachusetts Street Railway operates, the fares are 10 cents and the jitneys running for a 5-cent fare.

Trucks Save London From Distress

When Railroad Strikers Tried to Starve the City, Motor Trucks Came to Fore

WASHINGTON, Nov. 25.—That the full milk supply of the city of London, a total of 250,000 gal., and the required 12,000 tons of food consumed daily were supplied by motor truck during the 10 days of the railroad strike, is reported in a statement by Gen. C. B. Drake, Chief of the Motor Transport Corps, following an inquiry into the value of motor trucks for hauling food.

The great value of good highways is also emphasized in a report which states that the strikes advanced the cause of good roads in England more than all the agitation of good roads advocates.

"The World War," stated General Drake, "proved the absolute necessity of an efficient system of motor transport to the nation at war and the English railway tie-up provided an emphatic demonstration of its value in peace times. With all railroad trains motionless for 10 days, nevertheless, food was distributed and the business and social life of the nation was carried on, subject of course, to the limitations of transportation as curtailed. Because of the efficiency of the system of transportation by motor that was devised under compulsion of necessity, the life of the nation was not thrown out of joint entirely—as was expected by the striking railroad employes—and in consequence, the strike itself fizzled out.

"The possibility of a general tie-up of American railroads, such as has been talked of for months past, makes a survey of the English strike situation and the lessons to be drawn from it, valuable at this time.

"In England, the great, immediate problem faced was that of feeding the 8,000,000 inhabitants of London, just as in this country, the big problem would be to provide an adequate and steady supply of food for New York City, and the other large cities. The former task was not nearly so formidable as it would appear at first sight, as the geographical situation of London is such as to continually assure the presence of large stocks of food. It is a port of heavy tonnage from all the seven seas, the entering place for large quantities of perishable supplies from the continent and, on the land side, easily approachable from main roads from practically every point of the compass. There can never be a serious food shortage in London as long as the highways are kept open for motor transport and a sufficient number of trucks and drivers can be obtained to bring the supplies in.

"About 12,000 tons of food and 250,000 gal. of milk are required daily to supply the needs of London. It is reported that about one-quarter of the necessary quantity of milk was delivered during the first day of the strike, which had begun the previous evening; on the second day about one-half and on the third day and every day thereafter, a full supply. As far as is known there was no perceptible shortage of food in London at any time during the 10 days of the strike.

"To gather the milk from the dairies in the country surrounding London required more than 1,000 trucks. Altogether in the districts affected by the tie-up, 23,000 trucks were employed in the gathering and distribution of food."

Field Body Expands

OWOSSO, MICH., Nov. 15.—The Field Mfg. Co., maker of truck bodies, will establish distributing centers for fleet owners in the principal cities of the United States in addition to manufacturing units for truck manufacturers. Plans are being made for an output of at least 100,000 units during 1920.

Triangle Service Station

LANSING, MICH., Nov. 24.—The Triangle Truck Sales Co., in charge of the distribution of Triangle trucks in twelve Michigan counties, has opened a service station in this city.

Coming Events

1920

Jan. 3-10—New York City, Motor Truck Show, 8th Coast Artillery Regiment Armory, 193d St. and Jerome Ave.

Jan. 17-24—Hartford, Conn., Truck Show, State Armory.

Jan. 24-31—Chicago, Ill. Motor Truck Show, International Amphitheater, Stock Yards.

Feb. 9-14—Louisville, Ky., American Good Roads Congress.

March 13-20—Boston Motor Truck Show, Mechanics Bldg.

March 22-27 — Wilkes-Barre, Pa., Motor Truck Show, Armory.

Fulton Production Is To Be Continued

Tangible Assets in Excess of Liabilities—No Work Let-Up Expected

NEW YORK CITY, Dec. 2.—Although a receiver has been appointed for the Fulton Motor Truck Co., Farmingdale, L. I., assurance comes from the officers of the concern that there will be no break in the sales and distribution of its product.

The value of the orders booked is said to be in excess of $2,000,000, while the liabilities of the company are less than $250,000. George C. Sherman, president, says that the company is exceedingly strong from the standpoint of distribution and sales, and that the appointment of a friendly receiver was brought about through the desire of the officials to effect a proper reconstruction of the affairs of the company.

The Fulton truck, in the estimation of Sherman, will be on the market continuously, and with no break in the sales and distribution. The material situation has not interfered with production, and reports of the company for October showed the shipment of more than 250 vehicles.

Luedinghaus a New Truck

ST. LOUIS, MO., Nov. 28.—The Luedinghaus - Espenschied Wagon Co., this city, which has been manufacturing horse wagons for more than 50 years, will in the near future bring out a 2-ton truck known as the Luedinghaus. It will cost $2,490 and will be assembled at the present plant which has been enlarged to take care of the new department. Trucks of other capacities will be built later.

The truck will be made up of standard parts and will include a pressed steel frame, wood wheels, three-speed gearset and a worm-driven rear axle. The wheelbase will be 145 in. Bodies will be built at the plant to the customer's specifications.

New Detroit Service Station

DETROIT, Nov. 25.—M. A. Young, distributor of Oldsmobile trucks, started construction last week of a new sales and service station to be three stories high. The top floor will be devoted entirely to the service department. Safety devices and modern freight elevators will be features of the new building.

The
COMMERCIAL VEHICLE
Read by Fleet Owners

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Hartford

UNIVERSAL JOINTS *and* **CONE CLUTCHES**

More Hartford Universal Joints Are Going Into *Good Cars* Every Year.

The position of the Hartford Universal Joint on this page indicates *graphically* the Hartford Line of Production during the past four years. The reason: Quality—Dependability.

THE
HARTFORD
AUTOMOTIVE PARTS CO.
HARTFORD CONN.

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI DECEMBER 15, 1919 No. 10

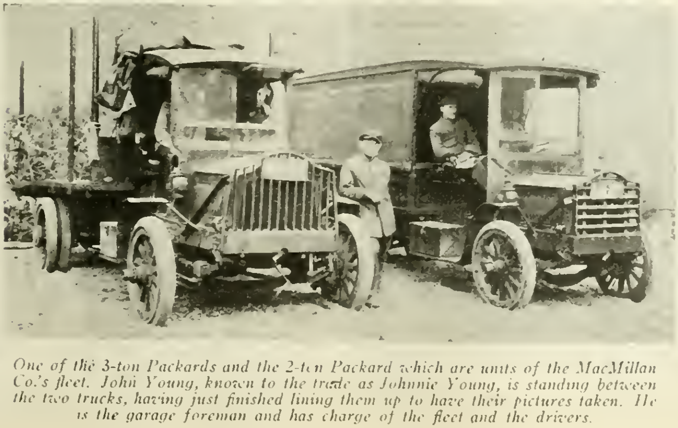
✓

MOTOR TRUCKS HAVE MANY ADVANTAGES in the Book Publishing Business

Prove Superior on Short Runs and Give Better Service During Peak Load Periods

THE MacMillan Co., one of the largest book publishing firms in existence, has found that motor trucks are better than horses, whether for haulage or for delivery. Motor trucks are more economical; smarter in appearance, and have a far greater work capacity. That company is international in scope, as well as having branch offices in Boston, Chicago and other cities in the United States and Canada. But for the purpose of this article it will be sufficient to consider the New York branch of the business.

The MacMillan Co. publishes a great many books of fiction. It publishes religious books and technical works on medicine and on many other sciences. It also publishes a great many school and college text books. In this last respect the volume of business, much of which is handled by the company trucks, is enormous. For example, a certain state adopts the use, let us say, of Tarr & McMurry's Geography, a widely-used school book published by the MacMillan Co. Such a state adoption means that this school book will be used in all state controlled schools throughout the state in question. When such an adoption is decided upon, the publishers have to print, publish and deliver hundreds of thousands of copies of the book, in time for the opening of the schools. When we consider that this example is only one of many text books adopted for state use by many different states, the tremendous amount of trucking to and from the MacMillan Co.'s establishment, for this one branch of the business, becomes apparent.



One of the 3-ton Packards and the 2-ton Packard which are units of the MacMillan Co.'s fleet. John Young, known to the trade as Johnnie Young, is standing between the two trucks, having just finished lining them up to have their pictures taken. He is the garage foreman and has charge of the fleet and the drivers.

Moreover, it must be remembered that school text books are only one branch of the business. In their turn, works of fiction, of religion, of medicine, college text books, etc., all have their peak load periods, according to the season of the year, the publication date of the book, the opening of colleges, etc.

Practically all of the MacMillan Co. publications are printed outside of New York; most of them are also bound outside the city. About 25 per cent of the books published are shipped direct to the retailers in various states, most of such direct shipments being state or college textbooks. But the remaining 75 per cent of the books on the MacMillan list must be shipped from the various binderies to the MacMillan Co.'s establishment in Fifth Ave., New York. They are then distributed among the four stock floors which extend the entire length of the building.

As orders are received, the books are redistributed from these stock floors to the distant schools and colleges or to the firm's retailer custom-

The above illustration shows one of the MacMillan Co.'s 3-ton Packards in process of being unloaded on a side street outside the MacMillan Co.'s premises. The loading gangway shown has proved a great time saver and is fully described on page 401 of this issue.

ers all over the United States. In other words, 75 per cent of the books published by the MacMillan Co. have to be dealt with twice by the company's fleet of trucks.

Double Handling Necessary

While this double handling of the books might at first appear unnecessary, it must be remembered that, in order to ship its books direct from the binders to its customers, the company would have to maintain very large storage space for its stock at the binders and also maintain a staff at each bindery to look after the stock and to select, pack and ship outgoing orders. This would be necessary in addition to the clerical staff to keep records of the stock kept on hand of each one of the thousands of books published by the company.

Moreover, as different books are bound at different binderies, a single order might involve the collection of many different books from several different binderies, which brings us back to the necessity of a collecting and shipping point for all the books, which is part of the role now played by the establishment on Fifth Avenue.

It is clear from the above that exactly half of the books handled by the company's fleet of trucks are collected from freight stations and transported to the MacMillan Co.'s establishment on Fifth Ave. The other half of the total books handled by the trucking fleet are the same books mentioned above, on their outgoing journey to the company's customers.

Of such outgoing shipments at least nine-tenths are for out of town customers: that is, are freight, express or parcel post shipments. The other one-tenth are deliveries to schools, stores and retail customers in New York City. Taking these incoming and outgoing shipments together, we find that 95 per cent of the books handled by the delivery fleet involve trips from and to freight yards, postoffices, etc. In other words, short runs make up 95 per cent of the work of the company's trucks.

To be more exact, the actual runs of the trucks consist almost entirely of trips to and from docks and the various freight yards. None of these runs exceeds two miles.

The great quantity of books shipped direct from the binderies to the company's large depositories in Chicago, Boston, Atlanta and elsewhere, are not handled by the trucking fleet at all. For the purpose of this article they may, therefore, be disregarded.

It is generally recognized that one of the great advantages of the motor vehicle over the horse wagon is the greater radius of operation of the motor truck. The motor vehicle can make longer runs in less time. But from the above it is clear that the MacMillan Co.'s trucks do not hold this advantage, because they are not called upon to make more than a negligible number of longer runs.

Again, another outstanding superiority of the motor truck is its greater speed. On short runs this advantage is largely reduced. But in addition, the congested conditions of the streets through which the MacMillan Co.'s trucks operate, and congestion at the freight yards, still further reduce this advantage or eliminates it altogether.

Now in spite of the above arguments which militate in favor of the horse wagon, other motor truck advantages have been found to tip the scale in favor of the motor truck.

Costs Compared

Mr. L. J. Lucas, general manager of the MacMillan Co., has consistently favored the use of motor trucks for handling the company's collections and deliveries. Early in the present year the firm was employing four teams of two horses each. Mr. Lucas went into the question of costs thoroughly and arrived at the following conclusions:

A one-horse team cost the company between $60 and $65 per month for stabling, feed, etc. For four teams and for the year, therefore, this item stood at between $2,880 and $3,120.

Garaging a motor truck cost the company between $30 and $35 per month, or between $1,440 and $1,680 per year for a fleet of four trucks. The additional cost of gasoline and oil, the depreciation item, the MacMillan Co. writes off its motor trucks every 7 years, just as it wrote off its teams every 7 years, and other expense items chargeable against motor trucks, did not bring up the total to a higher figure than the one mentioned above for horses. Other expenses such as overhead expenses, drivers' wages, etc., remained almost the same for trucks as for horses.

The first question taken up was that of hired trucks. The quotation obtained from a trucking contractor figured out at a total of about $26,000 per year for handling all the MacMillan Co.'s collections and deliveries. This figure was much higher than the cost of maintaining the delivery fleet drawn by eight horses.

There remained then, the question of owned trucks. After careful calculations this was found to figure out at between $12,000 and $13,000 per year for the entire cost of maintaining and operating a fleet of four trucks. This amount of course includes depreciation, insurance, overhead expenses, repairs, drivers' wages and all other items chargeable against the trucks.

The figure is low for two reasons. First, the runs are short and over good roads, therefore depreciation is figured so as to write off the trucks in 7 years—an unusually low depreciation item. Second, the MacMillan Co. owns a small garage, large enough to accommodate the four trucks. This is used for housing the private cars of officials of the company during the daytime and it has never been rented, either wholly or in part. Therefore it was not necessary to charge against the trucks the possible rental of the floor space which they occupy, which would work out at about $1,000. That is, this was not necessary in comparing motor truck costs against those for horses.

The actual total cost of maintaining a delivery fleet drawn by four horses, worked out at about the same figure, or between $12,000 and $13,000. But this would be about $14,000 today, which would neutralize garage rent.

Maintenance Compared

Early in March of the present year, the MacMillan Co. sold its eight horses at private sales. In place of them it installed two new 3-ton Packard trucks with stake bodies and one new 2-ton Packard truck with a screen body and canvas top. A little later a 1-ton Peerless of an older model was added to the fleet and equipped with a panel body. It was found that these four trucks were able to handle with ease all the work previously taken care of by the four teams of horses. They handled the work with greater dispatch and if necessary could handle more.

Although the fleet has not yet been installed a year and it is not possible to prove that the above estimate of costs was exact, it may be said here that up to the present time of writing, the costs of the fleet are under rather than over the schedule set for them and based on the above estimate.

Another point: in the maintenance of the horse teams, the horses had to be inspected twice a month by a veterinary surgeon. If all was well with them, the surgeon charged a merely nominal fee. If treatment was necessary, he charged between $5 and $10 per horse.

Under the present arrangement for maintaining the trucks, the fleet is inspected only once a month by the local branch of the Packard company. If all is well, or if only slight tightening up or adjustments are necessary, the Packard company makes no charge for this service, either for the inspection or for the subsequent report, outlining whatever slight adjustments may be necessary. On receipt of the report these adjustments are made by The MacMillan Co.'s garage foreman, without extra cost to the company. Nor is the garage foreman's salary an additonal cost item, because he lived in an apartment above the garage, took charge of it and worked in the shipping room, before the trucks were installed. For more elaborate repairs made by the Packard company the cost to the MacMillan Co. has not yet reached $100.

Moreover, when a horse is sick or disabled, it is down and out and cannot work for some time. This means serious inconvenience, extra work for the other teams and consequent possible disablement of the other horses later on.

On the other hand, unless a truck is badly smashed in an accident—such an accident as would kill a horse and eliminate it for good—the ills to which it is heir are usually easily and quickly repaired and the truck is in as excellent condition as before.

Motor Trucks Superior

To sum up, the haulage work of the MacMillan Co. is heavy and continuous, but for the most part, it is such as to offer every advantage to the horse wagon. In spite of this, the motor truck has proved that it can handle the same work more quickly, more efficiently and at no greater cost than can horses. In addition, where the company has longer runs to make, such as occasional parcel deliveries in the Bronx, the motor truck is immeasurably superior. Lastly, the well kept motor truck does, and always will, present a smarter, more efficient and more up-to-date appearance than the best of horse wagons.

Further articles dealing with the MacMillan Co.'s operation methods and the large volume of work handled by the company's small fleet will appear in later issues of The Commercial Vehicle.

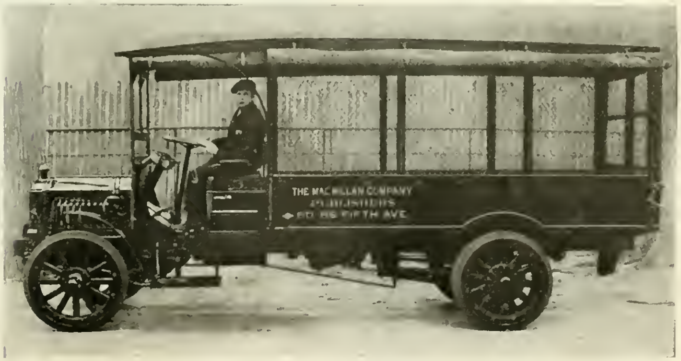
Michigan Overland Haulage Increases

Detroit, Dec. 15.—Ship-by-truck concerns that a few months ago were operating one or two used trucks, encouraged by the enthusiastic response of shippers, are branching out in all departments. Many concerns are employing regular traffic managers; are operating return-load bureaus and have established fuel and repair stations along the routes they are covering.

With a desire to in every way encourage the movement, the manufacturers are compiling information on which to base freight rates and a comprehensive plan of truck line systems appears destined to be the outcome. New companies are being started in many sections of Michigan and Ohio and those in operation report capacity business.

The Rainbow System of Motor Transportation operations between Detroit, Cleveland, Toledo, Youngstown, O., and Pontiac, Mich., Dec. 1, with an equipment of twenty-two trucks and twenty-six trailers. The corporation was organized in Cleveland and is headed by Richard Ferguson. Each train, consisting of a

Continued on page 422



Photograph of the MacMillan Co.'s 2-ton Packard, taken at the time it was purchased. Note the inexpensive wire framework of the body and the curtains, which can be unrolled to protect the contents of the truck in inclement weather.

PREVENTING BROKEN FRAMES on Contractors' Dump Trucks

Angle Irons Rivetted to Outside of Frame Stops Failures but Requires Lengthening of Jackshaft on Chain-Driven Truck

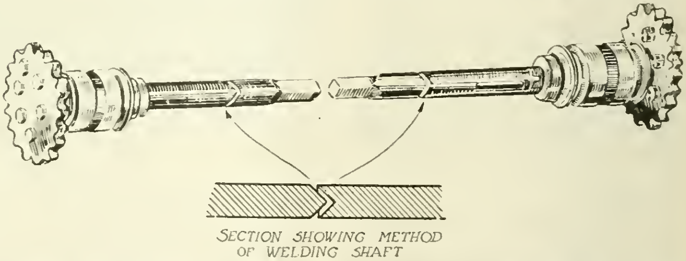
ONE of the big maintenance problems to be solved by a fleet owner in the contractor's field is the breakage of frames caused by excessive strains during the unloading of the dump bodies. The usual practice when a truck is loaded with heavy rock is to back the truck against some obstruction to the rear wheels, thus expediting the dumping of the rock by giving it an additional momentum. By successive jamming of the rear wheels, the rock is completely dumped.

It is manifest that these severe strains are bound to have a deteriorating effect on the frame, resulting finally in a breakage. Jacob Fradus, a large contractor in New York City, has solved this problem by reinforcing the truck frames with 6 by 5½-in. angle iron, laid on the outside of the frame. The 6-in. side is placed vertically on the outside of the frame, while the 5-in. side is on the top, horizontally, facing out.

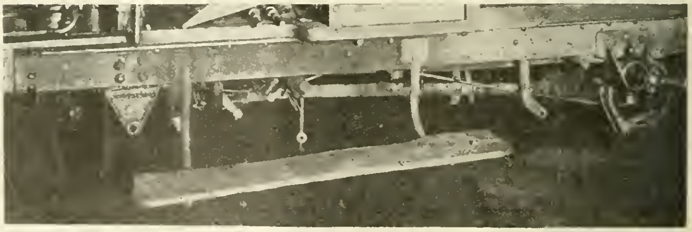
Before the angle iron was put on the frame, holes were drilled for all cross members and the jackshaft hangers. The reinforcing angle iron was then attached to the frame by being riveted with ¾-in rivets in zig-zag formation every 8 in. along the frame. By placing the rivets every 8 in., it was found that the frame was considerably stronger than it would be were the rivets placed in square formation or in batches of four. Previous experience without the reinforcement, showed that frame breakages occurred where the rivets were placed near each other.

As the Fradus fleet is made up of Mack chain-driven trucks, it was necessary to bolt the jackshaft hangers in their original positions on the frame It was then found that the ½-in. thickness of the angle iron shortened the purchase of the squared end of the jackshaft in the master gear of the differential just ½ in. At first, the original jackshafts were used, there being 3 in. of squared end on the end of the jackshaft, and this allowed that member to enter the master gear within ½ in. of its original position. Later, when the jackshafts started breaking and the squared ends were sheared due to the overloading of the trucks, it was deemed best to lengthen them ½ in. so that the squared ends might get a better purchase in the hub of the master gear.

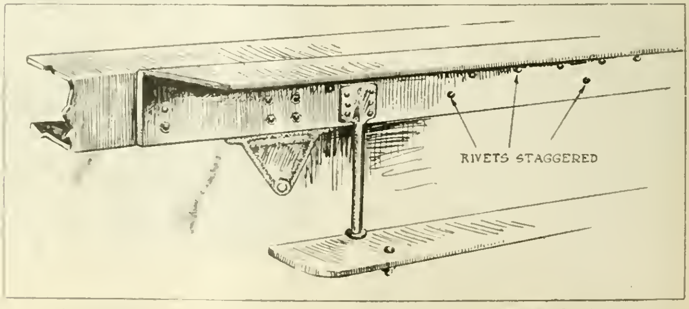
Lengthening of the two jackshafts is accomplished in two ways. The shorter jackshaft is lengthened by cutting down one of the larger shafts which has been broken, to the required size. The larger jackshaft is lengthened by the French welding process, in which one piece is tapered and the other grooved in a V-shape so as to form male and female members. These two ends are fitted together and then welded. One of the jackshaft pieces retains the original flange for holding the sprocket, while the other piece is one that has been cut down from some other broken shaft. The end of this piece is squared to fit the hub of the master gear of the differential.



The jackshafts we lengthened by the French welding process.



The angle iron reinforcement was laid on the outside of the frame.



The rivets were placed in zig-zag formation, every 8 in. along the frame.

Simple Device to Unload Trucks *Paralled to the Curb*

Publishers Reduces Loading and Unloading Time by Its Use

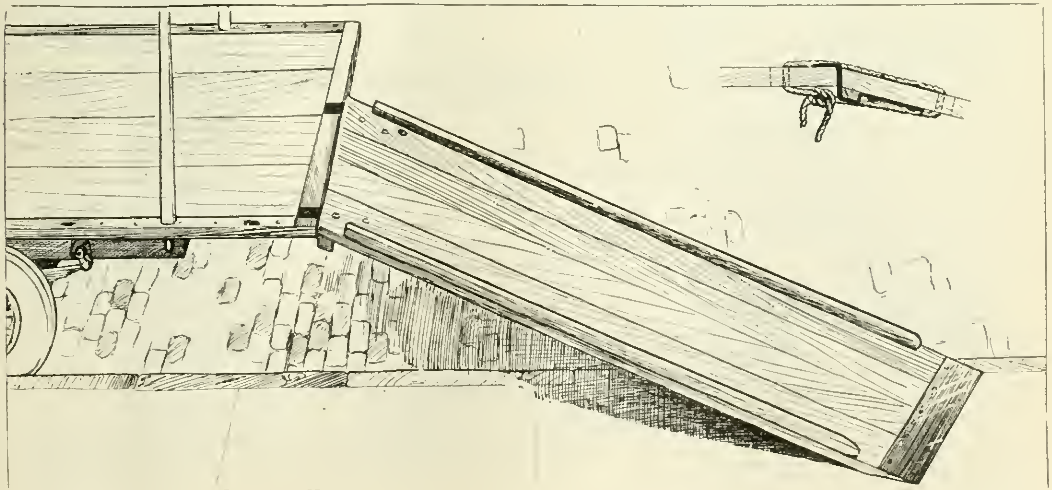
TRUCKS are still loaded and unloaded at the sidewalk in many industries. Practically all trucks so loaded are backed up so that the tailgate is parallel with the curb-edge. This means that practically all trucks so loaded and unloaded, in city districts occupy almost half the street width during the loading process. Moreover, they must be maneuvered into and out of this position, and during these maneuvers, either hold up other traffic, are subject to delays themselves, or both. Yet the practice is almost universal where curb-edge loading is still in vogue.

In view of the obvious inconvenience of this method, where it is not necessary to load or unload a large number of trucks at a time, the device shown below is of unusual interest.

The device was constructed for the MacMillan Co., book publishers, by the firm's carpenter, Herman Schwenk. It is simple in design, can be constructed on the premises by any good carpenter and has proved a great labor and time saver. It serves the purpose of bringing the advantages of a loading platform into sidewalk loading. Moreover, it enables two men to unload a truck which is parallel with the sidewalk, in about one third the time previously taken by three men to unload a truck backed upon the curb-edge.

The work of the MacMillan Co.'s delivery fleet consists almost entirely of calling for and delivering large cases of books at docks and freight stations. Conditions on the company's premises are such as to necessitate sidewalk loading and unloading of these heavy cases. Before the present device was installed, it was necessary to back the company's trucks up to the curb. One man then mounted the body of a truck and pushed or rolled the cases toward the tailgate. Here a second man eased them to the sidewalk, while a third picked them up on a hand truck and wheeled them into the building. Under this system the man on the truck body usually "overended" the cases from the front to the rear of the truck, a method calculated to bring severe jars and strains on the truck springs and chassis. When the cases were eased to the sidewalk, the easing was usually negligible, especially where the cases weighed 200 lbs. and over. Therefore, the cases came to the sidewalk with a crash, starting every nail, cracking and splintering the boards and frequently breaking the cases wide open and spreading the books over the dirty sidewalk.

The loading device shown is a simple gangway, built on a slant so as to connect the tailboard of the truck with the sidewalk, when the truck is drawn up parallel with the latter. Two men can easily lift it into place. It can then be fastened by means of ropes running through two of the stake pockets on the truck and through two pockets in the gangway. This is rarely necessary, however. When in place, two men can load or unload the truck in about one-third the time taken by three men working by the old method. Hand trucks are run up the gangway onto the truck body. A case is then picked up on each hand truck and run down the gangway and into the building without further change. Moreover, there is no jar and strain on the chassis or on the springs.



Two sketches of the MacMillan Co.'s loading device. The shorter side of the gangway is 12 ft. long and the other 14 ft. long. The total width is 3½ ft. A guide, about 3½ in. high, prevents the hand truck wheels from running over the edge. The gangway is sufficiently flexible to take up the angle difference in the planes of the truck body and the sidewalk. The total weight of the device is about 250 lbs.

ELIMINATING MISTAKES in Loading Packages

Read How a Wholesale Butcher Prevents Errors in Delivery

WHAT happens when one of your trucks pulls up to make a delivery and the driver finds that the goods to be delivered are not in his trucks? In the first place, the driver may have to return for the correct goods and this means additional run back to the store. In the second place, the customer receives his goods late.

In the wholesale butcher business, such a delay may cost the firm a big customer. Restaurants do not as a rule order goods in bulk until they are needed, and the non-arrival of such goods may cost the restaurant considerable business. Also, for example, a big ocean liner cannot postpone sailing because a small proportion of its supplies for the voyage have not arrived. In addition to this, the run to the store and back for the delayed goods means a big waste of time and gasoline.

Therefore, the Nathan Schweitzer Co., a big New York wholesale butcher, has perfected and installed a checking system for truck loading which practically eliminates any possibility of mistakes.

By this system, goods to be carried on a truck on every trip are collected in one spot on the ground floor. The truck driver collects his orders from the office compartment reserved for his route. By the aid of these orders he then assembles his packages from his route space on the ground floor. He and his helper place these on hand trucks.

The driver now enters on his driver's record the packages he has assembled and the addresses to which they are consigned.

When the record is completed, the driver and helper push the hand trucks to the tail of their delivery truck and are ready to begin loading.

The Additional Check

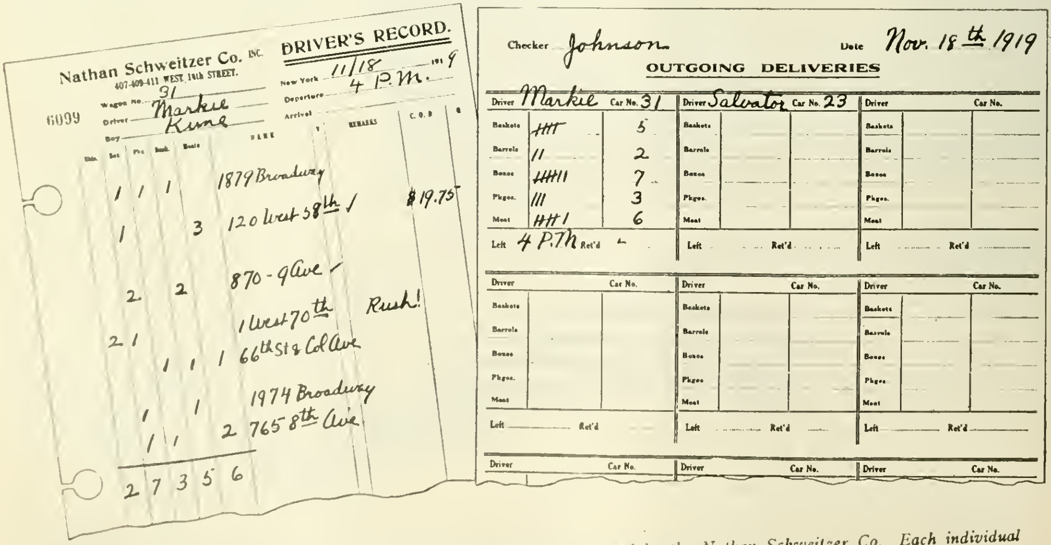
Just at this point in the loading process, the company's double checking system comes into play and prevents any possibility of error. During the course of the loading and sometimes before the loading is begun, where two or three truck are to be loaded at the same time, the checker checks off on his sheet each parcel or box or barrel as it is loaded into the truck, or to be loaded into the truck.

Where goods are checked off in this way before being loaded, they are carefully segregated, after the checking is completed, from all other goods piled nearby, so as to avoid the possibility of packages being removed by mistake or other packages added.

When this final checking has been completed, the checker's record is compared both with the orders by which the driver has assembled his load and with the driver's record which he has made up from these orders. If all three of these records agree, the possibility of any mistake in the load is practically eliminated.

Philadelphia Show Jan. 19

PHILADELPHIA, Dec. 1—The week starting Jan. 19 has been selected by the Motor Truck Ass'n of Philadelphia for holding the motor truck show in Philadelphia. The exhibition, which will follow that of the passenger cars, will be held in the Commercial Museum.



Nathan Schweitzer Co. INC.
407-409-411 WEST 14th STREET.

6099
Wagon No. 31
Driver Markie
Boy Kune

DRIVER'S RECORD.
New York 11/18 1919
Departure 4 P.M.
Arrival

NAME REMARKS C.O.D.

1 1 1 1879 Broadway
1 3 120 West 58th ✓ $19.75
2 2 870 - 9 Ave ✓
1 West 70th Rush!
2 1
1 1 1 66th St & Col Ave
1 1 1974 Broadway
1 1 2 765 8th Ave
2 7 3 5 6

Checker Johnson Date Nov. 18th 1919

OUTGOING DELIVERIES

Driver Markie	Car No. 31		Driver Salvator	Car No. 23		Driver	Car No.	
Baskets	𝍸	5	Baskets			Baskets		
Barrels	||	2	Barrels			Barrels		
Boxes	𝍸||	7	Boxes			Boxes		
Pkges.	|||	3	Pkges.			Pkges.		
Meat	𝍸|	6	Meat			Meat		
Left 4 P.M.	Ret'd		Left	Ret'd		Left	Ret'd	

Driver	Car No.		Driver	Car No.		Driver	Car No.	
Baskets			Baskets			Baskets		
Barrels			Barrels			Barrels		
Boxes			Boxes			Boxes		
Pkges.			Pkges.			Pkges.		
Meat			Meat			Meat		
Left	Ret'd		Left	Ret'd		Left	Ret'd	

Driver Car No. Driver Car No. Driver Car No.

This illustration shows a driver's record and a checker's record as used by the Nathan Schweitzer Co. Each individual truck load is entered in detail on each of these records at different times during the loading process. Note that the columns on each record are totaled. Each total must agree with the corresponding total on the other record.

A Simple Washstand With Good Lighting Facilities

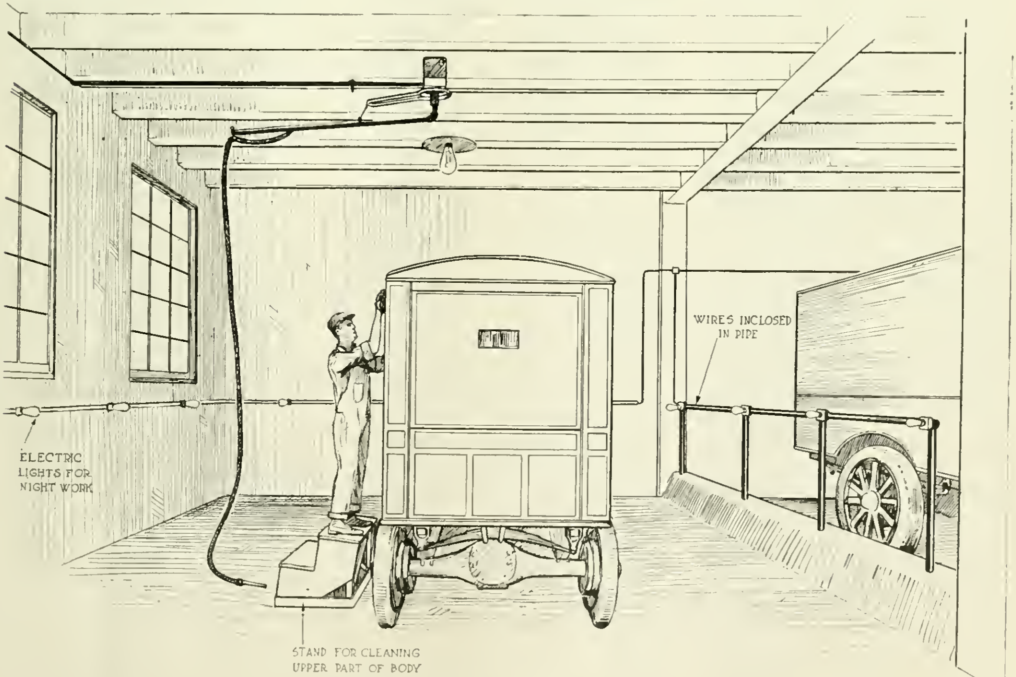
Concrete Partition 27 In. High Helps to Prevent Splashing of Trucks Already Washed

TRUCK washing is one operation that should receive as much attention, so far as efficiency is concerned, as any other piece of work in a fleet owner's garage. This is especially true when a fleet has become so large that every inch of available garage space is needed for storage purposes. Washing a truck while it is standing close to another vehicle does not always give good results. In the first place, the work is done under crowded conditions, resulting in the splashing of cleaned trucks on either side. In the second place, it is not always possible to get the best of lighting facilities.

An example of how this problem was solved by a large fleet owner may be cited by the experience of the Shults Bread Co., operating 165 trucks in New York City and the surrounding territory. In the Hoboken, N. J., garage of that company, all washing of the trucks is done at one place in the garage. A space 15 ft. square has been set aside in a corner of the garage near the entrance. A drain has been placed in the center of this space and the concrete floor slants toward the drain from the four sides of the space. An overhead washing device with an 8-ft. hose permits of easy access to any part of the truck during spraying.

A concrete partition, 27 in. high, separates the washing space from the space adjacent to it and acts also as a protection against splashing. A framework of 1-in. pipes is built up from this concrete partition to hold four electric lights, which are equally spaced along the length of the framework. Four more electric lights are also placed along the wall at the rear and four on the side wall opposite the concrete partition. An overhead light, placed in the center of the ceiling, is also used. These excellent lighting facilities have made it possible for the cleaner to work at night under conditions almost as good as during the day.

Detroit, Dec. 12.—The Sewell Cushion Wheel Co. plans to treble its production with the addition of a factory on a 10-acre site purchased recently. Work on the new factory has begun.


WIRES INCLOSED IN PIPE
ELECTRIC LIGHTS FOR NIGHT WORK
STAND FOR CLEANING UPPER PART OF BODY

All of the trucks in the Hoboken, N. J., garage of the Shults Bread Co. are washed in one part of the garage on account of the crowded conditions. This washing stand is equipped with an overhead washing device and electric lights for night work. Note also the convenient stand used so that the washer may reach the upper parts of the truck body.

Company Selling Distilled Water Finds Electrics Most Economical

GETTING RID OF HORSES

in Delivering Beverages

FOR the horses, it was an inauspicious day back in 1912 when the Hygeia Distilled Water Co., New York City, bought its first electric truck. The purchase was principally for experimental purposes, for electrics were not very well established at that time in the business of delivering table waters. As for the horses, they had been used ever since the company began business, 30 years before. There were twenty-seven teams then. Later, when another electric was added, the number of horses was reduced to forty-odd. And so it has been from 1912 to the present, a steadily decreasing number of horses and a constantly increasing fleet of electric trucks, until now there are ten electrics of various types and sizes and not one team of horses. Yet, the ten do all the work, and more, too, of the forty-four horses they have displaced.

The electrics have shown many advantages over the horse-drawn equipment. The difference in operating cost was, of course, the most striking factor, but added to this was the fact that the electric could go to places far beyond the reach of horses. These two—increased service and lowered costs—are the real reasons for the fact that the Hygeia company's beverages are now delivered by motor vehicles.

The delivery system today covers all of Manhattan, the Bronx and Brooklyn, N. Y. The electrics reach customers in all three boroughs. Beyond these districts express and freight are relied upon. In the days of horses, the wagons did not go beyond Manhattan. The trips were too long. Even a trip to Harlem, a distance of five miles, taxed the horses to the utmost, and they required the better part of a day for the journey. These outlying parts of the city depended on express for their shipments. Now the whole local territory is covered by the electrics of the company, and the service is not only better but more economical.

The Hygeia fleet is made up of four 3½-ton, one 3-ton, three 2-ton and one 1-ton G. V. electrics, and one ½-ton G. M. C. electric.

Only Trucks Make Possible the Large Expansion of Business Area

No. 7

This is the seventh in a series of articles on the principles to be considered in getting rid of horses in different industries. The first six articles in this series were published as follows:

No. 1 Coal. . . . . .Aug. 15
No. 2 Paper. . . . . .Sept. 1
No. 3 Lumber. . .Sept. 15
No. 4 Groceries. . .Nov. 1
No. 5 Express. . .Nov. 15
No. 6 Florist. . . . .Dec. 1

Article No. 8, on getting rid of horses in the publishing business will appear in the issue of Jan. 1, 1920.

When an owner of a fleet of horses in the beverage field wishes to replace these with a motor truck fleet he must consider certain fundamental principles in effecting this replacement. He must first understand that the replacement is a gradual process. The application of these principles may mean a complete change in the functioning of the delivery system, but in the end the trouble and expense necessitated will more than pay for itself.

There are seven cardinal principles that must be considered by a beverage concern before it installs a fleet of trucks.

Cost of Delivery

1—The cost of delivery is the paramount issue to be decided upon before anything else is brought up. Though horse wagons were found to be reliable on the short hauls in the spring and fall months, they often caused a disarrangement of the delivery schedule in the hot summer because of the heat and in the winter because of the snow and slippery pavements. Another point to be considered is the fact that in the beverage field, the use of horse wagons is limited to the local territory only and in no way can it meet any expansion of territory outside of the city limits. Though they may be used for short hauls in the city, it is doubtful whether they are practical even then. The logical answer to this question is in the determination of the time saved in delivery and the number of such deliveries per day. An electric truck can take care of all of the short hauls necessary each day, while a gasoline truck can be used to advantage in the long hauls outside of the city limits and also as a feeder for the electrics.

Delivery Area Increased

2—The area of delivery territory is the next principle to be considered by a beverage concern which contemplates the installation of a fleet of trucks. Though this has been partially covered in the previous principle, it does not take into account the class of business handled. The business of the Hygeia company is made up of deliveries to private families and office buildings, all short hauls, and necessitating frequent stops. It is therefore possible to adhere to a delivery schedule and to keep the trucks on certain routes, as the orders come in regularly. Other companies, on the other hand, take care of the drug store and other trades, orders from which are usually subject to immediate delivery, according to the fluctuations in demand. As a result, such a company must be prepared to rush its particular brand of beverage to any part of the city at any time of the day and must therefore have on hand gasoline trucks which are fast enough to make deliveries in time to satisfy a customer.

Average Load Size

3—The average size of the loads is the next principle to be considered in the installation of a fleet of trucks in the beverage field. He must consider the size of trucks to take care of these loads and the right number of each size to purchase. The Hygeia company uses the 3- and 4-ton trucks for the heavy routes to the lower end of the city, where it delivers drinking water for the offices, and the trucks of lower capacities for the short hauls and the family trade.

The Garage Question

4—The design and location of the garage must next be considered in the installation of a fleet of trucks in the beverage field. With three to four trucks, such a fleet owner may house his trucks in some neighboring garage. Those who are planning the erection of their own garage should locate them as close by the plants as possible, so as to reduce mileage in the running of the trucks between the plant and the garage. Often a company is able to convert its stables into a garage, as in the case of the Hygeia company. The first floor is used for housing the electrics and the second and third floors for storing its bottles. Charging plugs have been installed along the wall space, the batteries being charged at night. By using the former stables on the second and third floors for the storage of its bottles, the company has been given the opportunity of taking advantage of any bargains in the purchase of extra bottles. It would be impossible for the company to buy these bottles at bargain prices when the chance occurred without this extra storage room, because the profits made by the purchase would soon be consumed in rental of outside premises.

Loading Important

5—The fifth principle takes into consideration the loading of the trucks. A beverage concern, whose business dates back long before the advent of motor trucks, will find that its loading facilities are not adequate to harmonize with the efficiency of motor truck use. The platform will probably not be high enough to accommodate the higher bodies of the trucks, nor be large enough to meet with any expansion in the fleet. In the case of the Hygeia company, the platform has been built large enough to accommodate the whole fleet at one time. The boxes are conveyed to the loading platform on automatic conveyors which wind in and out of the plant. These conveyors are made up of rollers, mounted between two tracks. The boxes, when placed on these rollers, receive enough momentum after being given a start to carry them out to the platform, where they are taken in hand by the driver on whose truck they are loaded. Loading conditions must be such as to allow the loading of all of the trucks at one time, especially in the morning rush. As the loading of a truck takes from one-half to one hour's time, it is apparent that were several trucks forced to wait on account of insufficient loading space much valuable time would be lost. Loading of beverages is also dependent on the efficient layout of the plant. There should be no confusion or delay in the morning rush through lack of proper grouping of orders. The drivers should not be forced to waste their time in spotting the various cases of beverages or drinking water. The trucks must be kept moving in order to get any kind of efficiency. This cannot be accomplished if the trucks are kept waiting for any undue length of time during the sorting of the loads. Efficient unloading of the beverages is contingent upon placing the different orders in the truck body and also upon the proper unloading facilities at the point of delivery. The boxes must be placed so that they may be unloaded in regular order, thus obviating the need of moving other boxes in order to get at those desired.

Sturdy Body Types

6—Body types have an important bearing in beverage delivery. Though this principle goes hand-in-hand with the unloading of the vehicles, still it does not take into consideration the various conditions that are met in the beverage field. The bodies, in the first place, must be designed for accessibility. Protection against theft must also be considered. Most beverage concerns that make family deliveries use a panel body, which is completely enclosed. On each side one or two swinging or sliding doors are usually placed on the bodies to enable quick spotting of the boxes. Each door is provided with a lock to prevent theft of the beverages while the driver is making his deliveries to the rear of the houses. When it is considered that a syphon bottle costs in the neighborhood of 80 cents unfilled, the need of adequate means for prevention of theft is manifest. The inside of the body is usually made up of two floors on which the boxes are placed according to their rotation of delivery. The outside roof space is used for carrying empties collected during the deliveries. A guard rail is placed around the sides of the roof to prevent the boxes sliding off. Some of the beverage companies which deliver drinking water and coolers to the offices use an open stake body for this purpose, as there is no need of segregating the orders. Each bottle is of the same size and therefore may be used to fill one order as well as another. Those companies that use gasoline trucks for the delivery of their brands of syrup, used by drug stores, etc., for making up the various beverages, rely on the express type of body. This type of body is also useful for the delivery of bottled beverages when carried in boxes.

Size of Fleet

7—Maintenance of trucks is dependent on the size of the fleet. The establishment of a service station is the result of a process of development in the size of the fleet. From an economical point of view an owner of five or six trucks may not find it worth while to maintain his own trucks. There might not be enough work to keep a mechanic busy all of the time. In a case of that kind it would be better for him to have the work done in a local repair shop or service station. On the other hand, as the fleet grows to eight or ten trucks, he must consider taking care of such work as engine repairs, tires, etc.

Beverage concerns are given the opportunity of cutting their maintenance costs to the minimum by the installation of electric trucks and using the by-products of the bottling machinery. These by-products consist of electricity and steam. The electric generators which produce the current employed to operate the machinery may also be utilized to supply the current used for charging vehicle batteries. As distilled water is made in the plant, there is no need of outside purchases.

This has been the experience of the Hygeia company. Maintenance of its ten electrics is taken care of by the plant engineer and his assistant. As the speed of the trucks is limited to 12 or 14 m.h.p., there is little chance for unusual wear and tear, and as a result, these vehicles give little trouble in that respect. Most of the wear that occurs is in the driving chains, brakes, controller fingers and battery jumpers. Occasionally the drivers will carelessly forget to start the trucks slowly and as a result the battery jumpers will burn out.

The New York baking plant of Horn & Hardart, where the Automat foods are cooked. The picture shows the entrance on the front to the loading platform for outgoing orders and the platform on the side for receiving raw materials.

Fleet of Electrics

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Delivers Cooked Foods To Gotham's Automats

Cleanliness, Low Operating Cost and Ease in Handling Make Electrics Choice of Horn & Hardhart

CLEANLINESS, low operating expenses and ease in handling in the heavy traffic of the downtown section of New York, were the three main reasons why the Horn & Hardart Co. selected electric trucks for the delivery of its food products to the nineteen Automat restaurants it operates in that city.

The Automat, introduced in New York in 1912, had already been serving Philadelphians since 1881. The use of electrics in New York followed logically an earlier experience with this type of truck in Philadelphia, where the pioneer truck was installed fifteen years ago. Therefore, when the Automat moved to New York, a vehicle of 1-ton capacity was installed. A second truck of double this size was soon added and since then the fleet has been increased to nine, consisting of the one 1-ton C. T. electric and eight 2-ton C. T. electrics. A Ford delivery car and one 2-ton Autocar are also used. The latter carry supplies and also take care of special deliveries.

With one or two exceptions, none of the food served in the various Automats is cooked on the premises. There is little besides the serving tables and warming closets behind the slots and compartments of these marble-lined rooms. Everything is prepared at a central plant or commissariat and delivered by the electric trucks to the various restaurants throughout the city. The central baking plant is at Fiftieth Street and Eleventh Avenue and the branches are scattered throughout the territory lying south of Forty-seventh Street and between Madison and Eighth Avenues. In this territory the longest run is to the lunchroom at 50 Broadway, a distance of approximately five miles.

Baking Plant Layout

The baking plant, on account of its corner location, offers an excellent opportunity for taking care of incoming and outgoing supplies. At the front is located the loading platform and at the side the shipping department, where all incoming raw materials, etc., are unloaded. At the rear there is a yard, which enables ash and garbage carrying trucks to operate freely. In addition, there is a small garage for housing four of the company's trucks. The Ford delivery car is kept in the rear at present. A small addition to the garage will be added soon to house it. The remaining six are parked all night at the loading platform, which, on account of being inside the building, offers excellent protection. The platform is 15 ft. back from the sidewalk and under the floor above, thus affording protection for the entire length of each truck.

The trucks are charged at night when lined up at the platform. A charging board has been installed at one side of the platform and six plugs, placed along the platform wall, make it a simple matter to hitch up the truck batteries for charging. A small board has been installed in the engine room at the rear of the plant to take care of the three electrics housed in the garage. The engineer and his assistants are in complete charge of the battery work, as well as any maintenance work.

The managers at each of the nineteen Automats make up a list of the food supplies needed for the morning, noon and evening meals. These orders are sent by messenger to the plant, where they are prepared by 175 bakers and cooks who are constantly employed. Here the portions are measured or weighed and each is packed separately. These orders are then placed on shallow pans 15 by 20 in., which are in turn collected by the driver and his helper for his particular delivery area.

Six Automat trucks may be loaded or unloaded at one time at the Horn & Hardart plant in New York City. Sidewalk loading has been eliminated by locating the loading platform inside the building. The trucks are garaged here at night and also charged, the charging plugs being placed along the wall of the platform.

The bread and pies are made in the bakery on the first floor and the special meat dishes, etc. on the second floor. The bread is placed in boxes and carried on four-wheeled trucks to the loading platform. The pies, which are placed on trays, are carried in rack trucks. An elevator, whose lower entrance is on the loading platform, is used to carry the special meat dishes. As these are carried on trays, rack trucks are also used.

The deliveries of the day begin at 5 a. m., bread and rolls and other breakfast supplies being carried. The second trip starts at 9 a. m., providing for the luncheon hour. The 2 o'clock trip takes care of the requirements of the supper hour, while a special round is made at 9 p. m. to meet the needs of late diners. All of the vehicles are required for the three

A charing board is placed on the loading platform where it is useful during the day for boosting the truck batteries that have run down. The batteries are boosted at the noon hour when the trucks are being loaded. All food carried in dishes is placed on the trays, which are slid on rack trucks and conveyed to the loading platform. Milk cans, etc., are carried on hand trucks trips during the day. Some of the trucks supply three restaurants, while those which serve the larger places carry food for but two. Only two trucks are used for the fourth trip, as the demand is not so heavy at night. These are able to supply all the restaurants in the city.

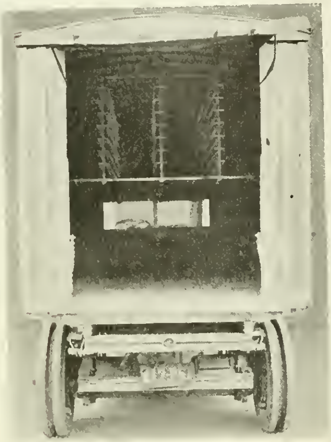
Advantages of Electrics

The electric trucks were found particularly desirable for this work because they are clean and odorless, an asset in the haulage of pastry, cooked meats, etc. Their speed being limited to only twelve miles per hour helps to eliminate to a great extent breakage of dishes and the spilling of fluids through careless driving. The slow speed of the trucks and the fact that there is little chance for overloading them has also eliminated excessive wear and tear on the vehicles. As a result, little repair work is done. Outside of the few minor repairs and monthly inspections, the trucks require scant attention in that respect. In addition to the foregoing features, the company has saved much in its operating expenses by the employment of drivers who do not command as high salaries as gasoline truck drivers. Little skill is needed to operate an electric and as a result, they are particularly handy for delivery purposes in the heavy traffic of the congested area in which they are employed.

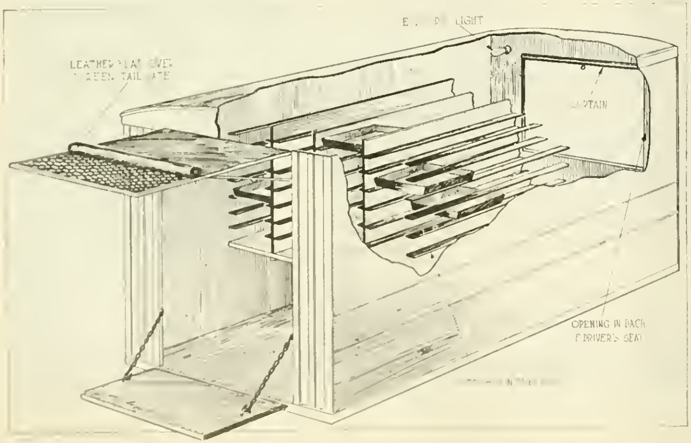
Bodies Important

The trucks are painted brown and the bodies are unusually wide and high. They are 6 ft. high and wide and 11½ ft. long. Within the trucks there are four racks into which the shallow pans are slid, each vehicle having room for from 160 to 175 pans. Below the racks there is clearance enough to take care of all large packages. Barrels of sugar, baskets of bread, cans of milk and freezers of cream are carried in this space.

On account of the length of the bodies, it is necessary to have access to the pans and so forth at the front as well as the rear. As a result the front is left open. The food products are protected from dust and rain by the windshield on the dash and also by the side curtains of the cab. All inaccesible pans, placed at the middle of the racks, are slid out by means of a hooked rod. In order that there will be no difficulty in getting at the pans during the unloading periods, the orders to be delivered to the last Automat are placed at the middle of the racks. The space at either end of the racks is used for the earlier deliveries.



Rear view of an Automat truck showing the shelves for carrying the trays of cooked foods



All food, pies, etc., carried in trays, are placed on shelves running the length of the truck. Milk cans, boxes, etc., are carried below the shelves. From 160 to 170 trays can be carried by one truck at a time

Bodies Electrically Lighted

All of the trucks have electric lights on the inside to enable easy handling of the trays, etc. at night or during dark days. These lights are placed at the front end of the body, directly back of and within easy reach of the driver.

One of the most important features in regard to cutting down the operating expenses of this fleet of electric trucks is the use of the by-products of the heating plant. These by-products consist of electricity and steam. The electric generators which produce the current employed to operate the machinery power, etc., may also be utilized to supply the current used for charging the electric vehicle batteries.

Own Current Used

Instead of paying the Edison company 3½ cents per kilowatt for current, the Horn & Hardart Co. saved itself 1½ cents per kilowatt by generating the current itself, the cost being 2 cents. Figuring on the basis that the battery consumption per day is 12 kilowatts and multiplying this figure by nine, representing the number of trucks on the road each day, and by 300 working days per year, the total kilowatt consumption for a year is 32,400. At 2 cents the cost of generating a kilowatt in its own plant, the total for the year for the 32,400 kilowatts is reduced to $648, a saving of $486.

The Battery Service

The batteries, which are of the Edison type, are cleaned off once a year with steam and painted with vasoline. Every three months an inspector from the Edison plant makes a visit to make tests on the batteries. He makes a report to the owner and also to the Edison factory. As a result of these reports, Horn & Hardart can tell whether their batteries are receiving the best of attention from the repairmen. Most of the wear that occurs in the electric trucks is in the controller fingers and battery jumpers. Occasionally the drivers will carelessly forget to start the trucks slowly, and as a result the battery jumpers will burn out. In order that the drivers may not be unnecessarily delayed while on their deliveries through such an occurrence, each truck is equipped with several battery jumpers that can be easily installed to replace the burned-out ones.

A Short Story on Truck Instruction Books

Disregard of Instructions Causes Serious Lubrication Troubles on Oil Tank Trucks

ARE you paying big bills for engine repairs on your trucks? If you are, your first step should be to find out whether your drivers—or the men responsible for the daily and weekly care of your trucks—are reading the instruction book issued by the truck manufacturer.

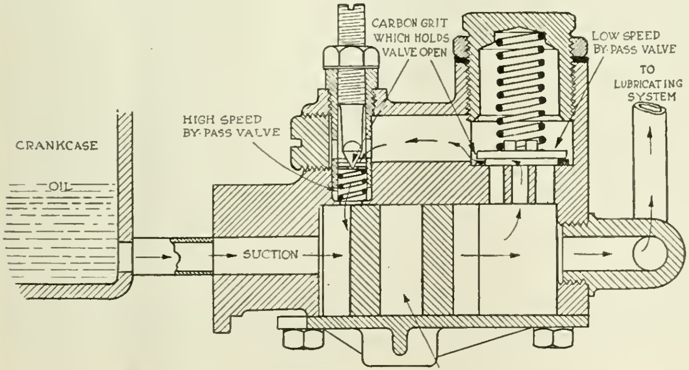
These instruction books are not advertising matter. They are supplied to the new owner when a truck is sold and they contain information, attention to which will save you hundreds or thousands of dollars, according to the number of trucks which you employ. But it is not sufficient that these books should be read once and the instructions more or less memorized. They should be referred to constantly by the men in charge of the welfare of your trucks. Moreover, the instructions must be observed in every detail, all the time, if your trucks are to last their normal span of life.

Results of Neglect

Let us take an example. The Texas Co. is one of the largest oil distributing companies in the United States, operating something like 600 trucks with tank, stake and combination bodies. The main office for the New York district recently received a report from the Philadelphia branch complaining of the high repair costs on Pierce-Arrow 2-ton trucks. Some ten or eleven trucks had apparently been laid off within a short space of time because of burnt bearings, scored cylinders or other defects due to faulty lubrication. On the other hand, the force feed oil pumps on all these trucks were working and there was a sufficient level of oil in the crankcases.

Now let us turn to the instruction book on the 2-ton truck, issued by the Pierce-Arrow company. In one part the instructions read: "There is no one thing which is the cause of more trouble and expense in the maintainance of the mechanism of a truck than insufficient lubrication." In another place the book states one of the duties which should be performed *weekly* in caring for the 2-ton truck. This read in effect: "Empty the crankcase of the old oil and refill it with six pints of cylinder oil." The book adds: "Change oil more frequently, if necessary, draining out old oil first."

On receipt of the above-mentioned complaint the New York office of the Texas Co. sent an inspector to investigate the condition of the 2-ton Pierce-Arrow trucks at Philadelphia and locate the trouble. The inspector found out almost at once what was wrong. The men in charge of the trucks had neglected to empty the old oil in the crankcase sufficiently often, or had not emptied all of it. As a result, an ever-increasing amount of unvaporized kerosene in the explosive mixture had seeped down the cylinder walls and into the lubricating oil, thinning it and reducing its lubricating qualities. Moreover, in some cases, carbon grit or other obstructions in the old oil had become lodged under the two valves of the by-pass, holding these valves open. The pumps were in good order and there was plenty of oil in the crankcases. But with the valves open, the oil lines were "short-circuited," so to speak, and thus oil was not pumped to the bearings at all. Consequently all sorts of trouble due to insufficient lubrication ensued.



The above is a sketch showing the way in which carbon grits may hold the by-pass valves open, allowing the oil to be short circuited through the valves. When this happens, little or no oil is pumped through the lubrication channels. The sketch is based on a drawing from The Pierce-Arrow instruction book.

A glance at the accompanying sketch will illustrate how dirt will cause a short-circuit through the by-pass in the oil pump of a 2-ton Pierce-Arrow. The pump is equipped with a by-pass containing two valves, one for low engine speed, which allows a small amount of oil to pass back into the pump suction chamber when the engine is turning over slowly and the oil pressure is low. The other, or high speed valve, allows a greater quantity of oil to pass back into the suction chamber when the oil pressure reaches about 30 lbs. The function of this by-pass is to prevent an unnecessary amount of oil being pumped through the bearings and thrown onto the cylinder walls, which would result in the engine smoking and possibly in the spark plugs becoming sooted or fouled.

In order to prevent a recurrence of the conditions mentioned above, it was merely necessary for the Texas Co.'s inspector to make sure that the men in charge of these trucks entirely emptied the crankcase at least once in every 10 days. But the point to be made here is the fact that the men in charge of the trucks thought all was well, because the pumps were working and there was plenty of oil in the crankcase. The fact that all was far from well was not recognized because the instruction book had not been obeyed in every particular.

Moreover, it must be remembered that this is only one example of the defects and damage which result from disregarding the instruction book. There are many other parts of a truck which require special attention in minute detail. In order that this attention be of the best, it is not only important but absolutely essential that the instruction book be read and *observed* in every particular by the men who are responsible for the trucks.

DEPARTMENTIZING Truck Repair Work

Get This Idea—It's Worth Money to You

DEPARTMENTIZING shop work is one of the steps forward in the maintenance of a fleet of trucks. Especially when a fleet is large, is it advisable to divide up the repair work so that the operations may be handled by separate departments. By departmentizing the shop work, the repairmen become specialists and the whole repair organization is put on a more systematic basis. Take, for example, the maintenance department of the Shults Bread Co., which operates 165 trucks throughout New York City and the surrounding territory. In the Hoboken, N. J., repair station of that company, the repair department has been divided into five parts. These are so arranged that the work of each department will dovetail without interfering with that of the others and the men have become specialists in the various repair operations.

The first department takes care of the engine work; the second of all adjustments; the third of machine shop work; the fourth of all heating and welding; and the fifth, of body repairs, etc. All confusion has been eliminated. Each department has its own tools and benches. When a truck comes in for overhauling, instead of having five or six men working on separate parts of the truck at one time and one place, the work is segregated in different departments. Thus all crowding and confusion is avoided.

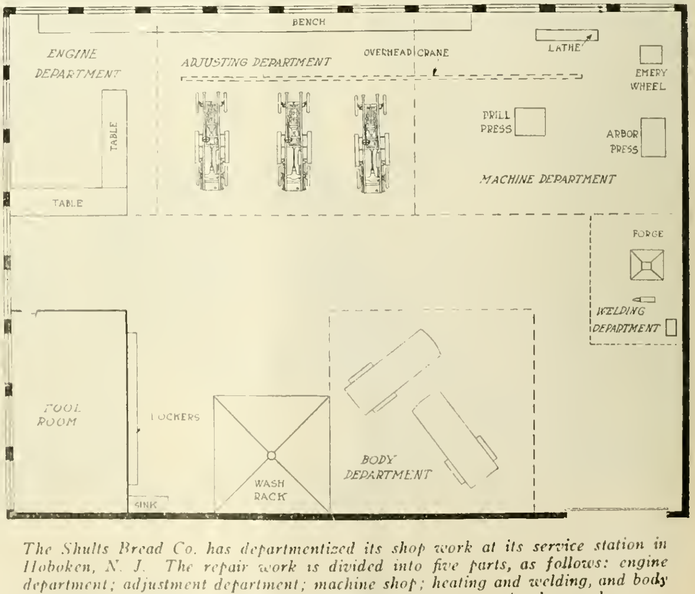
The placing of the departments along the wall space has left the center of the shop open for incoming and outgoing trucks. The overhead track, which is 60 ft. long and runs the width of the adjustment department, extends at one end into the machine shop and at the other end into the engine department. The engines are lifted out of the frame by means of a Peerless 2-ton hand hoist running on the overhead track.

The adjustment department, under the supervision of the foreman determines whether a truck needs a thorough overhauling or not. If so, the men in the engine repair department come over and lift out the engine and take it to their department. While they are working on the engine, the men in the adjustment department are busy on the frame, etc. The machinists are given all work; the heating and welding department is called on for repairing or making new springs, etc., and the body department is busy on repair work or making new bodies. Apropos of the body department, it is best to state that before a truck is put in the hands of the adjustment department, the body is lifted off first in the body department.

The engine department personnel consists of two mechanics, especially trained as engine men. These two men take care of all of the bearing repairs, etc., and make all road tests. All cylinder reboring is done at a different garage at Jamaica, L. I.

Two mechanics work in the adjustment department. They take care of all small repairs and adjustments, as directed by the foreman. One mechanic operates the machine shop equipment, which consists of an 18-in. swing lathe made by the Rahn-Larmon Co., Cincinnati, Ohio; a power hack saw made by the Millers Falls Co., Millers Falls, Mass.; a drill press made by Manning, Maxwell & Moore, New York City; a grinder, and an arbor press made by George Pfaff, New York City.

All heating and welding work is taken care of by one mechanic, this department being placed along the side wall leading to the entrance. The equipment in this department consists of an oxy-acetylene welding outfit, a forge made by the Buffalo Forge Co., Buffalo, N. Y., and a kerosene torch made by the Hauck Mfg. Co., Brooklyn. Frame straightening, etc., which needs a large flame for heating, is taken care of by the kerosene torch, which has a flame width of 3 in. The forge is used for making springs, etc. The body department work is taken care of by two carpenters.



The Shults Bread Co. has departmentized its shop work at its service station in Hoboken, N. J. The repair work is divided into five parts, as follows: engine department; adjustment department; machine shop; heating and welding, and body work. The location of the departments in the garage is shown above.

Elevated Repair Pit Improves Mechanics' Work

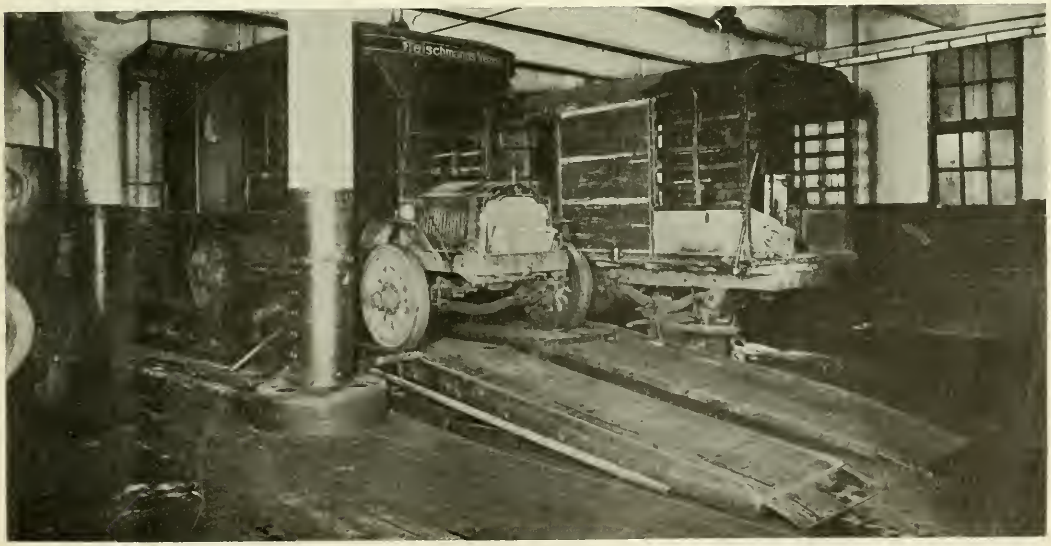
Provides Comfortable Working Position and Gives Better Light on Chassis Parts

IN many repair shops it is inconvenient to provide pits by which the workmen may gain access to the under portions of a truck. A very practical elevated pit which provides plenty of space for working under a truck is shown in the accompanying illustration. Though there is not enough room for a repairman to stand up while working, he is nevertheless given more freedom in getting at inaccessible parts of the under portion of the truck than were he forced to work while the truck was standing on the garage floor.

The wooden platform type of pit, as shown in the accompanying illustration, allows the repairman to sit while working. The pit being elevated, has eliminated the usual problem of getting proper ventilation. Cleaning a pit of this type offers fewer difficulties than in the pit of the sunken type. The latter type is often rendered useless after the garage floor has been washed, as the water from the floor often collects in the pit, making it impracticable as far as working conditions are concerned. With good lighting conditions nearby, the workman receives the benefits of these when a truck is elevated. With the depressed type of pit, he is often forced to use artificial lighting, unless the lighting facilities are excellent.

The elevated pit, as used by the Fleischmann Yeast Co. in its New York City garage, consists of a stationary platform and two skids which form an inclined runway to the platform. The latter, like the two skids, has an open space in the middle. This open space serves as the pit. The truck is elevated 2 ft. off the garage floor. Both the runway and the platform tracks are 2 ft. wide, thus allowing sufficient width for trucks with dual tires. The platform tracks are 15 ft. long. The skids are 10 ft. long so that the incline to the platform is sufficiently slight that the trucks can easily negotiate it. In order to facilitate steering, the skids and the platform have been equipped with strips of 1-in. boards, laid on both sides of the skids and platforms for their entire length and extending above the surface to act as guides for the wheels. Iron plates have been placed at the lower ends of the skids to save the planking from wear and tear from the impact of the truck wheels.

A device of this type offers opportunities for the expression of new ideas in construction. Instead of making the skids integral with the platform, as in the case of the Fleischmann device, the upper ends could be equipped with hooks to fit on cross rods on the platform. The skids could then be taken out of the way at night when not needed, thus giving better parking facilities. The guides used for facilitating steering would be less liable to wear were they made of angle iron instead of wood, as in the case of the Fleischmann device. Carrying out this idea for minimizing wear, the 1-in. wooden pieces laid crosswise on the plank support of the platforms could be replaced by iron plates, similar to the skids.



By means of this elevated repair pit, the workman is able to work in a more comfortable position and have better light on the under portions of the chassis than is possible with the sunken type of pit. The pit shown is in use at the garage of the Fleischmann Yeast Co., in New York City.

Installing Trucks in the Wholesale Tobacco Industry

Bodies Play Important Part in Truck Success Because of Great Diversity of Loads Carried

WHAT trucks to install and what weight capacity these should be, are problems following close on the heels of the decision to install a company-owned fleet of trucks. The facts and figures which brought the American Tobacco Co. to the decision to install its own trucks were described in the November, 1, 1919, issue of THE COMMERCIAL VEHICLE. How the trucking department and the report system were organized to handle the company's projected nation-wide fleet was described in the November 15, 1919, issue. This article deals with the personnel of the fleet itself. In later issues will be taken up loading methods and the maintenance system, as already installed, or to be installed, by the American Tobacco Co.

Although all the problems in the box on this page present facts peculiar to the wholesale tobacco business, they nevertheless apply, broadly speaking, to large fleet owners throughout the country, because the functions of a motor trucking fleet, together with possible trucking economies in the way these functions operate, are much the same everywhere.

40 Trucks in Fleet

The American Tobacco Co.'s fleet consists at present of about forty trucks split up into small fleets and distributed among the various factories throughout the eastern states. The company's investigation into the relative economy of hired trucks and owned trucks showed that in about nineteen cases out of twenty, owned trucks prove an economy of about 25 per cent over hired trucks. This is the more readily understood when it is realized that the trucking contractor's percentage of profit is not a low one as a rule, and that it is just this percentage of profit on which the company is economizing in operating its own trucks.

The present owned fleet of about forty trucks makes up about 25 per cent of the total trucks operated. But in view of the above potential economy, the company plans to increase its fleet until almost 100 per cent are owned trucks. This must be done gradually, however, because all contracts for trucking are made by the year and these must be given time to expire.

The 4 Problems

1—The number of trucks to be installed at each factory.

2—The make of these trucks.

3—The weight and capacity of these trucks.

4—The various types of bodies to be installed on these trucks for the various kinds of trucking they are to do.

Size of Local Fleet

Taking the above four problems of the fleet personnel in turn, the number of trucks to be installed at any one factory largely depends, of course, upon the volume of trucking to be handled at that factory. But there are other features also which affect the number of trucks to be installed. For example, where a factory is situated two blocks from the freight yards, one 5-ton truck will handle a certain volume of freight trucking per day. But in a different factory, where the volume of trucking is the same, but the factory is situated twenty blocks from the freight yards, it may take three 5-ton trucks to handle the same volume of trucking.

Again, one truck operating on a straight, wide, well-paved road, on which there is little traffic, can handle a volume of work requiring from two or three trucks of the same weight capacity when operating over crooked, narrow, ill-paved and congested roads. This applies when the actual distance covered is the same in both instances.

Where a factory turns out various forms of tobacco, various kinds of tobacco must be collected from the freight yards, as well as many different products used in putting up these various forms of tobacco. If the factory is situated in a large city, numerous different runs to various freight yards and warehouses must be made. Such a factory will require twice the fleet needed to handle the same volume of trucking for a factory situated in a small town and turning out one form of tobacco.

Make of Trucks

Concrete examples of this may be cited. The American Tobacco Co.'s Blackwell Durham Branch, at Durham, N. C., operates four heavy trucks of somewhat lighter capacity, while the Golden Belt Mfg. Co., one of the American Tobacco Co.'s factories, also situated in Durham, operates only one 1½-ton White truck.

The make of truck to be installed depends upon many things, including the personal taste of the man responsible for recommending the trucks to be purchased. For example, one make of truck may prove more generally reliable for handling heavy hogsheads over short runs, while another may prove better for long runs, over poor roads, at higher speed and with lighter loads. Only experiment will prove this out to a final conclusion, but it may be said here that the American Tobacco Co. operates three 5-ton G.V. electrics at its Blackwell Durham Branch, for transporting boxes of Bull Durham tobacco. The company operates five 5-ton Pierce-Arrow trucks at its Kinney Duke Branch in New York, on much the same class of trucking. While at the Richmond Leaf factory, at Richmond, Va., the fleet includes four 5-ton Federal trucks.

Heavy Whites, Packards and Alco trucks are also included in the different company fleets. The owned fleet installations have not been in being long enough as yet to give very conclusive comparative evidence on different truck makes. But up to the present, the American Tobacco Co. has found the Federal Truck, among others, to give complete satisfaction wherever it has been installed. H. P. Hatfield, manager of the trucking department, states that the Federal has stood up well and operated well up to date, and the company is gradually coming to the use of this make for its heavier truck installations everywhere.

It must also be remembered that standardizing trucks of each weight capacity is a great economy and efficiency builder for the maintenance department, because spares are interchangeable and always available for each truck. Fewer spares need be kept in stock and repairs are greatly simplified.

The weight capacity of the trucks used in the various forms of trucking depends, primarily, upon the class of goods the trucks are to handle—that is, the weight of the goods relative to the bulk. For example, it is possible to load about 7 tons of flat cardboard for boxes into a 5-ton truck, because the weight of this cardboard is great compared to its bulk. To take a more extreme case, it is possible to load something like 9 tons of plug tobacco into the usual body space of a 5-tonner. Therefore, trucks occupied in transporting these products should be of high weight carrying capacities.

On the other hand, for various reasons which wil lbe explained in a later article, it is not desirable to load more than six leaf-tobacco hogsheads onto one truck. The aggregate weight of these is about 3 tons. Therefore, a truck employed in transporting hogsehads may be a 3- or 3½-tonner, fitted with a large body. Again, not more than about 2 tons of certain classes of goods used in tobacco manufacture can be loaded in the body space of an average 5-ton truck.

The weight capacity rests, secondarily, upon the volume of goods which a truck is called upon to carry on one trip. That is, where a factory collects goods from several different freight stations at add times, the average load so collected may not exceed 2 tons. In the same way, if the output of the factory be comparatively small, regular daily shipments may be small and can be handled by a smaller truck.

Thirdly, trucks used for direct deliveries to retailers will naturally be of low capacity. The deliveries will naturally be small and the low capacity permits greater speed in making deliveries. The Kinney Duke Branch of the American Tobacco Co., in New York, uses one 2½-ton Federal and one ½-ton Ford for such deliveries, as well as other work. The Park Avenue Branch, in Brooklyn, employs one 1½-ton Federal for similar trucking.

Types of Bodies

In the tobacco industry various types of bodies should be available for trucking purposes. As a rule, hogsheads are transported on 5-ton trucks, fitted with open platform bodies and racks, as shown in the picture. These are also carried on 3- or 3½-ton trucks with narrower bodies. In this case, the hogsheads are run on the truck via the tailgate; are loaded runlatterally to the truck, instead of fore and aft, and only five are carried, one behind another on one trip. The 5-tonners are also used occasionally for cigarettes.

Stake bodies are used for barrels; cigarettes, plug tobacco, for other manufactured tobacco, packing material and for miscellaneous package freight. They are also used for cardboard, sugar, cholocate and other products used in tobacco manufacturing.

Turkish tobacco is delivered to the factory in bales weighing about 150 lbs. each. This tobacco is quite valuable and must be protected from inclement weather. It is, therefore, usually carried in trucks with panel bodies or stake trucks with covered in sides and tops. The latter are also used to some extent for local deliveries. Where smartness of appearance is an important factor.

Continued on page 422

Portable Stands Used for Body Repair Work by the Shults Bread Co.

All body repairs and painting are taken care of by two carpenters. When the trucks come in for general overhauling, the bodies are lifted off the chassis by means of a chain pulley attached to the ceiling. They are then placed on portable stands equipped with swivel castors

The Small Fleet *and Its* Maintenance Problems

3 Ways to Maintain a Fleet of 12 Trucks

Wholesale Butcher Chooses One Method and Gets Results

FOR the small fleet owner, what is the best method of garaging and repairing trucks in city districts, where rents are high? The Nathan Schweitzer Co., wholesale poulterer and butcher, garages and repairs its trucks in a public garage. The company believe this method to be the best and, accordingly, has arranged for the necessary floor space for its trucks in the Morania Commercial Garage, a modern public garage newly opened on Eleventh Ave., New York City. There the company's trucks are garaged at night and, when necessary, repaired during the daytime.

Garage in the Store

Now let us consider the three ways of garaging and repairing owned trucks that are open to the small fleet owner whose store or warehouse is located in the heart of a city.

First, the truck owner may be able to find sufficient space in his own establishment to accommodate his small fleet. If his establishment is well located from a retail point of view, however, the probabilities are that his rents are high. In this case, he is probably using valuable retail or clerical or storage floor space for his trucks. With this method, he may either maintain his own mechanic or mechanics, to repair his trucks, or he may have his repairs attended to at local service stations.

Separate Garage

Second, he may garage his trucks in his own garage at a distance from the store, in some locality where rents are lower. This method, however, has the disadvantages of necessitating a long run, unloaded, from and to the garage each morning and evening. As a general rule it also means either insufficient supervision of drivers, trucks and mechanics at the garage, or else the retention of a high-priced and reliable man to carry out this supervision. In most cases the salary of such a supervisor would not be justified by the size of the fleet. In this case again, repairs may be attended to by the fleet owner's mechanics at his own garage, or may be turned over to local service stations maintained by the manufacturers of the trucks concerned.

The above illustration shows that the Nathan Schweitzer Co. has had plenty of time to consider the maintenance problem. The original picture hangs above Mr. Schweitzer's desk and that gentleman states that it is a photograph of the company's first truck, a 2-ton Gramm, bought in 1906.

The Public Garage

Third, the fleet owner may arrange to garage his trucks at a public garage. There again, the garage rent he pays will probably be greater, the nearer the garage is to his establishment, if the latter is well situated from a retail point of view. If the garage is some distance away, where rents are lower, he will probably have less garage rent to pay but his trucks will have a considerable run, unloaded, from and to the garage, morning and evening.

In the case of a public garage, the small fleet owner may handle his repairs in any of three ways. Repairs may all be attended to at local repair stations. They may be taken care of by the mechanics attached to and employed by the garage. Or the truck owner may hire additional floor space in the garage, install his own mechanics therein, build them a work bench and supply them with the facilities necessary to handle all repairs on his fleet.

The Problem

Like many other small fleet owners, the Nathan Schweitzer Co. had only two of the above methods open to it. The company's store is situated well in toward the business district, where rents are high. Not only is there no space available in the store in which the fleet could be garaged, but it would be practically prohibitive to attempt to add the necessary space to the store or to rent or build a garage nearby.

The company's fleet consists of twelve trucks. Three of these are ¾-ton Whites, used for special rush orders and small deliveries in suburban districts. Seven of the trucks are 2-ton Autocars, employed in making city deliveries. The remaining two trucks are 3-ton Packards, used for collections and deliveries at wharves and freight stations.

This fleet is large enough to occupy a great amount of valuable space in the store, but neither store nor fleet is large enough to justify the construction of a basement or sub-basement garage with elevators for the trucks. Ramps to such a basement are out of the question, because of the congested nature of the district. The probabilities are that these same conditions apply to nine out of ten city owners of small fleets.

The Solution

After deciding that owned trucks were cheaper than hired trucks—the company's first truck was bought in 1906—The Nathan Schweitzer Co. went into the possibilities of the two garaging and repairing alternatives open to it. A comparison of costs, both immediate and overhead, showed run to build a garage close by for the company's trucks. This, however, proved to be impossible. The necessary land could not be obtained near the store.

It was then ascertained that it actually was not worth while to build and maintain a garage for comparatively small a fleet, at a distance from the store. Therefore, it was decided that if the trucks could not be garaged in or near the store in a company-owned garage, it would be less trouble and expense to arrange for the care of the fleet in a public garage. Heating, lighting, supervising and maintaining such an owned garage at a distance from the store meant a large direct expense. But in addition, it meant high overhead charges in clerical work and supervision. At that time, and since that time, therefore, the company's trucks have been garaged in a public garage.

The Advantages

The Nathan Schweitzer Co. trucks were recently transferred to the Morania Commercial Garage, a highly modern edifice completed this year. The garage accommodates about eighty trucks on the ground floor and about 120 on the upper floor, which is reached by a long ramp at one side of the building. In spite of this large floor space, there are no pillars. The garage is well drained and well lighted. The floors are of cement and there is a complete steam heating system, with radiators 8 ft. or 10 ft. from the floor.

The Schweitzer Co. decided to make its own repairs rather than to have these attended to at service stations, because, after the cost of installation, the former plan proved cheaper—for a fleet of twelve trucks—and repairs could be made much more promptly, because a service station must, to some extent, observe priority and therefore cannot always attend to repairs immediately.

The company therefore arranged with the Morania Garage for extra floor space in which the garage manager installed a workbench and lockers for the use of the company's two mechanics. Here repairs are made, when necessary, on all the Nathan Schweitzer trucks and an occasional overhaul can be made on one of these with as little loss of time as possible. Spare parts are also kept here, adjacent to the floor space occupied by the trucks. These can be used to replace worn or damaged parts with practically no loss of time, the work being done, if necessary, in the early morning or at night, when the truck is off duty.

Although the ground floor of the garage is intended for trucks and the upper floor for passenger cars, the company arranged to have its floor space and repair bench on the upper instead of the ground floor, because of the better lighting on the upper floor, where the mechanics have to do their work. These men can do practically all their work in daylight and in plenty of it, an advantage thoroughly appreciated by every good mechanic who has ever been obliged to make delicate adjustments by artificial light.

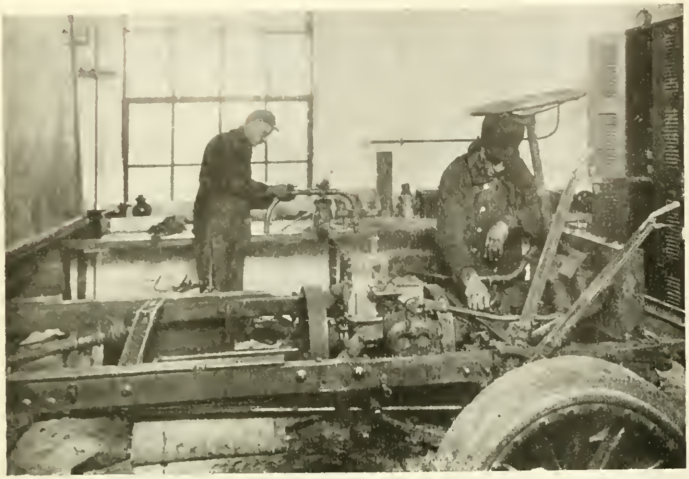
By this system the company obtains a garage for its trucks, with its own repair and maintenance facilities on the premises, without the necessity of building a garage, buying coal, keeping the garage in repair and maintaining a large staff of men, such as watchman, fireman, manager, etc., and the staff to look after the clerical work of such items as coal, electricity, upkeep, rent, depreciation, water, city ordinances, etc.

The Disadvantages

The garage is within six city blocks of the Nathan Schweitzer store, however, and the garage rent which the company must pay for these advantages is a high one. Also there are two other features of this system which present difficulties.

The first of these is the fact that a thorough supervision of the mechanics and drivers, while at the garage, is difficult if not impossible, without hiring a competent and reliable man for this work. The size of the fleet does not justify the outlay for such a man's salary. Moreover, where there are a number of workmen employed by different firms all working together, tools and spares are liable to disappear with alarming fre-

The Morcnia Commercial Garage in which the Nathan Schweitzer Co. trucks are garaged and repaired. The beginning of the long ramp which leads to the upper floor can be seen on the extreme right. Note the numerous windows. Accommodations such as these have solved the garage problem for many owners of small fleets.



The Schweitzer Company repair bench in the Morania Garage. There is a floor drain immediately under the truck in the foreground. Note the excellent lighting. Owing to the lack of an overhead crane, the truck body had to be pushed back by means of hand jacks, rollers and man power.

quency, unless someone watches them, or unless the mechanics waste valuable time taking these out of lockers and putting them away again whenever they lay them down.

The second drawback is the fact that the interests of the Nathan Schweitzer Co. are not, to the same extent, the interests of the garage owners as would be the case if the Schweitzer company owned the garage. This fact is noticeable in several ways. For example, while the garage is fitted with a complete steam heating system, it is intended and used for the most part for storage only. For this purpose no further heating is necessary other than to keep the temperature above freezing. On this account, the Schweitzer Company's mechanics are often obliged to handle metal parts in a temperature somewhere around 40 deg. Fahr., a condition calculated to take the enthusiasm out of most employes engaged in more or less sedentary work, as well as having an extremely bad effect on their health, on their tempers, and on their work in consequence.

Repair Facilities

The Nathan Schweitzer Co.'s maintenance system has one defect, the results of which serve to show the importance of a complete understanding of truck wants on the part of the delivery superintendent. At present the drivers are instructed to oil and grease their trucks every morning, before starting on their routes. The necessary oil and grease are issued to them at the store each morning. But no one individual is directly responsible for seeing to it that this work is done. As a result, daily oiling and greasing is often scamped or neglected altogether. Hence, bearings wear out and parts are damaged long before they should be, with proper care, and the mechanics find it necessary to overhaul trucks as often as three times a year, when a complete overhaul should not be necessary more than once a year.

An Autocar was left in the garage recently, for overhaul. The mechanics removed the body and on inspecting the various oil and grease cups on the chassis found them caked with dry mud. Moreover, there was about half an inch of old oil in the crankcase. It was quite clear why the truck had not been running satisfactorily and had required overhaul. By the appearance of the various running parts it had had little or no oil for at least a week. The driver apparently had not taken the trouble to oil it and there had been no one to make sure that he did this work. Of course, no truck can remain efficient under such treatment and it speaks well for this one that it was able to run at all.

There is a very simple remedy for such a state of affairs. If the mechanics at the garage are given a certain amount of authority over the drivers, they can then be held responsible for the condition of the trucks, for it can be left to them to see that the drivers do oil and grease their trucks. Every night, then, when the trucks return to the garage, or every morning before they leave, the mechanics can inspect all the trucks. It is a simple matter for a trained mechanic to tell at a glance whether a truck is or is not receiving proper care, as regards oiling and greasing. Thus if the mechanic is himself held responsible and is given sufficient authority, he will see to it that the drivers do not scamp this work. Then if bearings burn out through insufficient lubrication, necessitating costly repairs, the blame can be fixed on an individual and steps can be taken to prevent a recurrence of the same condition.

As matters are now, the drivers find plenty of time to smoke and chat before starting for the store in the morning, but when the mechanic suggests a little oiling, the average driver either has no time or has no oil can. A driver who said recently that he had no oil can, was found, by the mechanic, to have not one but two oil cans stored away in his tool box, a fact of which he appeared to be in total ignorance. This single instance is sufficient to show an inherent weakness in a system which does not provide for proper supervision in this regard.

The Nathan Schweitzer Co. has ordered a drill; lathe; a crane and a press machine to be installed at the mechanics' bench in the Morania Garage. These facilities have not arrived as yet, however.

Road Repairs

In this connection it is of interest to note the effect which the lack of such facilities has upon the time consumed in making repairs. In overhauling an Autocar, recently, the mechanics found that without a press available, it would be necessary to send the clutch shaft to the Autocar service station in order to have the spider pressed off. This part was sent accordingly, but owing to the stress of work at the service station, was not returned for several days. In the meantime, work on the truck was held up to some extent, and because the truck was idle in the garage and there is floor space for repairing only one truck at a time, no other truck could be taken in for repairs. This meant about four days' work wasted. On the other hand, the mechanics estimated that with the proper facilities the job should have taken them about 35 minutes. The time actually taken was over a week!

The outstanding advantage of a company-owned repair system—that is, of maintaining mechanics and re-

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A Good System for Repairing Truck Radiators

DESCRIPTION OF TOOLS USED AND METHODS EMPLOYED

SYSTEM and cleanliness are two big factors that fleet owners should watch out for in the maintenance of their trucks. A repairshop may be completely equipped, but if unclean and disorganized, the work turned out is liable to be poor.

Radiator repairing is an operation which requires more attention to cleanliness than the usual garage work demands. This work should be departmentized. All tools, equipment, and storage facilities used in that particular operation should be grouped so as to not only save time but to better organize the work.

The accompanying illustration shows the radiator repair department in O'Maley's Kansas City service station. O'Maley handles the Ford truck. One feature of the department is the stand used to hold the radiator while it is being worked on. Each stand rests in a sheet-iron pan to catch the drippings after testing the job. This means a clean floor and the workman does not have to stand in water.

Convenient Stands

These stands are constructed so as to form a cradle for the radiators. The cradle is built at a height of 3 ft. from the floor so as to offer the best possible working conditions by bringing the radiator nearer to the mechanic and eliminating any tiresome stooping. The water testing tank is mounted at the same height from the floor for the same reasons. It is placed next to the stand, thus minimizing the effort needed in carrying the radiator from it to the stand.

Supplementing this elimination of waste motion and effort is the manner of placing of the radiator storage racks. Instead of storing them in the stockroom, usually some distance from the workbench, the radiators have been placed in a specially built rack, composed of three platforms. This rack is within convenient distance of the mechanics.

The O'Malley radiator department equipment consists of the stands, tank, air pressure indicator, water connection, oxy-acetylene outfits, vise, and tools.

The usual waste of time in opening drawers or looking for tools spread all over the bench has been eliminated by the use of shelves, mounted above the bench and occupying the space across the windows. Here the tools are within convenient reach of the mechanics and afford him an opportunity to quickly pick out the desired device without the need of searching through a drawer.

In order to lay hot pieces of metal on the bench without the chance of a fire, the bench has been covered with sheet metal. This not only eliminates possible fires but saves the bench from wear and tear during hammering, etc.

Repair Hints

To solder a leak in the tube of a radiator necessitates some delicate work. The amount of skill that is required depends largely upon the position of the leak. Assuming that it is in such a place that it can be reached with a little care, the method of procedure is as follows:

Set the radiator in some position where it can be worked on in a good light. Put a small piece of emery cloth on the end of a thin stick or rod and work down into the space between the tubes, rubbing the metal along the leak until it becomes bright and clean. This must be done thoroughly if the ultimate work is to be a success. This will take some time if done right and can be handled best if the radiator is tilted up in some such position as shown in the illustration.

Immediately after the metal has been cleaned and before it has a chance to oxidize and become dull, apply the flux, which should be zinc chloride. With the oxy-acetylene welding outfit or with a thin soldering bit, heated to a cherry-red color, heat the metal to be soldered after it has been coated with the zinc chloride. If using a heated rod, another rod should be used. This should be heating in the blow torch flame so that before the metal will have a chance to become cool, the solder can be applied. The solder should be in the form of a narrow strip or else it will not be small enough to insert into the small aperture within which the work has to be done.

Strip— Solder

To make the strip solder, it is only necessary to heat a bar of solder and pour it into a vessel containing a small hole, as the solder is poured in, it will leak through the hole in a fine stream and by running this stream along a metal surface a thin strip of solder will be produced.

This solder is applied by a red hot bit or by the flame of an oxy-acety-

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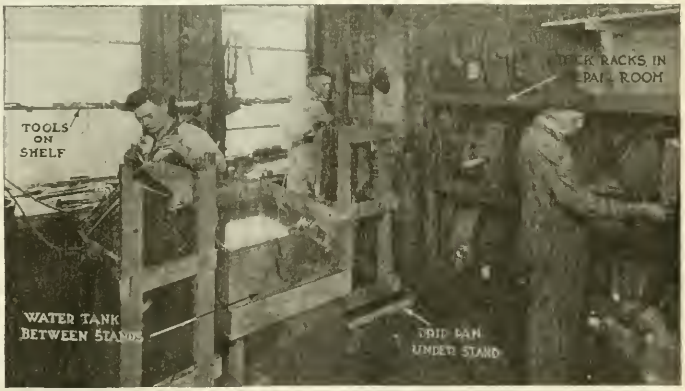


General layout of the radiator repair department, showing the two stands with the water testing tank between and the stock rack nearby. Note also the drip pan under each stand and the shelves for tools in front of the windows.

CLEANLINESS Is First Essential in Successful Garage Operation

Numbering Truck and Trailer Storage Stalls Also Helps to Avoid Confusion and Delays

VISITORS who inspect the garage, fleet, and repair equipment of the Victor Talking Machine Co., Camden, N. J., are astonished at the immaculate appearance of it all and the splendid condition of the different units of transportation, especially when it becomes apparent that they are in constant hard use. But when the size of the garage force handling the trucks, tractors and trailers and keeping them efficient is known, the wonderment that so few men are able to do it, increases.

"Attention to every detail, scrupulous care of all mechanisms and instant repair or adjustment of anything gone wrong—in short, system, does it," says Robert S. Burns, superintendent of the trucking department.

At any time of the day, when one of the motor trucks or tractors enters the garage, the hand can be passed heavily over any part inside the hood and withdrawn without showing a stain from grease or any trace of dirt. Brass, copper and all other metal parts shine like the brass rail of a ship saloon. This cleanliness of motor and other parts is insisted upon. Nothing has a chance to clog or get out of gear from collection of dirt, grit, excess grease, or any foreign matter. In this is found the beginning of the reason why the fleet, large and diverse as to units as it is, always is at topnotch efficiency.

The Fleet Make Up

The fleet at the present time consists of twenty trucks and tractors and twenty seven trailers. The trucks consist of fifteen 5-ton Pierce Arrows and one 2 tonner. One ¾-ton Dodge Bros. truck is employed for special deliveries and as a service car in case of accidents. Then there are three 5-ton Pierce Arrows made up into short wheelbase tractors and used in connection with eighteen 7-ton Troy four-wheeled trailers and nine 5-ton Troy trailers of the same type. In addition to this fleet engaged wholly in the transportation of goods, there are two six-cylinder Buick passenger cars employed for payroll distribution and a 2-ton Pierce-Arrow fitted up as a chemical fire engine. An additional 5-ton Pierce-Arrow truck; six 7-ton Troy trailers and three 5-ton Troy trailers have been ordered and are awaiting delivery at this writing.

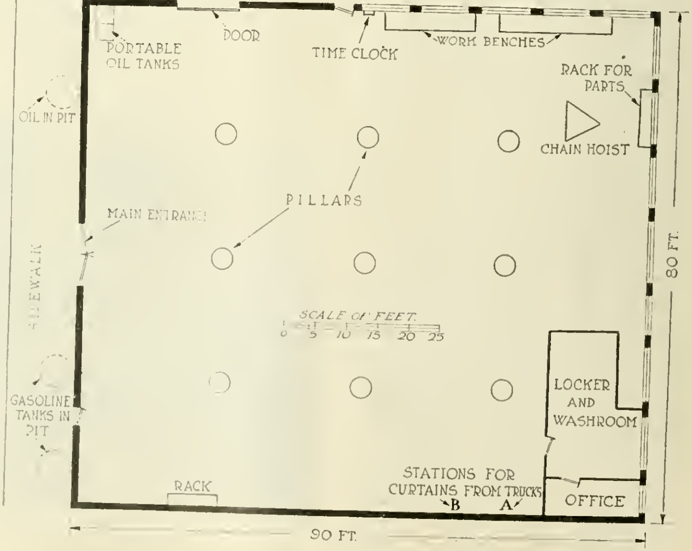
It was early learned that the drivers prefer to have their helpers do the lubricating of trucks and tractors, so now each driver is accountable for the manner in which his particular helper attends to this duty. Accordingly, lubrication is thorough, the helpers turning the grease-cups every night, after work on the outside is done, or during the dinner hour.

Every 2 weeks all oil is drained from the engines and other lubricated parts, collected in a can and sprayed with an air compressor on the springs of the trucks and tractors, which are then rubbed with waste. Fresh oil is applied to the parts so drained and each engine is thoroughly cleaned.

Not only do the trucks and tractors get daily and nightly inspection in the garage, at which time all nuts and bolts are examined and tightened when loose, but every Saturday night there is a brief, but thorough inspection of all the vehicles as soon as they are off the street.

The paintshop in this plant is under the direction of the superintendent of buildings. But each vehicle to be painted first gets a thorough overhauling in the garage before it is sent to the paintshop. The trucks and tractors are painted in the summer, unless there is some special reason for doing it sooner, and the trailers in winter. The trailers used for transporting lumber are stored in the company's lumber yard and are exposed to all kinds of weather the year around, so early winter is considered the best time to give them their protective coats to withstand the season's wear and tear.

Immediately after the general overhaul, preparatory to being sent to the



Plan of the Victor company's garage, showing the shop layout; the location of the columns; the locker room; oil and gasoline tanks and the position of the main entrance and exit door paintshop, each vehicle goes to the wheelwright for examination for needed adjustment or repairs. While the painting is annual, any vehicle whose exterior becomes dull, is given a coat of varnish as soon as it needs it. The body painter is an expert and has one helper. There are two washers for the vehicles in the garage.

While it seems remarkable that it is necessary to have only three mechanics for the repairshop—a boss and two helpers, the reason for such a small mechanical force is in the fact that the drivers and helpers, by the system in force, make a special effort to keep all vehicles out of the repairshop which handles only minor repairs.

Proof that this care is exercised is noted in the shop equipment, as well as in the vehicles themselves. The larger types of shop machines are lacking, as they are not needed. A workbench supplied with the usual small tools, including vises and reamers, occupies space along the wall in an unenclosed portion of the garage. Nearby is the chain hoist used as accident equipment. It is also used in lifting fronts and rears of trucks, as well as motors, which are placed for overhaul and repair on a Continental motor stand.

Spare Parts Carried

Extra equipment for the fleet consists of a front axle; one full set of wheels; two magnetos; one carbureter and three radiators. Such a small supply of reserve stock is about all that has been found necessary to carry.

Most of these articles are kept on a three-story iron rack in the rear left-hand, or shop portion, of the garage, as one enters. In the shop also are portable electric drills; a 150-pound air compressor and an emery wheel for grinding. The repairmen work on magnetos and the lighter forms of repair and adjustment, but as already mentioned, if heavy work is required, the Pierce-Arrow service station is called upon.

The ¾-ton Dodge Bros. truck already mentioned as being used in road emergencies, carries at such times the usual small wrecking car kit containing tools of various kinds such as wrenches, pliers and pullers, with small parts. Should a wreck or a breakdown be reported to the garage from the road, the Dodge would run to the scene carrying jacks, towing chain and the other needed heavy equipment. If the wreck were a bad one, one of the trucks would be rushed out, carrying a small chain hoist on arch supports, or it might be placed on a trailer, and used as a crane. Wherever possible, so as not to interrupt the work of the force in the repairshop and garage, the Pierce-Arrow service station nearest to the scene of the accident would be called on for assistance.

Trucks at their alphabetical stations in the Victor Talking Machine Co.'s garage in Camden, N. J.

Robert S. Burns, Superintendent of the Trucking Department of the Victor Talking Machine Co.

Gasoline is purchased in 550-gal. lots, there being two tanks of that capacity in a pit in front of the garage, near the main entrance. There are no exterior pumps, all pumping being done on the inside of the building at the right and left of the main entrance. Lubricating oil is purchased in 600-gal. allotments and this also is placed in a pit outside, in front. Cup grease is purchased by the pail.

In addition to the rigid fire precaution rules, there are patent extinguishers placed about the walls and on the pillars for additional safety. The chemical engine truck is always ready for duty.

Colored Pipes Used

In line with the policy of systematizing to get the best results in the shortest time and with the least expenditure of effort, the piping system in the garage, as in the other buildings at the plant, is designated by colors. The heating of the garage, which is 80 by 90 ft., with a 20-ft. drop from floor to ceiling, is by means of steam and hot water. All this heating apparatus is overhead to get it out of the way. Four broad, rectangular coils on the ceiling in front, heat the central portion of the building and four narrower ones heat the sides.

There are three large doors in the front and one on the left-hand side as one enters the building, but the heating system is very efficient. The steam pipes and coils are painted black and white. The hot water heat pipes climbing the big pillars and spreading over a portion of the ceiling is designated by red pipes with blue joints; the piping for the cold water for garage use is done in blue; the water pipes for the fire department are shown by red and the electric lighting conduits are yellow. The color effect on the visitor is striking. With such a network of piping, it is easy, nevertheless, through this color scheme, to avoid confusion in emergency.

Besides a rack or two for cans, poles and parts, there is little further

Section of locker and washroom in the Victor Talking Machine Co.'s garage.

maintenance arrangement for the fleet than already pointed out.

Indicative of the orderly manner in which the garage is conducted, each truck, trailer and tractor has its particular station plainly designated by letter or figure. Each set of truck body side-curtains, suspended, when not in use, on bars along the walls, has its own position. The stations for the different kinds of vehicles are denoted by large, easily discernible stenciled letters and figures. Numerals are used to designate trailer stations and letters to denote stations for trucks and tractors. Some of these stations are stenciled on the wall, under which are suspended in sequence the tarpaulin curtains for each truck, together with its robes.

As it is necessary to have considerable space in the front part of the garage for incoming and outgoing vehicles, most of the stations are lettered on the ceiling and the truck or tractor designated, takes its stand at night under the symbol assigned to it. By this system there is no confusion of vehicles, their curtains, robes, or other appurtenances and each driver in a second can lay his hand on the property under his charge.

Conveniences for Deliveries

The company has made every arrangement for the convenience and comfort of the men. Alongside of the garage office, which is partitioned off, is a good-sized locker and washroom section. A long row of stationary washstands lines one side and in the rear are individual ventilated steel lockers and also along the wall on the side opposite the washstands. There is, in addition, a row of lockers for the mechanics and washers at the lower end of the garage, adjoining that portion of it assigned to the repairshop.

No smoking is allowed in the garage and there is every precaution to prevent fire and to extinguish it.

The drivers assemble in the garage by 7 o'clock in the morning each weekday. After receiving orders for the day and his Daily Report Card, to be filled out by him, each driver inspects his vehicle.

While each machine is gone over at night as well, the morning inspection, to see the truck is in proper shape for the day's work, is not omitted.

Vehicles that are to be used first during the day, are dispatched first. The trucks, tractors and trailers begin to leave the garage about 7:15 and the dump body trucks also leave early. It is a rule that the building must be vacated by drivers and trucks not later than 7:30. The cabinet and record department trucks are off for their platforms by 7:15. Some of the trucks, for instance, will stop at the following platforms for loads: One platform at the cabinet manufacturing department, four platforms at the general storehouse; one at the motor manufacturing department; two at the record manufacturing department, one at the shipping department and one at the storehouse known as the Boyd building.

The vehicles re-enter the garage for the night, from 5 p. m., to 5:30 and the rule is rigid that the last truck must be inside not later than 5:30. A uniformed guard is on hand to close the doors as soon as all vehicles are in and the men are through looking over their trucks. The mileage of each truck and tractor is taken at night and recorded.

But it is quickly recognized that garage efficiency, beginning with clean gear; the tightening of every nut and screw daily, or nightly; weekly inspection; thorough yearly overhaul; painting and varnishing; attention to wheels and the draining and replenishing of oil, added to careful driving requires only this minimum of shop force and repair equipment.

Commerce to Increase Production

Detroit, Dec. 13.—The Commerce Motor Car Co., Detroit, is making plans to materially increase its production of 1- to 2-ton trucks for 1920. In order to carry out this plan, it has just acquired 2 more acres of ground at its present location. As soon as the present additions being made are completed, it is reported that additional buildings will be erected on the newly acquired ground.

This shows, on the extreme right, how orderly is the arrangement of the tarpaulin curtains and robes belonging to the different trucks. Each truck has its alphabetical station and the curtains for truck A, for instance, will be placed, when not in use, at that particular station, stenciled A on the wall. A and B stations are here shown, next to the partition separating the office from the garage proper.

Daily Time Cards for Truck and Driver

Two Simple Forms Used by Fleet Owner to Record Truck Work and Driver's Time

THE two simple forms reproduced at the bottom of this page are all that are used by the Victor Talking Machine Co., Camden, N. J., to keep a record of the goods carried and the time worked by the drivers of that company's fleet of twenty trucks and tractors and twenty-seven trailers.

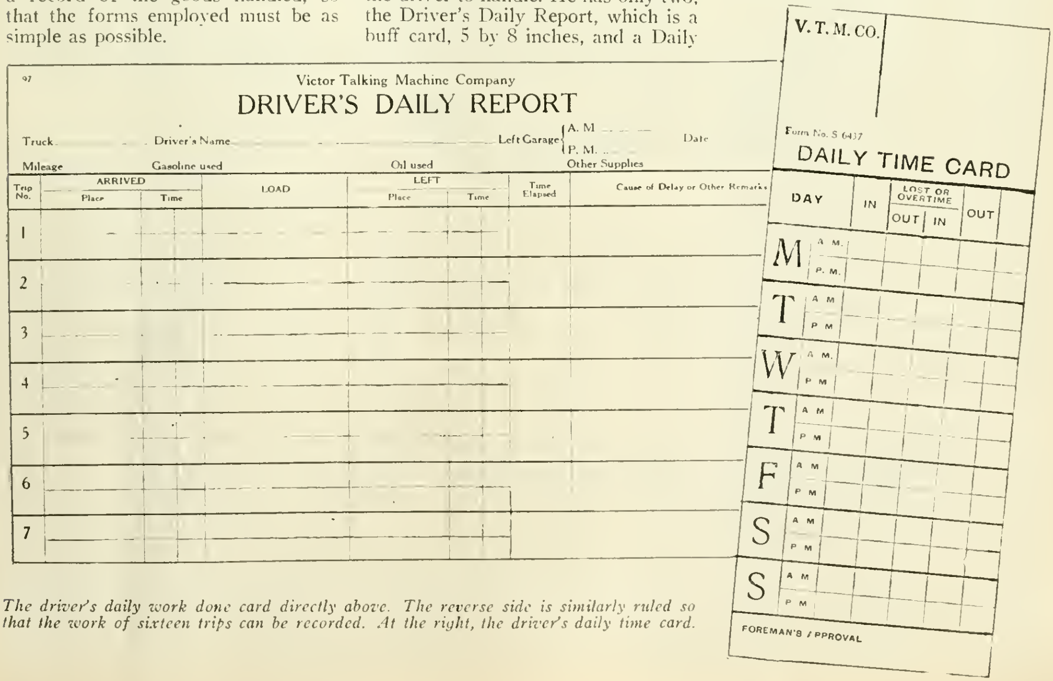
The simplicity of the two forms is significant because the bulk of the Victor company's haulage is the handling of raw and partly-finished goods between different buildings of the plant. This results in very short hauls but more trips per day than are usually made in an average business. Because of the short hauls, trailers have been of great value in that they can be loaded while the truck or tractor is moving another loaded trailer between plants. This additional trailer load has somewhat complicated the problem of keeping a record of the goods handled, so that the forms employed must be as simple as possible.

Then again, the size of the fleet of trucks, tractors and trailers has made it necessary to produce a form which can be used to record both truck and trailer loads.

The Victor motor truck department, including the garage, is operated under the supervision of the purchasing department. This arrangement permits the truck superintendent to concentrate on the operation and maintenance of the trucks and leaves the details of the cost accounting to the regular cost accounting department of the company. All that the trucking department has to do is to procure and record the truck work data each day. This data is recorded on the two forms shown on this page and then forwarded to the cost accounting department for the compilation of unit costs and average costs of different classes of truck haulage.

There is a minimum of forms for the driver to handle. He has only two, the Driver's Daily Report, which is a buff card, 5 by 8 inches, and a Daily Time Card, which folds and is combined with a Weekly Record of Time. This last-mentioned form is printed on a manila card and when folded, is 7 by 2¾ in.

The driver fills out his Daily Report at the end of each day's work and presents it at the garage office, where it is examined, checked up and copied in the office book devoted to recording such data and it is then made ready for the driver again. The same kind of card is used for trucks and tractors. The driver records on this form his name; truck letter, or tractor letter; date; time of leaving garage on each trip; destination of each trip; time of arrival at destination; nature of load; mileage; quantities of oil, grease, or other supplies used; time of leaving destination with load; elapsed time through delays and time of arrival at garage. There is a rule that if any driver is delayed on



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Victor Talking Machine Company

DRIVER'S DAILY REPORT

Truck ______ Driver's Name ______ Left Garage { A. M. ______ P. M. ______ Date ______

Mileage ______ Gasoline used ______ Oil used ______ Other Supplies ______

Trip No.	ARRIVED		LOAD	LEFT		Time Elapsed	Cause of Delay or Other Remarks
	Place	Time		Place	Time		
1							
2							
3							
4							
5							
6							
7							

V. T. M. CO.

Form No. S 6437

DAILY TIME CARD

DAY		IN	LOST OR OVERTIME		OUT
			OUT	IN	
M	A. M.				
	P. M.				
T	A M				
	P M				
W	A. M.				
	P M				
T	A M				
	P M				
F	A M				
	P M				
S	A M				
	P M				
S	A M				
	P M				

FOREMAN'S APPROVAL

The driver's daily work done card directly above. The reverse side is similarly ruled so that the work of sixteen trips can be recorded. At the right, the driver's daily time card.

the road by an accident for more than 15 min., he must call up the garage office and report the trouble and receive advice or instructions.

The Driver's Daily Report Cards are filed by truck or tractor letter; retained for 1 month after being presented and checked up when filed and are finally destroyed. Every Monday morning, the Daily Time Cards for the week just ended are sent to the accounting department in the main building for checking up.

The Small Fleet and Its Maintenance Problems

Continued from page 416

pair facilities at the company garage or on the company premises is the ultimate economy of this method. It is clear that at first, when the trucks are new and few repairs have to be made on them, it will be more expensive to maintain a mechanic and repair facilities than it will be to have the few necessary repairs handled at nearby garages or service stations. But later on, when the trucks are older and require more frequent repairing, the maintained mechanic comes into his own and proves an ultimate economy to the company. But in the case of a serious breakdown, a good mechanic and good repair facilities at the garage are not sufficient.

Suppose, for example, that a driver drains the old oil out of his crankcase and forgets to refill the latter with new oil. He starts off on his route. For a time the old film of oil on the bearings will keep everything running smoothly so that he may get some distance from the store and garage before his engine begins to make a noise that sounds as if someone had dropped two or three hammers and a few odd bolts into the crankcase and cylinders. The driver manages to deduce from this that something is wrong. He pulls up to the curb, wherever he may be, and telephones to the garage that he is in trouble. Now, unless the company maintenance system provides some facilities for repairing the truck where it stands, or locating the damage, still further serious damage will probably be done, whether the injured truck is towed back to the garage, taken to a repair station, or run back under its own power. In cases where something goes wrong with the ignition system, too, if the company provides some method of getting the company mechanic to the damaged truck promptly, an immense amount of time may be saved. On the other hand, if the mechanic cannot be brought to the scene immediately it may be necessaryto call in the assistance of some garage mechanic who is close at hand. In this case the economy of maintaining a repair system is largely reduced, if not actually counterbalanced.

Accordingly, the Nathan Schweitzer Co. has provided its mechanics with a Ford car. The car is a two-seater runabout with a small box body on the rear. In it the mechanics can run to any point on the company's routes at a moment's notice, taking with them, in the box body, any repairing tools or spare parts which may be necessary for making road repairs promptly. In this way an S.O.S. from any one of the company's trucks on the road can be promptly attended to and the truck either made ready for service again or at least prepared to be run back to the garage for more extensive repairs. This, without the necessity of calling in outside mechanics and largely increasing the company's repairing costs.

The Ford is also turned over to the mechanics to bring them to the garage in the morning and take them home at night, a privilege much appreciated by them, and is also used for purchasing repair supplies, laying in spare parts and other similar outside trips which the mechanics may find necessary.

Repairing Truck Radiators

Continued from page 417

lene welding outfit. It is carefully moved along the surface of the metal which has been prepared by the flux. After the solder is applied, the work should be cleaned by the aid of a fine file.

The probabilities are that for the first two or three attempts made on this work, the solder will drop gently from the surface of the metal and leave the leak in very much the same state as it was at first. But with the use of considerable amount of patience, the job can be made permanent.

The main part of the work is the preparation of the surface by means of the emery and flux. Some flux should remain on the surface when the solder is applied. The flux may be applied by the use of a fine paint brush. If the leak is in such a place that it is inaccessible for this work, the best thing would be to send it to the factory. The solder to be used is the ordinary medium solder to be obtained in any plumber's shop. It can also be made by melting together one part of lead to two parts of tin.

Michigan Overland Haulage

Continued from page 399

truck and one or two trailers will carry from 12 to 15 tons, maintaining an average speed of 12 m. p. h.

A company organized in Cadillac, Mich., the home of several truck factories, now has four trucks in operation over the route of the defunct East and West Railway, formerly operating between Manistee and Marion. So successful has been the venture, the company has placed orders for additional trucks and trailers and will broaden the scope of the business to include all roads in that section of the state. The railway, built to haul lumber, was abandoned when the timber supply was exhausted, and since then farmers who have developed the lands have had no way to get their products to town other than by wagons.

A new company also is being formed in Ionia, Mich., to cover the territory in that section with a motor truck express line.

Trucks in Tobacco Industry

Continued from Page 413

Generally speaking, where goods all of one class can be handled separately, The American Tobacco Co. provides a body for that class of trucking. For example, most of the heavy hauling is done at the leaf department branches. But in any case, on every truck the company buys, it provides a special body, suitable for the class of work for which the truck is required.

Buying and installing trucks may seem a comparatively simple matter, after the decision to install them has been made, an dthe financial appropriation provided. But there are many different conditions of widely different kinds which must be considered if the fleet, when finally installed, is to be operated at the highest efficiency.

Truck Mechanics

CUT OUT THE TWO FOLLOWING PAGES

IDEAS

¶The ideas expressed in the Repairshop Shortcuts shown on the two following pages may save you many dollars and much time in the upkeep of your trucks, no matter of what make or how many there are in your fleet.

¶If you have similar ideas, send them in to the Repairshop Shortcut Editor. He will pay you at $1 for each idea accepted.

HANG UP THESE TWO PAGES IN YOUR SHOP

Better Truck Repair and Maintenance

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks, The Commercial Vehicle prints on these pages better methods of maintaining trucks and the latest ideas in making quick repairs.

THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 50—Bearing Cap Held Straight for Scraping.

A SIMPLE method to hold a connecting rod or other bearing cap in place in a vise while the cap is being filed or scraped is to clamp two pieces of drill rod approximately the diameter of the bearing bolt in the vise, separating these sufficiently so that each rod will go through one of the holes in the cap. The bearing is then slipped over these rods and will be held straight so that it can be filed or scraped.—Motor World, JOSEPH CANTANELLI, Glenview, Ill.

No. 51—Frame to Prevent Wire Tangling.

SMALL wire when kept on a spool is easily tangled up if the loose end is not kept taut. A device to keep this end taut consists of a wood frame; a bolt which acts as an axle for the spool; two springs to act as a brake on the spool, through which is drilled a small hole, and a saw cut run from this hole. The end of the wire is threaded through the hole and the saw cut is narrow enough to pinch the wire, preventing it from running back through the hole.—Motor World, OLIVER WITTENMYER, Pottstown, Pa.

No. 52—Electric Motor for Sharpening Tools.

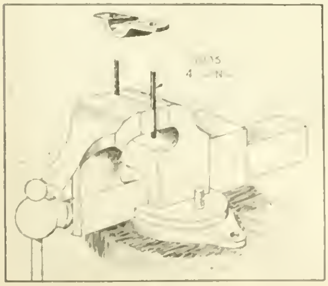
FLEET owners whose garages are equipped with a machine shop, can save over 50 per cent of the time usually occupied in sharpening lathe tools by taking a ¼-hp. electric motor, removing the regular shaft and replacing it with one which protrudes 4 to 5 in. at each end. Then fit a drill chuck at one end and a combination fine and coarse emery wheel on the other and mount the motor on the bedplate of the lathe, as shown. A stand and adjustable face-plate feeds work to the drill and a snap switch is installed on the top of the motor, which can be plugged to any convenient lamp-socket. — Motor World, C. W. CHAPIN, Bird Island, Minn.

No. 53—Bench to Hold Taps and Dies.

AN individual bench should be used for holding taps and dies, as otherwise they are likely to be mislaid and not be immediately available when needed. A handy arrangement is to have both dies and taps on boards slightly elevated at the back, with the smaller taps at the top, graduating to the largest at the bottom. Dies should be similarly arranged at the opposite end of the board, with handles side by side in the center. Nuts of proper size and thread should be placed opposite each die and bolts opposite each tap. The adoption of this method shows the truck repairman at a glance the condition of his die equipment. The S. A. E. set should be to the left and the U. S. standard to the right, with a vise placed in the center of the bench.—Motor World, C. R. PIERSON, Salineville, Ohio.

No. 54—Corked Bottle for Filling Battery.

AN ordinary corked bottle may be used to advantage for adding distilled water to storage batteries. A ⅛-in. hole is drilled in the top of the bottle to allow air to enter as the water goes out. The cork has a hole drilled in it and a glass tube or quill is inserted. The flow of the water out of the bottle can be controlled by lifting the finger from the hole. When the hole is stopped up, the water will cease to flow.—Motor World, L. BUTLER, Darien, Conn.



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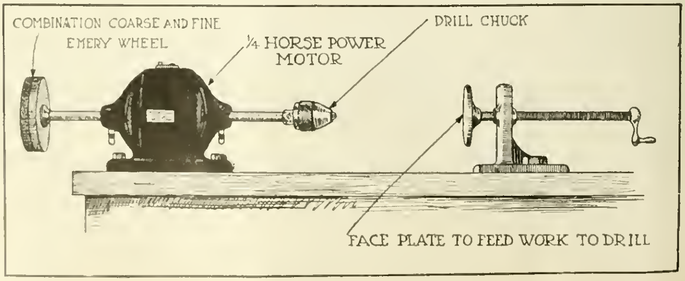
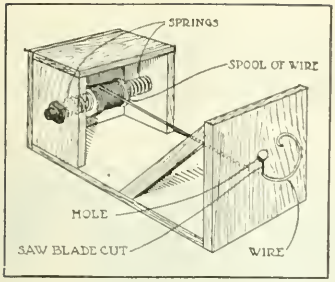

COMBINATION COARSE AND FINE EMERY WHEEL
¼ HORSE POWER MOTOR
DRILL CHUCK
FACE PLATE TO FEED WORK TO DRILL

No. 52



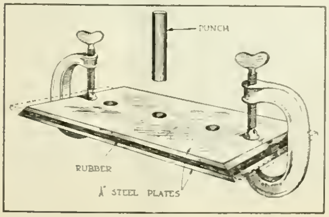
No. 51

No. 55—Spark Plug Testing Compression.

A SPARK PLUG with the porcelain removed and a Twitchell air gage inserted in its place, can be used to good advantage as an engine-compression tester. The air-gage should have its lower end fitted with two or three washers made out of an old inner tube. The gage is then set down in the body of the plug in the position formerly occupied by the porcelain and the stuffing nut of the plug screwed down to make a tight joint. By screwing this device into a spark plug opening and then cranking the engine, the gage will register the compression of the cylinder in pounds.—Motor World—OTIS GIBBONS, Roodhouse, Ill.

No. 56—Rubber Battery Tops from Cracked Jars.

CRACKED battery jars can be used in an emergency for making rubber tops for batteries. A piece of rubber from an old jar is clamped between two pieces of flat iron or steel plates, ⅛ in. thick and of the length and width that is wanted for the different size batteries. Holes of the proper size are bored in the plates and properly spaced for vent holes and posts. The edges of the plates are ground off to a bevel. The piece of rubber is then clamped between two of these plates and the whole outfit is steamed until the rubber is soft. The holes are then punched or cut with a sharp knife, the steel plates forming a template.—Motor World, KELSIE CLICK, Fostoria, Ohio.



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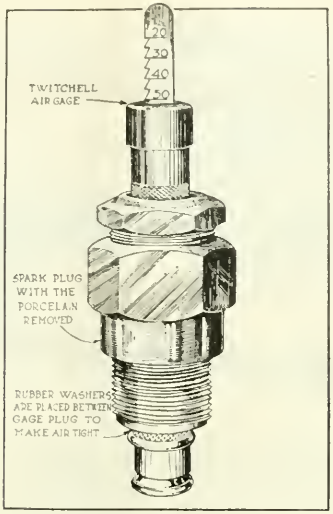
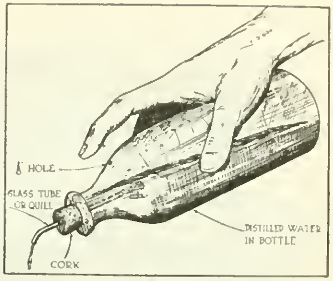

20
30
40
50
TWITCHELL AIR GAGE
SPARK PLUG WITH THE PORCELAIN REMOVED
RUBBER WASHERS ARE PLACED BETWEEN GAGE PLUG TO MAKE AIR TIGHT

No. 55

No. 57—Removing Acid by Syphon from Carbon.

WHEN trouble is experienced in emptying acid from a carboy, this difficulty may be overcome by the use of a syphon made from 5 ft. of ⅜ in. short rubber tubing. A double-ended rubber bulb and two short pieces of ¼-in. hard rubber tubing complete the device. The pieces of hard rubber tubing are inserted in both ends of the bulb and one end of the soft tube is slipped over one end of the hard tube. The other end of the soft tubing is notched to prevent its clinging to the bottom of the carboy. The carboy is set on blocks to bring it to the desired height and the notched end of the tubing is placed in the acid. Pressing the bulb and holding the finger over the open end of the tube forces the air out of the long rubber tube and upon releasing the bulb, a vacuum is formed which brings down the acid when the finger is removed.—Motor World—R. E. WALKER, Hannibal, Mo.



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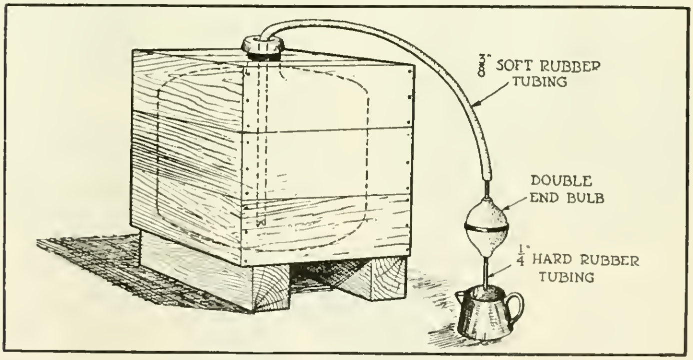

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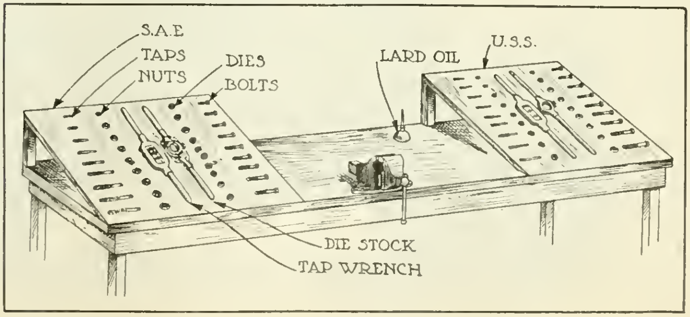

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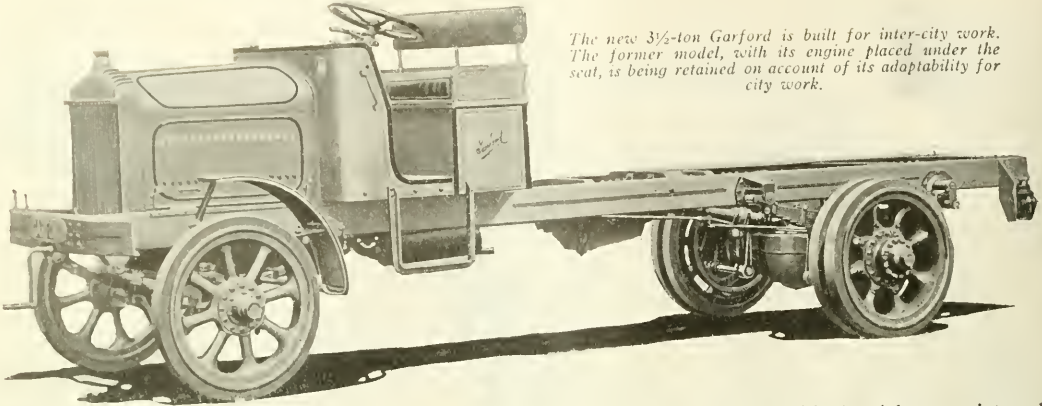


The new 3½-ton Garford is built for inter-city work. The former model, with its engine placed under the seat, is being retained on account of its adaptability for city work.

New 3½-Ton Garford Has Longer Wheelbase and Larger Engine

GARFORD SPECIFICATIONS

Capacity, tons	3½
Price	$3,900
Wheelbase, in	162
Tires, front	36x5
Tires, rear	36x5d
Bore, in.	4½
Stroke, in.	6
N. A. C. C. h.p.	32.4
Speed, r. p. m.	
Speed, m. p. h	14
Gear ratio in high gear	
Final drive	Worm

NEW 3½-ton worm-driven model has been added by the Garford Motor Truck Co., Lima, Ohio, in order to further round out its line. This latest model is not intended, however, to supplant the former 3½-ton model. Both will be available, thus affording two 3½-ton models from which to select. The new model has a 162-in. wheelbase, the other being of the original Garford design with a short wheelbase of 128 in. The new model at $3,900, establishes a new price standard for that capacity, as the former model sells at $4,300.

It differs from the former model in that the engine is placed forward under a hood instead of under the seat. The former model is being retained on account of its short wheelbase, which provides a short turning radius. The new model with the engine out in front is intended for intercity work, where a great amount of turning is unnecessary. It is built to handle efficiently and economically the heavier tasks in modern haulage. The engine is rated at 32.4 h.p., compared with 29 h.p. in the former model; metal wheels are used instead of wooden; and the solid tires are interchangeable, being 36 by 5 all around, with duals in the rear. The former model had 36 by 5-in. solids on the front and 40 by 6-in. duals on the rear.

The loading space in back of the driver's seat is 12 ft. Equipment includes an odometer; curved steel dash; driver's seat; two oil lamps set flush in the dash; one oil lamp in rear; vibrator horn; jack; tools; oil can; front fenders and a bumper. Provision is made for attaching an electric generator and starter to the crankcase.

The engine cylinders are cast in block, the engine being suspended at three points. The crankcase is made in two separate castings, the upper half supporting the bearings, shafts and gears; the lower half forming an oil reservoir. The valves are on the right side. The pistons are of gray iron with three rings. A special feature in connection with the pistons is the snap ring provided for preventing any movement of the piston pin. The piston pin set screw is designed to prevent scored cylinders. The oil system is of the force-feed type. Oil is delivered by pump under pressure to all bearings. The overflow from the pressure relief delivers oil to the timing gears. Before admission to the oil pump, the oil must pass through a fine brass gauze screen. As far as possible, the oil is delivered through steel tubes, thereby running no chance of its escaping through porous castings.

The timing gears are of helical form, having large sized bearings with the usual face width of 1½ in. The camshaft is a single piece, drop-forged, with the eight cams integral. The cams are slightly offset from the valve lifters, because mushroom tappets are employed. The camshaft is of the type having enlarged journals to permit removal from the case without disturbing the three bearings. The push rod guides are retained in the case by means of a yoke which permits of very ready removal.

Ignition is effected by means of a single high-tension magneto. Spark control is by hand. Fuel is fed to the carbureter by gravity from a 25-gal. tank located under the driver's seat. The gasoline tank is cylindrical in shape and is made up of sheet steel, lead coated both inside and out. All joints are welded.

The clutch is of the multiple-disk type, having six pairs of plates. It is inclosed in a housing which matches the flywheel housing, thereby making it clean and durable. A covered hand hole is provided for inspection and adjustment. The clutch is provided with the highest-grade ball bearings and all working parts are of steel.

The gearset, which is mounted amidships, is of the four-speed, selective-sliding gear type; all gears and shafts are made of alloy steel, heat-treated. The transmission is so made that a power take-off for hoist or winch may be applied to it at slight additional cost.

The rear axle is of the worm type. The axle bearings are much larger than in previous models. The axle is of the floating type. The driving wheel brakes are of the double-internal type and are 21 in. in diameter and 3¾ in. wide.

The steering gear is of the screw-and-nut irreversible type. The slanted position of the column provides for a very comfortable position when driving. The hand wheel, 22 in. in diameter, is of the notched type. Steer-

New Parker 3½-Tonner Suitable for Both City and Country Work

PARKER SPECIFICATIONS

Capacity, tons	3½
Price	$4,150
Wheelbase	160
Tires, front	36x5
Tires, rear	40x10
Bore, in.	4½
Stroke, in.	6
N. A. C. C. h.p.	32.4
Speed, r. p. m.	1,030
Speed, m. p. h.	
Gear ratio in high gear	7.8 to 1
Final drive	Worm

TO meet the demand for a heavy-duty, high-speed truck suitable for city and country work alike, the Parker Motor Truck Co., Milwaukee, Wis., is now producing a standard track, worm-driven model. While rated a 3½-tonner, the truck has been designed throughout for a pay-load of 4½ tons on average roads. It is to be used only as a 3½-tonner where conditions are extremely severe. The wheel track all-around is 58 in. This is of much benefit when running on other than paved roads, because the rear tires do not break through on the soft part of the road alongside the standard wagon track.

The chassis complete weighs 6,800 lbs., and is designed for use with pneumatic tires. On solid tires, a road speed of 16 m.p.h. is obtained at 1,303 r.p.m. of the engine. With cushion tires, 19 m.p.h. is permissible and when using pneumatic equipment, 25 m.p.h. is a safe and usable speed.

Equipment consists of two electric sidelights; one electric taillight; electric horn; tools, jack and driver's seat with cushions and back. When electric starting and lighting is not wanted, a deduction of $125 from the list price is made by the Parker Company. Oil lights are then placed on the truck. Tire equipment consists of 36 by 5-in. solids on the front wheels and 40 by 5-in. dual solids on the rear. The buyer has the option of 40 by 10-in. single solids on the rear at extra cost. Pneumatics. 38 by 7 in front and 44 by 10 in the rear may be also had at extra cost. Metal wheels are supplied at extra cost. The body is built to the customer's specifications at extra cost.

The loading space back of the driver's seat to the end of the frame is 139 in.; from the driver's seat to the center of the rear axle, the loading space is 90 in.; and from the center of the rear axle to the end of the frame, the loading space is 49½ in. The height from the ground to the top of the frame when the truck is unloaded is 36 in.; when loaded it is 32 in. The width of the frame is 33 in.

The frame is made of pressed steel and is built in the semi-flexible type. It is 7 in. high and ¼ in. thick, the flanges being 3 in wide. Throughout the entire frame, heat-treated nickel steel has been used and in such places where steel castings have been used, they are annealed and heat-treated. All bolts are also heat-treated.

The four-cylinder Wisconsin engine employed has a removable head and is suspended at three points. The cylinders are cast in block and the crankshaft has four main bearings. Oil is forced by a pump through a drilled crankshaft to the main bearings and is then forced to the wrist pins. A gage on the dash indicates whether the pump is working. Water is circulated by a centrifugal pump. A radiator of the zig-zag tube type is used. Fuel is fed by gravity to the carbureter from a 25-gal. tank mounted under the driver's seat.

The clutch is of the multiple-dry-disk type. A double fabric universal connection is used between the clutch and gearset. The latter is of the selective, four-speed type, being mounted amidships on specially-designed cast steel cross members. The gearset is taken out by the removal of four bolts. The cross members are so designed that in the event of using hydraulic hoists for dumping purposes, the gearset may be mounted on the top without the use of cross members. This charge would necessitate the drilling of additional holes in the frame channels. The rear cross member also supports the propeller shaft service brake, which is mounted immediately back of the gearset. This form of attachment tends to prevent any disalignment between the service brake, frame and the gearset itself. The emergency brakes are internal-expanding on the rear wheels.

The full-floating rear axle is of Parker design, being of three-piece construction and made of electric cast steel annealed and heat-treated. Pro-Smith frame; Bosch magneto; Westinghouse starting and lighting; Willard battery; Monarch governor; Stromberg carbureter; Brown-Lipe clutch; Warner gearset; Shuler front axle; Tuthill springs; Ross steering gear and K-B universal joints. Steering is on the left.

The 3½-ton Parker is fitted with electric starting and lighting as standard equipment.

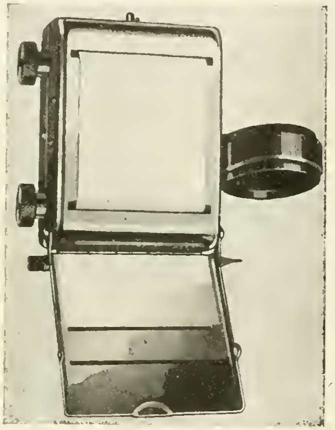
Bell's Memorandum Simplifies Work in Package Delivery

Lewis Reamer—Ford Jack—Exhaust Relief Valve—Gasoline Gauge—D. B. Decarborizing Outfit—New Way Engine

Bell Memorandum Pad

FLEET owners, and especially those engaged in parcel delivery work where the driver is forced to rely largely on his memory to make return calls to customers, etc., will find that they can simplify this work by supplying their operators with a memorandum roller pad that can be attached in a convenient place on the steering column. When the driver has made a promise to call the next day or some future date for goods that the customer may want to return, all he has to do is to make a memorandum on this pad, thus obviating the need of relying on his memory.

The Auto Memo, made by the Bells Auto Memo Co., Richmond, Va., is a memorandum roller pad contained within an aluminum case that has a pencil clip at the top and a match scratch strip across the face of the cover. The standard roll is plain white paper, but special rolls can be furnished to show the time out; destination; arrival time; waiting time; size and character of load; fuel and oil used; repairs and time mileage. The rolls are made with or without carbon paper as desired. The price is $5.



The Bell memorandum pad which is placed on the steering column

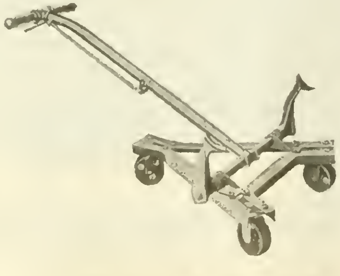
Lewis Reamer

REDUCING expenses in truck maintenance is one of the most important questions that a fleet owner has to consider. Saving in the repairmen's time is one way of bringing about this reduction. A connecting rod and main bearing reamer for Fords that will do the work of a skilled mechanic will therefore be of interest to fleet owners. It has three cutting surfaces so placed and of such lengths that all three main bearings can be reamed out at once. Furthermore, by moving the reamer up a little bit, two of the cutting surfaces will ream four connecting rod bearings as shown in the illustration. It is stated that a complete set of bearings can be reamed in 1½ hrs., compared with 8 hrs. by the hand-scraping method. The price of the reamer is $35 and that of the handle $2. The maker is the Lewis Tool Co., Minneapolis, Minn. Special reamers for all makes of trucks are made to order only.

Three main bearings can be reamed out in one operation with a Lewis reaming tool

White Jack

FLEET owners using Fords and who are desirous of saving time in their repair work, will be interested in a service jack or jack truck for quick handling of service work on Fords. The arms of the jack are placed under the rear axle. As the handle is pushed downward the vehicle is lifted. One stroke lifts the whole rear end from the floor. A safety lock holds the handle in position while the vehicle is raised. The jack is mounted on roller bearing castors. The jack is made by the White Products Co., Chicago, and sells at $10.



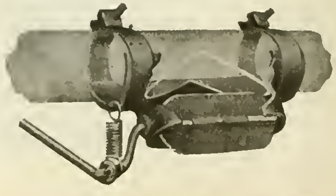
The White jack enables quick handling of service work on Fords

Exhaust Relief Valve

AN exhaust relief valve which snaps full open at a touch of a foot pedal and snaps tight closed on releasing the pedal is being made by Stevens & Co., New York City. The Snap exhaust relief valve, as it is known, is attached by cutting a V-shaped notch in the exhaust pipe, and clamping the device on over the notch. The pedal attaches to the floor in the most convenient position, and does not interfere with the moving of the floorboards. The price is $1.75.

Gasoline Gauge

FLEET owners are quick to realize the prime importance of equipment that tends to eliminate the possible loss of time and its attendant inconvenience. For this reason they should be interested in a gasoline gage, named the Gasograph. Its chief attraction lies in

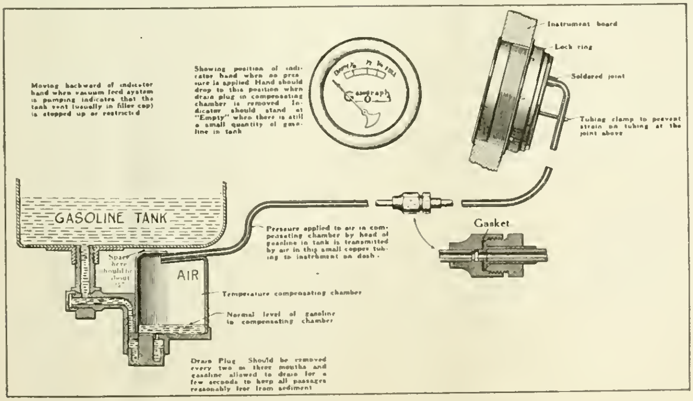


The Stevens exhaust relief valve which snaps full open at a touch of the foot the fact that the instrument or indicator head is located upon the dashboard in full view of the driver, irrespective of the tank's location. It overcomes the inconvenience and uncertainty of the old method of ascertaining the amount of fuel in the tank.

This gage operates on a very simple and scientific principle. The weight of the gasoline in the tank compresses the air in a small compensating cylinder that screws into the drain opening of the tank and this hydrostatic pressure is transmitted by means of a copper tubing to a pressure gage on the dash. The instrument is quite similar to a steam gage in operation, except that in the Gasograph, a diaphragm is used to record the slightest variation of pressure, while in the steam gage a Bourbon tube is used.

The instrument indicates the actual amount of gasoline in the tank irrespective of whether the truck is on a grade or otherwise. As practically all trucks have the drain opening of the tank located in the center, the height measured on the centerline is always the mean level.

The Gasograph is made by the New Standard Adding Machine Co., St. Louis, Mo. The price is $7 for use on a tank under the seat and $7.50 for tanks at the rear.


Moving backward of indicator hand when vacuum feed system is pumping indicates that the tank vent (usually in filler cap) is stopped up or restricted
Showing position of indicator hand when no pressure is applied. Hand should drop to this position when drain plug in compensating chamber is removed. Indicator should stand at "Empty" when there is still a small quantity of gasoline in tank
Gasograph
Instrument board
Lock ring
Soldered joint
Tubing clamp to prevent strain on tubing at the joint above
GASOLINE TANK
Space here should be about ½"
AIR
Pressure applied to air in compensating chamber by head of gasoline in tank is transmitted by air in this small copper tubing to instrument on dash.
Gasket
Temperature compensating chamber
Normal level of gasoline in compensating chamber
Drain Plug Should be removed every two or three months and gasoline allowed to drain for a few seconds to keep all passages reasonably free from sediment

The Gasograph, a gasoline gage mounted on the dashboard, overcomes the inconvenience of the old method of ascertaining the amount of fuel in the tank

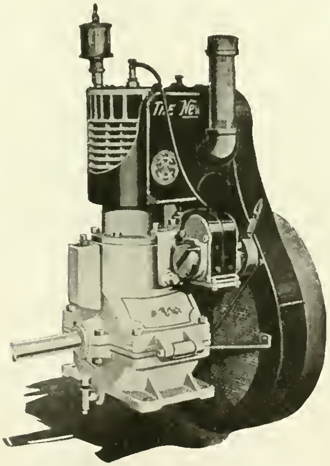
D-B Decarboning Outfit

BURNING out carbon with oxygen is a simple process that can be mastered quickly by any mechanic. To remove carbon from an engine by scraping generally requires taking off the cylinder heads or pulling the engine apart and lifting off the cylinder block in case it is not of the detachable-head type. The labor of dismantling and assembling is much greater than the actual cleaning. The apparatus required for carbon burning consists of the gas cylinder containing oxygen under pressure of 1,800 to 2,000 lbs. per sq. in.; a pressure regulator, a flexible hose and a metal nozzle or torch. The high pressure of the oxygen in the service cylinder cannot be used without a pressure reducer as the pressure required for carbon burning is from 5 to 15 lbs. only. The pressure regulator carries a gage to show the working pressure of the oxygen supplied to the hose. The pressure is controlled by the regulator screw.

The hose nozzle, or torch, consists of a thin copper tube that can be inserted in the cylinder through the spark plug opening and bent so as to reach all parts of the interior. A handle and valve are provided for convenient manipulation of the nozzle and control of the gas flow. From 3 to 5 cu. ft. of oxygen per cylinder are generally sufficient.

The D-B decarbonizing outfit

The decarbonizing outfit furnished by the Davis-Bournonville Co., Jersey City, N. J., consists of a special pressure regulator; 12 ft. of Midget Ebony hose and torch with ball handle and needle valve. The oxygen cylinders must be purchased separately. These may be obtained from the regular gas service stations. The price of the torch is $10; that of the regulator $7.50, and that of the hose, 9 cents a foot. The gas averages about 2 cents per cu. ft.



The New Way engine, designed for operating machine shop equipment

New Way Engine

AN air-cooled stationary engine designed for operating machine shop equipment, etc., has been put on the market by the New Way Motor Co., Lansing, Mich. It is made in four sizes, with single cylinders of respectively 4¼ by 4¼; 4½ by 4½; 4½ by 6 and 5¼ by 6 in. bores and strokes. The horsepower rating is respectively 4, 4½, 6, and 7, and the r. p. m. is 800, 750, 750 and 700.

A simple device permits of the speed being varied at any time while the engine is in operation. A high-tension magneto furnishes the ignition. Kerosene is the fuel used, and a friction clutch pulley of multiple disk type is furnished.

The Editor's Viewpoint

Cleanliness in Winter

IT is more important to keep the truck clean in winter than in summer. A truck should be clean at all times. Just as the habits of a person are indicated by the cleanliness of his dress, just so can the care which a truck receives be judged by its appearance.

Mud and dirt on the running gear of a truck help to cover up small defects or loose bolts, rivets and the like, and no matter whether the season is summer or winter. But in winter, frozen mud on the brake connections helps to stiffen up the proper action of these parts and results in greatly decreased braking efficiency. This means rapid brake wear and this costs money. Again, improperly operating brakes may result in serious accidents when the driver, placing his faith in good brakes, finds that they fail him at the crucial moment when a quick stop is imperative.

In winter weather, many accidents may be avoided by not driving too close to the vehicle ahead. Often times, even with the brakes apparently in the best of condition, their ability to stop the truck quickly will be lessened by the reduced traction of the wheels on the slippery pavement. Then if you are too close to the truck ahead and it stops suddenly, a collision can hardly be avoided.

The Coming Truck Shows

THE coming truck shows in New York and Chicago promise so much of real value to the truck user that every fleet owner should make arrangements to have his operating and maintenance superintendents present at all of the evening conferences to be held in connection with each exhibition.

Subjects of vital interest to every fleet owner will be discussed at these Highway Transport Conferences and by men who know their business. Among the speakers will be several motor truck owners who will speak from experience instead of by theory. Theory has its place and precedes experience, but the fleet owner who is desirous of saving money in the operation and maintenance of his trucks cannot afford to dabble too extensively in theory when sound, practical experience is made available.

These Highway Transport Conferences are something new in the world of motor truckdom. The wise fleet owner should have as many of his men present at these sessions as is possible without affecting his fleet operation. There is no one fleet owner who knows all about truck operation, no matter how excellent his methods may be.

These conferences, free to any truck operator, irrespective of the type, make or size of truck employed, present an excellent opportunity for him to learn the latest ideas in the various phases of truck operation. Papers will be read on cost accounting, routing and dispatching; loading and unloading devices; the design of buildings for more efficient truck use; the advantages of trailers and the relative fields of the solid and pneumatic tire for truck use.

In addition there will be discussions on overhaul and haulage and rural motor truck express lines, which will bring out many of the fallacies of the use of trucks in such work and which have cost motor truck operators thousands of dollars in the past two or three years. If your truck superintendent gets only one idea from the entire series of meetings, his attendance will be well worth while.

The Fleet Owners' Forum

List of Ten of the Largest Truck Producers

To the Editor, Commercial Vehicle:

Will you kindly give us the names of the ten largest manufacturers of motor trucks in the country today, and the way they rank? Also, if possible, their production.—Peter M. Andriot & Sons, Louisville, Ky.

According to recent production figures, the ten largest truck manufacturers are, in the order of their production, as follows:

Ford
Reo
Republic
White
Maxwell
G. M. C.
Nash
Pierce-Arrow
I. H. C.
Packard

We cannot give you the actual production figures of these companies, as these figures were given to us with the understanding that they would not be published as individual productions.

Link Belt Conveyors for Loading Grain

To the Editor, Commercial Vehicle:

Can you put us in touch with someone who makes a small elevator for loading grain into a truck body, the top of which is about 6 or 8 ft. from the ground.—Carter Motor Co., Plainview, Texas.

We do not know of any elevator which may be used for loading grain from the ground into trucks, but believe that you would find a link belt conveyor, which is equipped with small buckets for carrying the grain, would prove useful to you. This device is made by the Link Belt Co., 732 Dime Bank Bldg., Philadelphia, Pa.

We would also suggest that possibly a device made by the Ash Removals, Inc., 347 Madison Ave., New York City, could be applied for transferring grain to a truck body. It was originally designed for removing ashes but the system is entirely pneumatic. The air attains a velocity of 3 miles a minute in the conveyor line. At this velocity, the apparatus is capable of lifting powdered granite of a density of 180 pounds per cubic feet. Ashes weigh from 25 to 60 pounds per cubic foot.

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all reders. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

According to Mr. J. F. Linton, of the Ash Removals, Inc., the apparatus can handle any material up to a weight of 200 pounds per cubic foot and of sizes not greater than 6 inches in diameter. Mr. Linton is also of the opinion that the ash removal system would prove economical in the handling of all grains, as arrangements could be made to clean the grain at the same time the grain is being conveyed. He states that the cost of cleaning wheat is in the neighborhood of ½ cent a bushel. Cleaning and conveying the wheat in one operation would be of considerable advantage to anyone shipping wheat in large quantities, as it would save paying the freight on dirt to the market.

We would suggest that perhaps the best method of becoming more fully acquainted with the system of the Ash Removals, Inc., would be to communicate with Mr. J. F. Linton, Ash Removals, Inc., 347 Madison Ave., New York City.

Manufacturers of Stake Pockets and Body Irons

To the Editor, Commercial Vehicle:

We would like to locate some manufacturer who can furnish us with iron stake pockets and motor truck body irons—W. D. MacMillan, Jr., Wilmington, N. C.

The Eberhard Mfg. Co., 2734 Tennyson Ave., Cleveland, Ohio, manufactures stake pockets.

Below is a list of body or top iron manufacturers:

Ashtabula Bow Socket Co., Ashtabula, O.
Auto Specialties Mfg. Co., St. Joseph, Mich.
Bonney Vise & Tool Works, Allentown, Pa.
Cleveland Hardware Co., 4500 Hamilton Ave., Cleveland, O.
Columbus Bolt Works, Columbus, O.
Cowles & Co., C., New Haven, Conn.
Detroit Socket Co. 814 Jefferson Ave., W., Detroit, Mich.
Enterprise Brass & Plating Co., Cincinnati, O.
General Drop Forge Co., Buffalo, N. Y.
Michigan Bolt & Nut Works, ft. Meldrum Ave., Detroit, Mich.
Monarch Carriage Goods Co., Cincinnati, O.
Motor Products Corp., Detroit, Mich.

Special Bodies Made for Use on Farms

To the Editor, Commercial Vehicle:

Will you give us the dates of issues of The Commercial Vehicle in which you have published descriptions of special farm truck bodies. We would also appreciate receiving a list of manufacturers of convertible bodies which are applicable to farm use.—W. B. F., Kansas City, Mo.

We have published articles in The Commercial Vehicle from time to time which treat of special trucks and bodies for farm use. On page 23 of the June 1, 1919, issue is a description of the Republic All-Purpose body made by the Republic Motor Truck Co., Alma, Mich.

On page 31 of the June 15, 1919, issue is a description of the Federal special body made by the Federal Motor Truck Co., Detroit. This is not necessarily used on farms but is readily adaptable to farm use.

On pages 24 and 25 of the August 1, 1919, issue is a description of the Dailey Four-in-One bodies made by the Simplex Mfg. Co., Conneautville, Pa.

On pages 188 and 189 of the October 1, 1919, issue of the Everyway body, made by the Highland Body Mfg. Co., Cincinnati, Ohio, is described.

On pages 226 and 227 of the October 15, 1919, issue, the Fulton 2-ton truck equipped with special ground grippers is described.

On pages 332 and 333, November 15, 1919, issue, the 1½-ton Diamond-T farm special truck made by the Diamond-T Truck Co., Chicago, is described.

Below is a list of companies which make convertible bodies:

American Wagon Co., Dixon, Ill.
Auto Truck Steel Body Co., Chicago.
Commercial Auto Body Co., St. Louis, Mo.
Ell-Kay Mfg. Co., Kansas City, Mo.
Federal Motor Truck Co., Detroit.
Heil Co., Milwaukee. Wis.
Wm. G Hesse & Son Mfg. Co., Leavenworth, Kan.
Highland Body Mfg. Co., Cincinnati, O.
Horizontal Hydraulic Hoist Co., Detroit.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Luverne Automobile Co., Luverne, Minn.
Martin Truck & Body Corp., York, Pa.
Matthews Carriage & Auto Co., Inc., Des Moines, Iowa.
Metropolitan Auto & Carriage Co., Bridgeport, Conn.
Omaha Body Co., Omaha, Neb.
Republic Motor Truck Co., Alma, Mich .
Simplex Mfg. Co., Conneautville, Pa.
Thomas Wright Co., Jersey City, N. J.

We have also described the maintenance and operation methods of the Fifth Avenue Bus Co., New York City, on pages 128, 129 and 146 of the September 15, 1919, issue of THE COMMERCIAL VEHICLE. Also on pages 24-27 of the June 1, 1919, issue and on pages 16-21 of the March 15, 1919, issue.

Names of Truck Cartage Contractors

To the Editor, COMMERCIAL VEHICLE:

Can you put us in touch with some companies who would be in a position to haul oil on contract in the Texas and Oklahoma oil fields. It seems at the present time a good share of the cartage is being done by small producers.—SHAW PUBLISHING Co., Chicago, Ill.

The following campanies may be able to help you out:

Armstrong Transfer & Storage Co., 108 Johnson St., Amarillo, Tex.
Merchants Transfer, 400 Colorado St., Austin, Texas.
Merchants Transfer Co., 1608 Crockett, Beaumont, Texas.
The Motor Freight Lines, Inc., Dallas, Texas.
Dallas Storage & Warehouse Co., 911 Marion St., Dallas, Texas.
Binyon-O'Keefe Fireproof Storage Co., 800 Calhoun St., Ft. Worth.
Dolson Warehouse & Forwarding Co., Marine Bldg., Galveston, Texas.
Rips Transfer & Storage Co., 614 S. Cherry St., San Antonio, Texas.
The King Storage & Moving Co., 108 W. 2nd St., Bartlesville, Okla.
Clinton Transfer Co., 24 Frisco St., Clinton, Okla.
O .K. Transfer & Storage Co., 330 W. 1st St., Okaloham City, Okla.

We would also suggest that if you would get in touch with the Firestone Ship-By-Truck Bureaus in the following cities:

Dallas, Texas.
El Paso, Texas.
Houston, Texas.
San Antonio, Texas.
Oklahoma City, Okla.

Cost Figures of 3 to 5-Ton Motor Trucks

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us a list of articles which you have published in THE COMMERCIAL VEHICLE with which cost figures, shown on your regular monthly sheets of your cost form are reproduced, for 3 to 5-ton trucks.—R. C. BROWN, New York City.

Below is a list of articles which we have published from time to time showing filled-in cost forms for 3 to 5-ton trucks:

Gotham's Fleet of Municipal Gas-Electrics saves $71,315 yearly, issue of June 1, 1917, pages 5-8.

Cleveland Overland Truck Haulage concern serves Sandusky, Akron and Canton, issue of April 1, 1918, pages 5-9 and 20.

Truck operating and maintenance costs in New York City, issue of July 15, 1918, pages 20-22.

Detroit truck owner finds success by developing motor line in poorly served territory, issue of November 1, 1918, pages 47-49.

Trucks help 27-year-old contractor to establish a profitable business, issue of April 1, 1919, pages 5-9.

How fleet owners may keep their motor truck costs in simple, yet adequate, manner, issue of April 15, 1919, pages 32 and 33.

Detroit public haulage men increase profits by giving surplus work to associates, issue of July 1, 1919, pages 12 and 25.

How to keep motor truck costs, issue of September 15, 1919, pages 121 to 123.

Cost of operation of 5-tonners in wholesale grocery business, issue of November 15, 1919, pages 320, 322 and 334.

Power and Hand Hoists Applicable to Trucks

Will you furnish me with a list of manufacturers of power and hand hoists for dumping bodies which may be mounted on a 1-ton Reo truck? I want to use this in connection with a standard express body. I do not want to buy a dump body where the elevating gear has to be bought in connection with it.—H. T. CHAPMAN, Saybrook, Conn.

Below is a list of the makers of power and hand hoists which can be purchased separately from the body on which they are to be mounted:

Archer Iron Works, 34th Pl. & Western Ave., Chicago, Ill.
Anglaise Motor Car Co., New Bremen, O.
Auto Truck Steel Body Co., 3027 Carroll Ave., Chicago, Ill.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Columbian Steel Tank Co., 1601 W. 12th St., Kansas City, Mo.
Express Body Corp., 3244 Shields Ave., Chicago, Ill.
Graves Co., L. C., Springboro, Pa.
Guaranty Motors Co., 436 Mass. Ave., Cambridge, Mass.
Hanger, C. F., 6520 Carnegie Ave., Cleveland, O.
Hebb Motors Co., 1333 P St., Lincoln, Neb.
Horizontal Hydraulic Hoist Co., 456 Book Bldg., Milwaukee, Wis.
Hydraulic Hoist Mfg. Co., 292 Walnut St., St. Paul, Minn.
Hydro-Hoist Co., Milwaukee, Wis.
Lally Commercial Body Co., Paris St., Everett, Mass.
Meisel Press Mfg. Co., 945 Dorchester Ave., Boston, Mass.
Simplex Mfg. Co., Conneautville, Pa.
Truck Engineering Co., 7031 Broadway, Cleveland, O.
Wood Hydraulic Hoist & Body Co., 1028 Bellevue Ave., Detroit, Mich .
Woonsocket Wagon Mfg. Co., Orrall St., Woonstocket, R. I.

Three Companies Making Hub Odometers

To the Editor, COMMERCIAL VEHICLE:

In reading your publication, we have been interested in the study of cost systems, but one thing which has stalled us in ascertaining the mileage cost is that the speedometers we have on our trucks are no good and, furthermore, we do not seem to be able to find one that is any good. At the present time, we are using odometers on our trucks. It is not more than 3 or 4 months since we installed these, but the grease from the axles has squeezed through into the working parts so that it is impossible to read the figures on the dials. Do you know of any speedometer which you can recommend?—W. P. MAYO, Duluth, Minn.

We cannot be of the utmost service to you regarding the trouble you have experienced with your motor truck hub odometers because we do not know what make and type of odometer you have been using. If the grease from the wheel bearing has squeezed out into the hub odometer, we assume that you must have used too much grease in the bearing or else the felt washer usually fitted to prevent the grease from getting into the odometer has been left out or is badly worn.

The Dreadnought hub odometer, made by the American Taximeter Co., 20 West Sixty-first Street, New York City, has a reputation for good service and might meet with your approval.

Other hub odometers are made by the following concerns:

F. Baumgartner, 2344 East 105 Street, Cleveland, Ohio.
Stewart-Warner Speedometer Corp., Chicago, Ill.

List of Makers of Four-Wheel-Driven Trucks

To the Editor, COMMERCIAL VEHICLE:

We are considering installing four-wheel-driven trucks in the ore industry in Utah and should like to obtain specifications of all such trucks now offered on the market, together with the names and addresses of the makers. Please also tell us if the Beech-Creek, Couple-Gear, Walter and Winther-Marvin four-wheel driven trucks are manufactured by strong companies which are liable to remain permanently in the business or are some of them made by new uncertain concerns?—FORDYCE H. WALKER, Watson, Utah.

Below is a list of all the four-wheel-driven trucks to be offered on the 1920 market:

Name of Truck	Manufacturer and Address
Beech Creek..........	Beech Creek Truck & Auto Co., Beech Creek, Pa.
C. T..................	Commercial Truck Co., Philadelphia, Pa.
Couple-Gear..........	Couple-Gear Freight Wheel Co., Grand Rapids, Mich.
Duplex...............	Duplex Truck Co., Lansing, Mich.
F. W. D..............	Four Wheel Drive Auto Co., Clintonville, Wis.
Four Wheel Drive......	Four Wheel Drive Truck Co., Webberville, Mich.
Nash.................	Nash Motors Co., Kenosha, Wis.
Oshkosh..............	Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
United 4-Wheel-Drive..	United Four Wheel Drive Truck Co., Webberville, Wis.
Walter...............	Milwaukee Locomotive Co., Milwaukee, Wis.
Walter...............	Walter Motor Truck Co., New York City.
Ware.................	Twin City Four-Wheel Drive Co., St. Paul, Minn.
W-S..................	Weir-Smith Truck
Winther-Marwin......	Winther-Marvin Motor Truck Co., Winthrop Harbor, Ill. Co., Birmingham, Mich.

The Commercial Truck Co., Philadelphia, Pa., and the Couple Gear Freight Wheel Co., Grand Rapids, Mich., both manufacture electric four-wheel-driven trucks. The latter company also manufactures gasoline electric models.

Complete specifications of all of the four-wheel-driven trucks were published in the November 1, 1919, issue of THE COMMERCIAL VEHICLE.

Demountable Bodies and Trailers Save Time

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us a list of articles which have appeared in THE COMMERCIAL VEHICLE from time to time in which the use of demountable bodies or trailers for expediting deliveries was discussed.—J. TOWERS, San Francisco, Cal.

Below is a resume of all the articles which have been published in THE COMMERCIAL VEHICLE from time to time regarding the use of demountable bodies and trailers for facilitating loading problems:

April 15, 1914, page 23, contains an illustrated article descriptive of the method employed by the Royal Metal Furniture Co., Brooklyn, N. Y. Two demountable bodies are used in connection with one 3-ton Garford truck. The empty body is pulled off the chassis onto one end of an inclined platform entirely within the Royal company's warehouse and the loaded body similarly pulled onto the truck after latter has run to the other end of the platform. The truck and the two bodies have replaced seven teams of horses formerly used and, in addition, have trebled the delivery radius of the company.

June 1, 1914, page 7, contains Part II of an article descriptive of the motor equipment of the New York City milk dairies, showing how the detachable semi-trailer bodies are employed to save loading and unloading time. While these bodies are not of the demountable type in the usual sense of the word, they nevertheless may be so considered, differing only in the fact that they are equipped with wheels suitable for street service instead of the small rollers or other means of mobility.

July 1, 1914, page 14, describes the two demountable bodies, two small hand wagons and one 3-ton Packard truck in the service of the Kindel Bed Co., Brooklyn, N. Y. One body is loaded on the hand wagon inside the company's plant and then pulled out onto the street and transferred to the truck chassis after the empty body has been removed from it onto the other hand wagon. The latter is then drawn into the plant and the body loaded while the truck is on its delivery route.

July 15, 1914, page 28, gives a short article descriptive of the novel demountable body in use by Brownell & Field, wholesale grocers of Providence, R. I. The body is fitted with rollers and with a special spring attachment for securing it to the truck frame. It is removed from the truck and put onto it by means of an overhead telpher system which extends from the edge of the loading platform clear to the far end of the shipping and packing room.

October 15, 1914, page 28, contains Part II of an article describing how the Curtis Publishing Co., Philadelphia, Pa., has been able to make its trucks pay large dividends on very short hauls by means of demountable bodies deposited on end lifted from the truck chassis by means of electric hoists. The demountable bodies are of two types, one with stake sides for handling bags of mail and the other of the steel V-bottomed type for handling coal. After the truck's work is finished in hauling the mail, the stake bodies are removed and the coal bodies fitted in their stead, thus enabling the same trucks to perform two vastly different classes of work. The hoists are fitted at both ends of some of the routes.

March 1, 1915, page 30, gives a short illustrated article describing the neat lumber body used by the Hawkeye Lumber & Coal Co., Cedar Rapids, Ia. Transverse rollers are carried on the truck body platform and serve to enable the loaded or unloaded nest body to be pushed on or off the truck and onto an elevated platform at the same height as the truck platform.

June 1, 1915, page 5, describes the tractor and demountable semi-trailer equipment of the New York City Municipal Asphalt Plant. The installation was the first of its kind which employed semi-trailers, loaded at the plant; pulled to the waiting tractors by means of small removable fore-carriages and then attached to the tractors. These haul them to the job, where other fore-carriages are employed and the trailers moved from point to point on the work by means of the steam rollers which finish the street surface. Meanwhile, the empty trailers on the jobs are attached to the tractors and hauled back to the plant.

July 15, 1915, page 22, gives Part V of an article descriptive of the delivery equipment of the Loose-Wiles Biscuit Co., Long Island City, N. Y., in which it is pointed out how the efficiency of some of the company's trucks may be considerably increased by the use of nest bodies; nest loading bins and roller gravity conveyors for transferring the goods from the bins to the trucks.

November 15, 1915, page 5, contains the concluding article regarding the demountable body equipment of the Curtis Publishing Co., Philadelphia, Pa., in which is described the method of removing the demountable bodies of the mail trucks of the company at the Broad Street station of the Pennsylvania Railroad in that city.

February 15, 1916, page 5, contains a complete description of the demountable bodies used by Haas, Baruch & Co., Los Angeles, Ca., wholesale grocers. The special equipment mounted on the trucks for removing the empty bodies and pulling the loaded ones aboard is shown, together with illustration depicting the bodies in the course of being removed.

March 15, 1916, page 28, gives a short illustrated article on the demountable bodies which have practically eliminated the idle loading time of the motor trucks of the A. T. Stearns Lumber Co., Neponset, Mass. Two bodies are employed for each truck, one being loaded at the lumber yard while the other is on the truck making its deliveries. Ordinary four-wheeled wagons are used to transfer the empty bodies around the yard for the loading of the various lengths of lumber, etc. The loaded body is then transferred to a beam device, which is elevated by means of screw jacks so that the truck may back under it. The empty truck body is previously unloaded on a similar device, from which it is deposited on to another four-wheeled hand wagon.

July 15, 1919, pages 5, 6, 7 and 32, give a short article on how the Baltimore Bargain House was able to save a considerable amount of money by installing demountable bodies for use on its trucks.

August 15, 1919, pages 41, 42, 43 and 70, show how the Atlantic & Pacific Tea Co. has solved its problems of loading by installing two-wheeled trailers which can be used with its trucks.

September 1, 1919, pages 90,, 91 and 106, describes how the Robert Gair Co., of Brooklyn, N. Y., has found it more profitable to use trucks with demountable bodies than horse wagons.

October 15, 1919, pages 208, 209, 210 and 211, is a story of how the Soudders Gale Grocery Co., of St. Louis, Mo., is using demountable bodies on its trucks.

Articles Published on Bus Installations

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us all the data you have on passenger-carrying buses which are now in operation.—E. G. DORSCH, Milwaukee, Wis.

We would say that although we have published a great many articles on the operation of bus installations, we believe the synopsis of the one given herewith will be of value to you.

The United Transportation Co., Inc., Troy, N. Y., operates a bus line between Albany, N. Y., and Pittsfield, Mass. The company operates a 1½-ton White truck equipped with pneumatic tires in the front and cushion tires in the rear. The bus body was made by the Kingsbury-Leahy Co., 135 Hudson Ave., Albany, N. Y., and seats twenty-two passengers. This outfit was described on page 33 of the November 15, 1915, issue of THE COMMERCIAL VEHICLE. The truck chassis was manufactured by the White Co., Cleveland, Ohio.

Form Eastern Center for Trailers

Headquarters for Information and Sales in New York at Grand Central Palace

NEW YORK, Dec. 13—An industrial movement reflecting a high degree of competitive co-operation has just been accomplished by the Trailer Manufacturers' Asso. of America, through whose efforts a central location has been created in New York City for the display of trailers and the furnishing of general information regarding the industry and the use of trailers.

Together with a number of its members the association has taken office and exhibition space aggregating about 5,000 sq ft. in the International Tractor, Farm Implement & Trailer Exchange, in Grand Central Palace. In this group are included all but three or four of the members having branch offices, distributing agencies or dealers in the metropolis. All the latest models manufactured by the following companies will be displayed permanently on the seventh floor of the building:

Detroit Trailer Co., of Detroit.
Fruehauf Trailer Co., of Detroit.
King Trailer Co., of Ann Arbor, Mich.
Martin Rocking Fifth Wheel Co., Springfield, Mass.
Northway Trailercar Co., East Rochester, N. Y.
Ohio Motor Vehicle Co., of Cleveland.
Rogers Brothers Co., Albion, Pa.

This exhibit will be a great convenience to business houses in the metropolitan district and to visitors from all parts of the country and from foreign countries who desire to investigate the subject of trailers and to make purchases. There they will find displayed many makes, types and sizes of trailers, and representatives will be on hand to give all the information desired. This will save visitors the trouble of looking up the various offices of trailer companies and then going to warehouses or display rooms in other locations or parts of the city to see the trailers themselves.

Advice on Garage Design

NEW YORK CITY, Dec. 5—Fleet owners who are contemplating the construction of new buildings in which to house and repair their trucks, can now receive expert advice on the layout, design and erection of garages from a man who has made a special study of this work. Harold F. Blanchard, formerly connected with *Motor World,* joined the firm of Mann & MacNeille, architects and construction engineers in Detroit, who have added to their organization an automotive department which will render expert building advice to fleet owners. Mr. Blanchard has been appointed chief engineer of the new department, and will be in charge of the work. Garages without columns for supporting roof trusses will be specially featured.

Milburn Trying Gasoline Trucks

DETROIT, Dec. 8—The Milburn Wagon Works, which has been building electric passenger cars, has two experimental gasoline worm-driven trucks of 1½- and 2-ton capacities on the road. The company is planning to enter the truck manufacturing field on a large scale in 1920.

8 Columbus Truck Lines

COLUMBUS, OHIO, Dec. 6—A survey of the motor truck transportation routes out of Columbus shows a good development in that mode of transportation in recent months. In all there are eight regular motor truck lines out of the Buckeye Capital, radiating in many directions. Lines are run to Sunbury, for dairy farmers; to Johnston for the same purpose; to Dayton; to Newark; to Mt. Vernon and to Marion. In addition, several of the Columbus truck concerns run trucks on special trips as far as Pittsburgh to the east and St. Louis to the west, covering Michigan, Indiana, Illinois and other neighboring states. These runs are mostly for household goods.

Coming Events

1920

Jan. 3-10....New York City, Motor Truck Show, 8th Coast Artillery Regiment Armory, 193d and Jerome Ave.
Jan. 17-24....Hartford, Conn., Motor Truck Show, State Armory, First Regiment, Connecticut State Guard.
Jan. 19-24....Philadelphia, Motor Truck Show, Commercial Museum. Motor Truck Association of Philadelphia.
Jan. 19-25—Milwaukee, Motor Truck Show.
Jan. 29 ....Chicago, National Highway Traffic Assn. Convention, International Amphitheatre.
Jan. 24-31...Chicago, Motor Truck Show, International Amphitheatre, Stockyards.
Feb. 9-14....Louisville, Ky. American Good Roads Congress.
Feb. 14-21....Brooklyn, N. Y., Mootr Truck Show, 23rd Regiment Armory.
Feb. 23-28...Portland, Ore., Motor Truck Show, Pavilion, Pacific International Livestock Exposition.
Mar. 13-20...Boston Motor Truck Show, Mechanics Bldg.
Mar. 22-27....Wilkes-Barre, Pa., Motor Truck Show, Armory.

Truck Club Is Formed in Massachusetts

Thirty Men Start New Association On December 11

BOSTON, Dec. 13—The Massachusetts Motor Truck Club was formed December 11 at the Boston City Club, when about thirty men, representing different lines of industry, met and elected James J. Scully of Cambridge, president; Norman Halliday, director, and D. W. Sleeper, secretary. One of the objects of the organization is to check unfair legislation. Plans are being made for extending out into other cities and towns for members. As there are more than 30,000 trucks registered in this state, [illegible] expected that the present membership will increase considerably. Committees will soon be named to take up such activities as legislation, return loads bureaus, co-operation in establishing repair emergency stations along through routes, accident prevention work among drivers, and an employment bureau, etc.

Direct Road Tax in Colorado

DENVER, Col., Dec. 2—Recognizing the value of good roads to any state, the taxpayers of Colorado have pledged themselves to contribute the sum of approximately $6 for each resident to improve the bridges and highways of the state. This will mean a total sum of $5,000 000 for this purpose. The money is to be raised by direct taxation during the coming year, the average per capita expenditure being figured in excess of $5 a person, together with the gasoline tax and the license tax, which will increase this to about $6 for every man, woman and child in the state.

New Truck for Farm Use

KANKAKEE, ILL., Dec. 12—The Auto Farmer Co., this city, has been formed to manufacture trucks especially designed for farm use. Two models of 1- and 2-ton capacities will be produced. Both have a spring suspension that reduces much of the vibration noticeable in trucks. The frames are composed of two rigid units which can be adjusted according to the requirements of the load, being lengthened or shortened as desired. There will be an indicator which will record the weight of the load carried.

Important Highway Bill Introduced

Would Provide a Department to Build Interstate Truck Roads

WASHINGTON, Dec. 9—A National Department of Highways, headed by a National Highway Commission, would be created by a bill introduced into the House of Representatives by Congressman Raker. The bill would provide a department to construct and maintain a system of main and interstate motor truck highways adapted to use by motor trucks engaged in transportation of heavy burdens. It would not include highways or roads inside the boundaries of any municipality of more than 2500 population.

The plan, which is called the National Plan, provides that states will relinquish title to rights of way and control of highways except in times of national emergencies, when they would revert to the state in full. The cost of construction and maintenance would be borne by the national Government, but the work of construction and maintenance would be under the direction of state highway authorities working co-operatively with the Department of Highways.

The bill would divide the country into ten regional areas, including Northeast, Middle East, Southeast, Northeast Mississippi, Southeast Mississippi, Northwest Mississippi, Middle West Mississippi, Gulf States, Northwest and Southwest.

The Department of Highways would be presided over by a secretary as a member of the Presidential Cabinet, who would appoint ten commissioners to be known as the National Highway Commission, and who would be organized to give a fair representation to the ten regional areas and to the interests of agriculture, commerce, native resources, education and economics, highway construction, manufacture, military engineering and motor truck transportation.

The bill provides that as soon as practicable, the Secretary of Highways would request the Governor of each state to call a convention for the selection and recommendation of the highways of each state as may be deemed desirable to be included in the National System of Highways. State Conventions would be requested by the Secretary of Highways to elect nine regional delegates to insure adequate representation at regional highway congresses, which would function to combine in one harmonious the highway systems proposed by the state conventions.

The powers of the Secretary of Agriculture relating to highways would be transferred by the bill to the Department of Highways, including also the powers and duties of the Council of National Defense in relation to highways and public roads.

Rainier Service in Brooklyn

BROOKLYN, N. Y., Dec. 12—A large service station has been opened by the Scott Motor Truck Co., local distributor of the Ranier truck. The station is located at Atlantic and Classon Avenues.

Ohio Tax Bill Goes to Upper House

COLUMBUS, Ohio, Dec. 13—The lower house of the Ohio Legislature has passed the graduated motor vehicle tax by a majority of three votes. The bill will now go to the upper house, where strenuous opposition will be encountered. As passed, the bill provides for $8 fees for motor vehicles having less than 25 h.p.; $12 for vehicles having between 25 and 35 h.p., and $20 for all vehicles having more than 35 h.p. Trucks carry the same tax as passenger cars and in addition a weight tax of 20 cents per 100 lbs. on weight and carrying capacity.

N. Y. Seeks Road Bond Issue

ROCHESTER, N. Y., Dec. 2—The New York State Legislature will be urged to adopt a final bond issue of $100,000,000 for permanent roads in the state. A campaign has been started for the issue by the New York State Motor Federation.

New York has a reputation for highways at the present time, but unfortunately, many of the state's highways are falling to pieces as a result of the use they have been subjected to in the past 3 years. But there have been a number of permanent highways built in the state and the comparison between the two shows the value of the permanent type in no uncertain manner.

$4 Per Ton Truck Tax

INDIANAPOLIS, IND., Dec. 12—Beginning Jan. 1, 1920, trucks operating in this city, will be taxed on a scale of $4 per ton capacity, according to an ordinance which has been passed by the local council. Thus, a 1-ton truck will be taxed $4 and a 7-tonner, $28.

Application Made to Compete with Railroads

Santa Barbara Express Co. May Compete with Southern Pacific Railroad

HOLLYWOOD, Cal., Dec. 13—A very important case strengthening the legal position of existing and projected motor truck lines for the transportation of goods over highways between cities, has just been made the subject of a decision by the California State Railroad Commission. The decision permits the Santa Barbara Motor Express Co. to operate a new line of trucks running on regular schedule to carry freight and express matter between Los Angeles and Santa Barbara. This proposed new line is parallel to a main line of the Southern Pacific Railway.

In California, before any motor truck line can operate on the highways and carry passengers or freight, it must receive, after application and hearing, a "certificate of public convenience and necessity" from the State Railroad Commission. The application of the proposed Santa Barbara line for such a certificate was opposed by the United States Railroad Administration on the ground that the Southern Pacific, and the American Railway Express Co. operating over it, were giving adequate service.

The decision of the Railroad Commission was favorable to the motor line, permitting it to operate on the ground that "the public desiring transportation of freight and express between Santa Barbara and Los Angeles is entitled to a more expeditious service than that at present being given by the Southern Pacific Co. and the American Railway Express."

Packard Truck School Opens

BOSTON, Dec. 1—More than 200 owners of Packard trucks were enrolled in the Packard truck school that opened recently in the Packard building on Commonwealth Avenue. There were more than twenty-five of the largest industries represented among the students. Practical demonstrations will be given throughout the course on lubrication, fuel, cooling, ignition, etc. Motion pictures will be used to illustrate some of the lectures, and master drivers' certificates will be awarded to all who pass the final examinations. These certificates will be recognized at any Packard service station by the officials in charge whenever the holder seeks a position.

Start Educational Campaign

To Educate Truck Owner in Organization and Business Efficiency

INDIANAPOLIS, Dec. 4—A campaign of education in organization and business efficiency to reach every truckman, transfer man and warehouseman in Indiana, has been started by the Indiana Transfer and Warehousemen's Ass'n. Plans for this educational campaign were laid in Indianapolis Nov. 29 at the convention of that association.

Arrangements were made to organize the state after the idea of political organizations, putting a vice-president in each of the thirteen congressional districts, whose duty it shall be to superintend the county organizations, which take in the county seat organizations and the men of the smaller towns.

These district organizations will cooperate with the central organization in Indianapolis and the other organizations in the larger cities, where return bureaus will be maintained and where information will be gathered and sent out.

This sort of organization is deemed necessary in a political way as well as a business aspect, for concerted action on the part of the truckman is always valuable during the session of the Indiana legislature when there is always a wealth of legislation dangerous to the truckman.

This closer organization, it was felt, would be of value in giving support to national legislation, as for instance, in supporting the Townsend Bill for a national system of highways, which the convention went on record as favoring.

From Indianapolis, a campaign of education for the truckman and the consumer will be carried on, intending to show the big future of the motor truck in solving Indiana's transportation problems in the city and the country and in the connecting of the two.

The convention went on record as favoring the proper system of roads in Indiana, built strong enough and wide enough to care for the big future motor truck transportation. City streets, too, must be improved to permit of safe motor truck transportation. For in the cities now, where bad streets exist, the cost of transportation is so heavy that the bad streets are a municipal liability. Well-paved streets would lower hauling costs through the saving of time, and the elimination of the breaking of merchandise and motor truck equipment.

In the business meeting, B. J. Bartlett, of Huntington, Ind., told of how he had reduced costs by the installation of a cost accounting system in his rural motor express work. H. E. Merrithew, of Detroit, motor truck efficiency man for the Packard Motor Car Co., emphasized the necessity of keeping costs records before the motor truck would take its proper place in the business world. Tom Snyder, secretary of the association, reviewed Indiana's work during the past 2 years in developing the rural motor express; in establishing return loads bureaus and in generally bettering the condition of motor truck transport. W. S. Frye, of Indianapolis, a transfer man, talked on "The Crime of Cruelty to Trucks," explaining the many unnecessary hardships which a motor truck was subjected to.

New Mississippi Highway

JACKSON, MISS., Dec. 2—When the state bond issue of $25,000,000 for good roads is passed at the next session of the legislature, one of the first roads to be constructed under it will be the "Central Market Highway," which will run north and south through the state, will pass through fourteen towns, and will traverse a sections not now served by railroads, but heavily populated. It will completely take the place of a north-and-south railroad running clear across Mississippi.

Urge Removal of Snow From Roads

WASHINGTON, Dec. 12—The Federal Highway Council is making an appeal to state highway departments throughout the country to keep the roads clear of snow this winter. Snow melting on the roadbed tends to soften the subgrade and loosens the base under the wearing surface. It has been found that a larger percentage of road repairs are due to winter traffic than to summer traffic. This

Red Arrow Truck a Newcomer

LANSING, Mich., Dec. 8—The Red Arrow truck, built by I. L. Story and A. B. Bowman, has made its appearance here. It is four-wheel driven and of 3-ton capacity. With the exception of the engine and a few other units, everything will be manufactured by Story & Bowman. Their plans call for a factory with 320,000 sq. ft. of floor space. They expect to be in production in the early summer.

New Truck Line to Open

Covers 17 Cities and Charges 1 Cent a Mile for Each 100 Pounds

DETROIT, Dec. 13—The Western Michigan Motor Transit Co., organized by business men of Alma and Grand Rapids, Mich., is completing preparations for opening a ship-by-truck line that will cover seventeen cities radiating from Grand Rapids. The company has a fleet of fifteen trucks and has established a regular schedule which will include Hastings, Holland, Muskegon, Fremont, Grand Haven, Allegan, Hart, Shelby, Greenville, Belding, Kalamazoo, Lowell, Big Rapids, Howard City, Iona, Ithaca and Alma.

Terminal facilities have been established at Grand Rapids and Alma and warehousing arrangements have been made at all of the other towns along the route and at convenient points between stations. The average cost of transporting freight is given in the company's announcement as I cent a mile for each 100 lbs. The territory to be covered by the truck line is thickly settled and farmers along the routes have entered into the ship-by-truck idea with enthusiasm, assuring capacity business. Paul C. Pomeroy, one of the company officials, declared the inauguration of the new system would be followed by the discontinuance of many short line railroads, which already have felt the effects of business diverted to the smaller ship-by-truck lines which have been put into operation.

Mack Service in Harrisburg

HARRISBURG, Pa., Dec. 8—The Overland-Harrisburg Co., which has been appointed central Pennsylvania distributor for Mack trucks, will open a large service station at Fourteenth and Howard Streets. Construction of this building is now under way and it will be finished by the middle of March. Temporary quarters for a shop and service station have been obtained at Cameron and Berryhill Streets. That company is also distributor for Garford and Bethlehem trucks.

Service Station for Harrisburg

HARRISBURG, Dec. 8 — The Service Motor Truck Sales Co., recently organized to handle the Service truck here, will open a well-equipped service station at 1336 Thompson Street.

The
COMMERCIAL VEHICLE
Read by Business Men

THE CLASS JOURNAL COMPANY, Publisher

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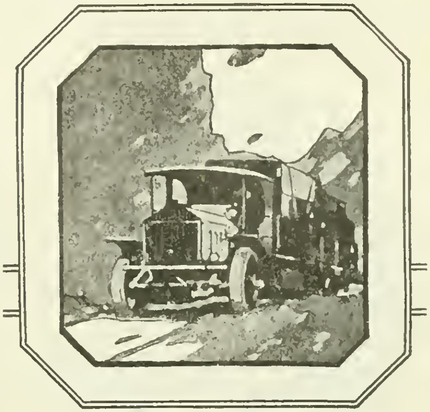

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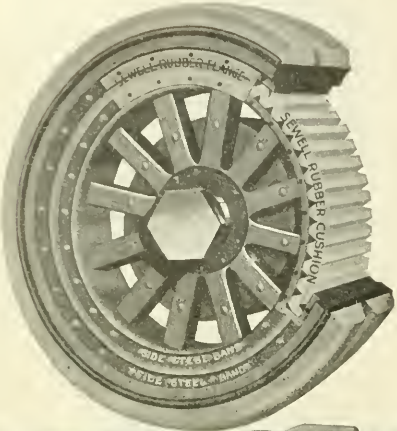
Wyman-Gordon Co.

"The Crank Shaft Makers"

Worcester, Mass. **Cleveland, Ohio**

The Resiliency is Built in the Wheel



Here are shown eight of the Fleet of twenty-one Heavy Duty Trucks owned and operated by the Hudson Motor Car Company—all equipped with Sewell Cushion Wheels

One of the Automotive Industry's Thirty-two Endorsers of

Sewell Cushion Wheels

The Hudson Motor Car Co. says:
"We purchased our first set of Sewell Cushion Wheels in 1914. The satisfaction given us by that first purchase has led us to equip twenty-one of our heavy-duty trucks with Sewell Cushion Wheels. This record, we believe, is the best evidence we can offer of our satisfaction with our investment in Sewell Cushion Wheels."

Hudson is only one of the Thirty-Two large Automotive Companies who, by re-ordering Sewell Wheels, have approved the soundness of the Sewell Principle.—*"The Resiliency is Built in the Wheel."*

These Motor Car and Parts Manufacturers of International Reputation Have Re-ordered Sewell Wheels:

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Cleveland Copper & Brass Company
Continental Motor Corp.
Delco Laboratories
Dodge Bros.
Everitt Bros.
Fisher Body Co.
Ford Motor Co.
Gemmer Mfg. Co.
General Aluminum Brass Company
Hayes Manufacturing Co.
Hudson Motor Car Co.
Hupp Motor Car Co.
Ireland & Matthews
Kelsey Wheel Co.
King Motor Co.
Long Manufacturing Co.
Manhattan Rubber Co.
Maxwell Motors Corp.
Michigan Stamping Co.
Michigan Copper & Brass Company
Parker Rust Proof Co.
Penberthy Injector Co.
Stroh Castings Co.
Timken-Detroit Axle Co.
Union Drawn Steel Co.
Wagner Electric Mfg. Co.
Winton Motor Car Co.
Wire Wheel Corporation
Young, L. A., Industries Company, Inc.

The Reason

It is the Sewell Rubber Cushion, "Built in the Wheel," supplying *Everlasting Resiliency* that adds many thousands of miles to the life of the truck tires; that reduces to a minimum repairs and replacements; that adds years of actual working life to every part of the truck; that, in short, has made possible this nation-wide endorsement and supremacy. It can be stated in a few words.

Sixty per cent of Sewell Wheels Sales are Re-Orders.

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Sewell Wheels Can Be Applied to Any Motor Truck Without Changing the Design or Construction of the Truck

For Eleven Years We Have Been Building Resiliency into Motor Truck Wheels

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Sewell Wheel Book to Truck Owners on Request

The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Jan. 1, 1920 No. 11

Hired and Owned Motor Trucks Prove Best In National Drug Distribution

Local Trucks Owned—Those in 125 Other Cities Are Hired—Demountable Bodies Show Big Saving

THE horse has passed into oblivion, as far as the haulage problems of the Louis K. Liggett Co. are concerned. That company operates the largest chain of drug stores in the United States, its territory at present taking in 125 towns and cities scattered over the country from Maine to Minnesota and south to Texas. Though, as a general rule, the old admonition, "Never swap horses when crossing a stream," is a safe guide, there are times when a "swap" offers the only solution of a serious situation. Especially is this true when "swapping horses" is interpreted literally.

When the Liggett, Riker & Hegeman, and Janes stores were merged into the Louis K. Liggett Co. some years ago that company's business was at flood tide, as it were. As they attempted to ford this stream, the officials of that company saw that the horses and wagons employed for transportation in the New York City and other territory were certain to flounder before the middle was reached.

Trucks Save Day

The officials decided to install a fleet of trucks to take care of its large warehouse business in New York and to replace the horse wagons in the other towns and cities with trucks. The merging of the three drug store companies resulted in an increase in the number of chain stores from a few to 205.

As the New York and surrounding territory took in nearly one-third of its stores it was deemed wise to locate its warehouse in that city and to take care of the deliveries to the seventy-five stores in New York and the surrounding territory entirely by motor trucks. The merging of the three firms also increased the number of stores in other cities throughout the territory to such an extent that is was found necessary to eliminate horse wagon deliveries entirely. The nine-story warehouse used was formerly the property of the Riker & Hegeman Co.

Nearly 800 tons of drug store material are handled weekly at the New York warehouse of the Liggett company. Each store throughout the entire territory averages at least 2 tons weekly. Those that are situated in busy sections of the various cities will take as much as 6 tons of materials, which include everything from a barrel of sugar, food, flour, to the regular druggist supplies. The selection of motor trucks for taking care of the deliveries throughout the territory is really an outgrowth of the war when it was impossible to ship, via freight or express, with any degree of certainty because of the car shortage and the many embargoes.

Motor trucks, though a little more expensive than horse wagons, were found more reliable in taking care of the shipments because they could be depended upon during any weather condition or when called upon for rush work. At the present time that company is paying its trucking representatives from 8 to 10 cents per 100 lb.

205 Stores Served

Centralized authority and decentralized supervision have solved all transportation problems in connection with taking care of the weekly turnover of the 205 stores scattered throughout that company's territory. A traffic department under the supervision of a traffic manager has sole charge of all trucking operations throughout the territory as well as taking charge of freight shipments. This department is located at the main offices of that company in New York City. It is responsible for the economical and efficient operation of its own trucks in New York City as well as those under contract in the rest of the cities. In order to eliminate the higher charges incurred in shipping in less than carload lots, as would be the case were only a few stores taken care of at one time in a car, the traffic department of that company arranges with forwarders so that its goods will be shipped with other consignments so as to fill a car and so receive the benefit of the reduced rates.

When new territory is about to be opened up the traffic manager is notified so that he may appoint a local trucking representative to take care of the shipments from the New York warehouse. It is his duty to arrange for the most economical contract which can be made with a local contractor under local trucking conditions. It is apparent then that he must be familiar with trucking conditions and concerns throughout the country. If at any time, however, stores are opened up in a city whose trucking concerns are not familiar to the traffic manager, his problem is usually solved by his getting in touch with some concern which has a contract with a trucking company in that particular city. It is a simple matter for him to ascertain just what concerns are represented in the cities by keeping a file of pamphlets showing the location of the stores operated by concerns of national reputation.

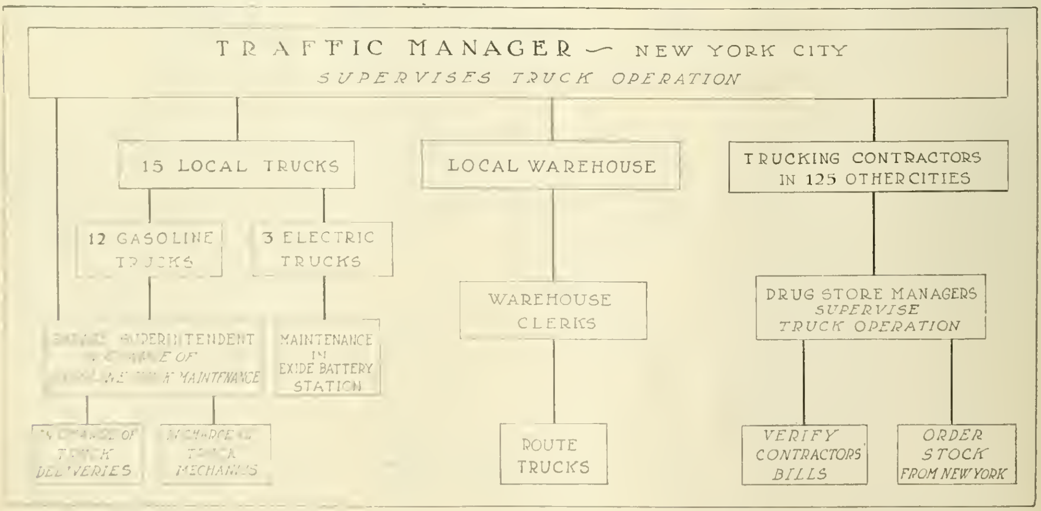
After placing his contract with the local trucking representative, the latter is instructed to make a semi-monthly statement of all goods handled by him. Duplicate copies are made up, one being sent to the local store manager and the other to the traffic department.

The store manager verifies the report by what he has received and the traffic manager by what he has sent out. In that way a check is made at both ends.

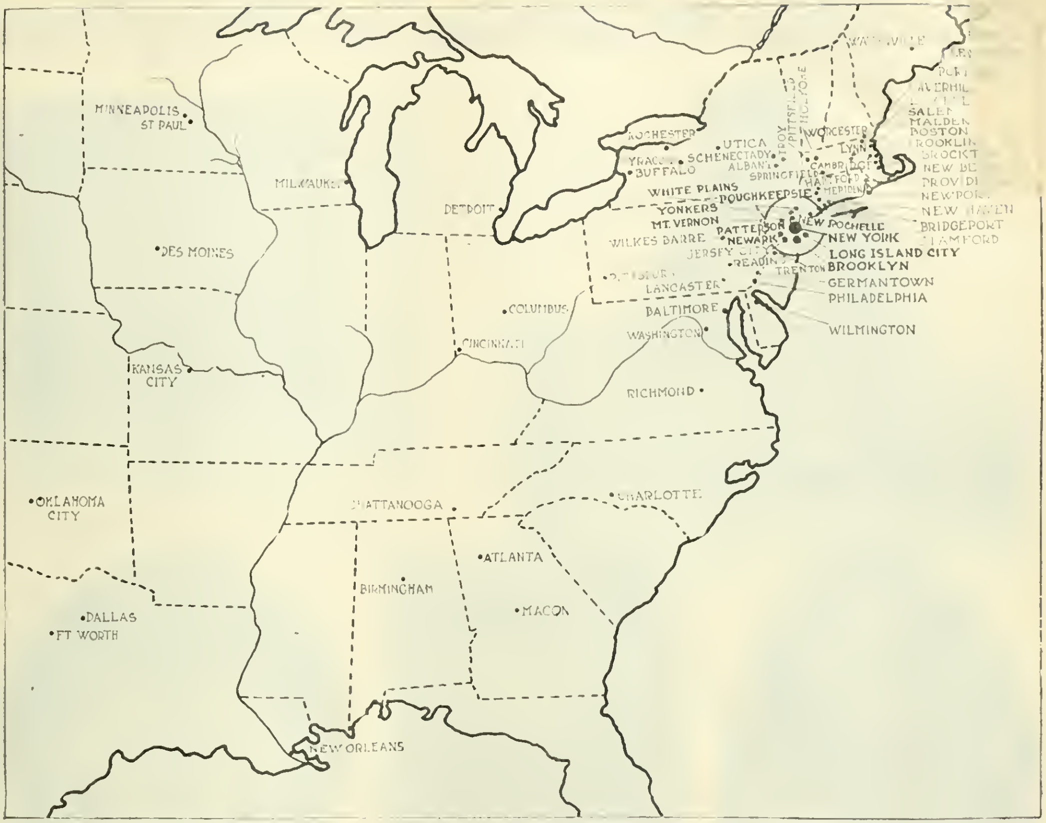
Hired Trucks Economical

Hired trucks have been found to be more economical than placing its own trucks in those cities. This is due to the fact that there is little demand for a truck straight through a period of 1 week. As shipments to the various stores are made regularly once a week the contractor is kept busy only on 1 or 2 days. He is notified in advance in regard to the amount of material that is being shipped. In order that his other local work will not conflict with that of hauling the drug store goods, shipments from New York are made on predetermined days. In many cases carloads will be sent to one place and then sent by motor trucks to the stores in nearby cities. This is so in the case of shipments to Minneapolis and St. Paul, the car being sent direct to Minneapolis.

The territory served direct by motor truck from the warehouse in New York City offers far different problems than that territory served by freight and then by motor truck. With seventy or more stores to take care of, all within a radius of 25 miles from the ware-


TRAFFIC MANAGER — NEW YORK CITY
SUPERVISES TRUCK OPERATION
15 LOCAL TRUCKS
LOCAL WAREHOUSE
TRUCKING CONTRACTORS IN 125 OTHER CITIES
12 GASOLINE TRUCKS
3 ELECTRIC TRUCKS
WAREHOUSE CLERKS
DRUG STORE MANAGERS SUPERVISE TRUCK OPERATION
SUPERINTENDENT IN CHARGE OF TRUCK MAINTENANCE
MAINTENANCE IN EXIDE BATTERY STATION
IN CHARGE OF TRUCK DELIVERIES
IN CHARGE OF TRUCK MECHANICS
ROUTE TRUCKS
VERIFY CONTRACTORS' BILLS
ORDER STOCK FROM NEW YORK

Organization chart showing how the authority of the truck traffic manager of the L. K. Liggett Co. is delegated for the operation of the fleet of owned trucks in New York City, and those hired in 125 other cities throughout the country. Truck operation and maintenance are in charge of separate departments



All the cities within the circle around New York are served by company-owned trucks operated from the New York warehouse. In all the other 125 cities shown, hired trucks are employed

house, and with an ever increasing demand for more stores, the installation of a fleet of its own trucks was manifestly the most economical thing that could have been done to solve this important problem. There were two important questions to be answered, namely: Hhow to efficiently take care of incoming raw materials, etc.; and how to take care of the daily turnover of the drug stores.

The Local Problems

From the time the organization was established up until 1917 horses and wagons had been used to haul merchandise from the piers and railroad yards to the company's warehouse. However, when the business increased through the merger with the two other companies it was found that the loading and unloading facilities at the warehouse could not accommodate the additional horse and wagon equipment that would be needed. Three electric trucks are now handling all shipments from the piers and doing it more economically and with far less waste of time. Shipments to the freight stations are being taken care of by the gasoline trucks, the electrics running empty back to the piers. This is a point of economy that will soon be attended to, as it is manifestly inefficient to run the trucks empty on the return trips to the piers.

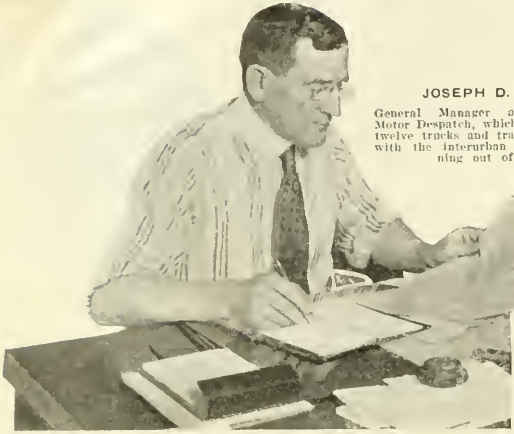
The maintenance and operation of the New York fleet of trucks are respectively taken care of by a garage superintendent and two shipping clerks. It is the duty of the garage superintendent to keep his trucks in good operating condition and to advise on the purchase of new trucks. The actual purchase of a truck is taken care of by the purchasing department, located at the main offices of the company. The superintendent notifies the traffic manager when one of his trucks has outlived its usefulness. The traffic manager then notifies the purchasing department of the need of a new truck. The purchasing department then co-operates with the traffic manager and the garage superintendent on the selection of the size and make of truck needed. The traffic manager, by keeping a check on the tonnage hauled by his trucks, can determine whether the size of his fleet is large enough to take care of the haulage of the supplies or not. It is up to him to advise on the purchase of new trucks to supplement the fleet.

The Fleet Make-Up

The fleet make-up consists of twelve Packards and three G. V. electrics; one of the Packards is a 5-tonner; eight are 6-tonners; one is of 4-ton capacity; one of 3½-ton and one of 3-ton capacity. The three electrics are 5-tonners. All of the 5- and 6-ton trucks, with three exceptions, are used for taking care of the deliveries to and from the warehouse. The other 6-ton Packard, together with the 4-tonner, are used for hauling ice cream and syrups in New York.

(Continued on page 462)

Men Prominent in Motor Truck



JOSEPH D. PORTER,

General Manager of the Interurban Motor Despatch, which operates a fleet of twelve trucks and trailers in conjunction with the interurban electric lines running out of Chicago.

JAMES WOODS,

Traffic Superintendent for R. H. Macy & Co., one of the large department stores in New York City. He has been with the Macy company for 47 years.

THOMAS J. BOWES,

Superintendent in charge of the twelve contracting trucks operated by the Union Paving Co., Philadelphia.

GEORGE J. PETERS,

Delivery Superintendent of the Boston Store, Chicago. He supervises the operation of a fleet of sixty nine department store trucks.

GEORGE H. PRIDE,

Head of the Heavy Haulage Co., New York, which operates over fifty trucks.

GEORGE HERON,

Maintenance Superintendent in charge of the department store fleet operated by the Boston Store, Chicago.

JAMES L. BLACK,

In charge of the centralized repair work on the fleet of 108 trucks and tractors owned by the Atlantic & Pacific Tea Co., Jersey City, N. J.

Fleet Operation and Maintenance

H. B. ANDERSON,

Who is in charge of the supervision and operation of the fleet of forty-six trucks and tractors working from the Jersey City, N. J., warehouse of the Atlantic & Pacific Tea Co.

W. H. COSTIGAN,

Transportation Superintendent for Robert Gair Co., Brooklyn, N. Y. He has charge of sixteen trucks

C. B. MONTGOMERY,

Superintendent of Transportation for the Union Paving Co., Philadelphia.

RODERICK STEPHENS,

Of the Olin J. Stephens Coal Co., New York, which operates a fleet of twenty-two trucks.

L. C. WRIGHT,

Who keeps the cost figures on the fleet of trucks operated by Rockwood & Co., cocoa merchants in Brooklyn, N. Y.

C. M. GEIGER,

In charge of trucks for the Peter Doelger Brewing Co., New York, and President of the Motor Truck Owners' Assn. of America.

ROSS E. BROWN,

Who assumes responsibility for the condition of the Olin J. Stephens Co.'s coal trucks.

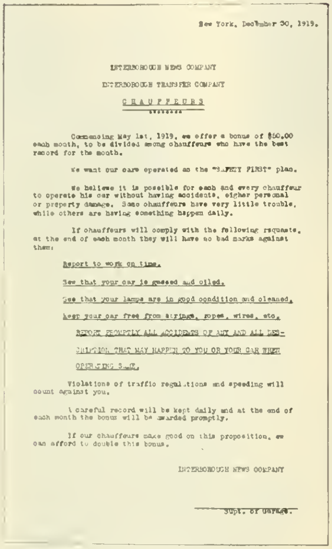
Increasing the Work Output of the Truck Driver

Monthly $50 Bonus Makes Newspaper Truck Drivers More Careful

ONE of the big items in the cost of truck operation and usually the greatest is that of the driver. It is therefore of the utmost importance that every fleet owner do everything in his power to make his drivers more productive if he wishes to lower his cost of truck transportation. There are many methods designed to make the truck driver more productive, all depending upon the work done. For instance, there is the closed cab, which enables the driver to keep warm in the coldest weather. This method is excellent for keeping up the morale of the truck driver.

Then there is the self-starter, useful for making the driver more productive by conserving his energy otherwise used in cranking. He thus can do more and better work. Every time the driver has to get down off the seat to crank the engine, he consumes two or three minutes' time before he can get back on the seat and drive his truck off. Aside from the benefits of the closed cab and the engine self-starter, many bonus systems have been worked out by truck owners to increase the driver's productivity.

A good example of how one company increased the productivity of its drivers may be cited in the experience of the Interborough News Co., a pioneer in the wholesale newspaper delivery business in New York City. That company operates twenty-five trucks to take care of the delivery of *The Evening Globe* newspapers throughout the city. Anyone conversant with the problems of the newspaper field knows that one of the first requirements of the circulation department of any newspaper is speed in making deliveries of new editions. Often local traffic rules and speed regulations are broken by the drivers in order to make the deliveries. Occasionally caution is thrown windward and as a result serious accidents are frequent.



New York, December 30, 1919.

INTERBOROUGH NEWS COMPANY

INTERBOROUGH TRANSFER COMPANY

CHAUFFEURS

Commencing May 1st, 1919, we offer a bonus of $50.00 each month, to be divided among chauffeurs who have the best record for the month.

We want our cars operated on the "SAFETY FIRST" plan.

We believe it is possible for each and every chauffeur to operate his car without having accidents, eigher personal or property damage. Some chauffeurs have very little trouble, while others are having something happen daily.

If chauffeurs will comply with the following requests, at the end of each month they will have no bad marks against them:

Report to work on time.

See that your car is gassed and oiled.

See that your lamps are in good condition and cleaned.

Keep your car free from strings, ropes, wires, etc.

REPORT PROMPTLY ALL ACCIDENTS OF ANY AND ALL DESCRIPTION THAT MAY HAPPEN TO YOU OR YOUR CAR WHEN OPERATING SAME.

Violations of traffic regulations and speeding will count against you.

A careful record will be kept daily and at the end of each month the bonus will be awarded promptly.

If our chauffeurs make good on this proposition, we can afford to double this bonus.

INTERBOROUGH NEWS COMPANY

Supt. of Garage.

For a time the Interborough News Co. tried to combat this profit-taking practice by warning its drivers of the dire results from careless driving. But this proved of no avail, as the suits for damages from injuries to pedestrians and from property damage came in just as frequently as ever. The discharge of those who were frequent offenders did not bring results as the company soon found that its delivery system would be completely demoralized through a dearth of drivers.

The System Explained

On May 1, 1919, a bonus system was installed as a means of reducing the number of accidents, violations of traffic regulations, and also as a means of keeping the trucks in good running condition.

Each month a bonus of $50 is offered those drivers who show the best records. This bonus is split up into three $10 prizes and four $5 prizes. To win the bonuses the drivers must drive through the period of 1 month without having accidents, either personal or property damage; must report on time and must see that their gasoline and oil supply is adequate. In addition, they must see that their lamps are in good condition and cleaned and must also keep the trucks free from strings, ropes, wires, etc., as well as report promptly all accidents of any and all descriptions.

The gasoline and oil supply item is important, for it determines in an indirect way the productivity of a driver. His efficiency as a driver depends upon whether he makes the deliveries of the important editions. Should he run out of gasoline or be delayed otherwise through the lack of oil, he has failed to carry out his work and has placed his employer in a most embarrassing position. In the same way, should he be held up in traffic during the course of an important delivery through faulty lighting, his productivity as a driver has been lessened just so much.

In order that there will be no cause for complaint on the awards made each month, a careful record is kept daily by the traffic manager. No truck is allowed to leave the garage during the day without first being inspected by the traffic manager. Oil and gasoline supply, lamps, etc., are included in the inspection.

Since the bonus scheme has been in operation, the Interborough News Co. has had few suits resulting from accidents, etc.; its drivers have been showing more judgment as regards speed and traffic regulations, and, in all, their productivity has been greatly increased.

The drivers are constantly reminded of the need of careful driving, etc., by a printed notice which is placed in a prominent place on a bulletin board in the garage. The words "Safety First" are prominently displayed.

DISGUISING THE FORD

for Department Store Deliveries

Wanamaker Uses $350 Bodies; Livingston Radiators and Electric Lights to Improve Vehicle Appearance

THE fleet owner whose trucks deliver direct to his customers considers three things in buying his trucks. These three are: 1. Costs, both original and operating; 2. Efficiency; 3. Appearance.

In the first of these, the matter of costs, his investigations bring him sooner or latter to the Ford 1-tonner or the Ford runabout chassis fitted with a delivery body. It is inexpensive to buy and, being very light, is inexpensive to operate.

The fleet owner next considers the Ford from the standpoint of efficiency. His conclusions will vary according to the class of work which the truck is to do, as regards both weight and quantity.

Lastly, as his trucks are to make retail deliveries, he considers the question of appearance. Presumably the truck is to do a special class of work and will, therefore, be fitted with a special type of body. It rests very much with the fleet owner, then, as to the appearance of this body. As regards the chassis, a large fleet owner in New York once remarked that the only thing against a Ford chassis, for retail delivery purposes, from the point of view of appearances, was the fact that it was a Ford and easily recognizable as such. In other words, it is well known as a very inexpensive vehicle.

The fleet owner may or may not be led to disregard the Ford for this reason. But he may also decide to use the Ford, but make additions to it which will, as far as possible and to a casual glance, disguise the fact that it is a Ford.

The Wanamaker Fords

Louis Crispin, delivery superintendent for John Wanamaker, states that the trucks at present used by John Wanamaker are all satisfactory in the class of work for which they were purchased. Modern trucks are so specialized that it is difficult, if not impossible, to compare them generally. They can only be compared as regards their usefulness for a certain class of work. Here the decision depends, according to the class of work they are to do, upon the price, the size or weight of the chassis and the weight capacity of the truck.

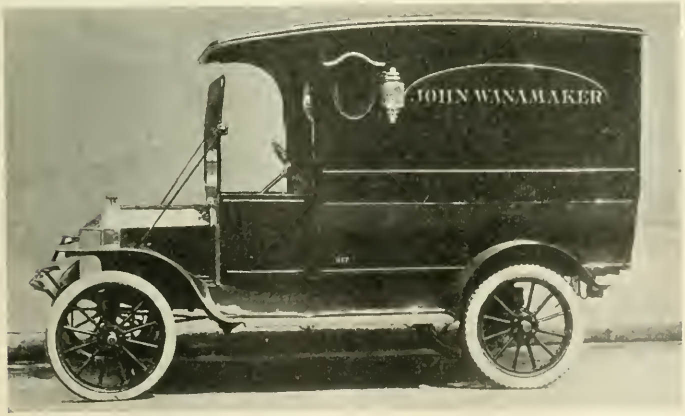
The Wanamaker fleet consists of fourteen G. V. electrics; twelve 3-ton gasoline trucks; about fifty-six 2-ton Autocars and Whites, and about thirty-five ½-ton Fords. The Fords are Ford runabout chassis, fitted with specially designed panel bodies. All these trucks are intended for a special class of work and each performs this work satisfactorily. The Fords are used for small local deliveries. Their advantage lies in the fact that into a small panel body on a Ford runabout chassis can be loaded all the packages which the exigencies of the business require to be delivered on a single trip in certain districts. Any other truck could carry these packages. But no other truck is light enough to carry them at so low a delivery cost per package.

Improving Appearances

The Wanamaker Ford trucks are fitted with high-class panel bodies which are specially designed by, and specially built for, the firm. These bodies were originally built in the West. But of late years they have been built by various body makers in New York.

The present cost of a panel body, such as that shown in the picture on this page, would be somewhere between $350 and $500. In other words, it would cost very nearly, if not quite as much as the chassis. The Fords are also fitted with Livingston radiators, bumpers and smart electric side lamps, as shown in the illustration. The current for the latter is supplied by a dry battery.

While these changes do not entirely disguise the chassis, they give the truck a smart appearance, which is all that is necessary on the third count mentioned above. An experienced driver will sometimes grumble when assigned to operate a Ford. This improved appearance will help to remove his grievance.



One of the Ford delivery trucks used by John Wanamaker. It is a Ford runabout chassis, fitted with a bumper, a Livingston radiator, electric side lamps and a $350 to $500 panel body. Note the clean lines and the generally smart appearance of the vehicle

The DUTIES of the Truck Driver

Close Attention to Small Details Essential for Successful Operation

THE average truck owner thinks mainly of his trucks as vehicles. That is, he thinks of their body space and their carrying capacity. This is natural, and he is right in thinking of his trucks as business assets. But if he stops there he is wrong.

Unfortunately, however, it is often not until a truck is laid up in the repair shop with some complicated internal trouble which he does not understand that the truck owner begins to realize that his truck is also a machine.

In spite of its simple and solid exterior, the modern motor truck is an intricate and, in one sense, a delicate machine. It is powerful and it is strongly built. It will carry heavy loads and stand almost any amount of hard work if it is properly treated. But it must receive skilled and comprehensive attention and care, like any other piece of intricate machinery. Without this attention the finest truck in the world will prove a very costly investment to its owner.

Drivers the Key

This being the case, every truck owner should assure himself that his drivers and mechanics in charge of his trucks actually know exactly what attention the trucks should receive and when they should receive it. With the best of intentions, a driver cannot give his truck the attention it requires unless he understands of exactly what that attention consists. Once he knows this, however, it is a comparatively simple matter to see that he carries out all his duties in this respect.

In a later issue of THE COMMERCIAL VEHICLE will be taken up this question of supervision over the driver's care of his truck. This present article deals with the duties themselves, their importance and the frequency with which they should be performed. Practically all the driver's duties in caring for any make of truck are covered in the box on this page, though given briefly and incompletely for convenience. There will, however, be other duties peculiar to special makes of trucks, and all these can and should be looked up and carefully memorized from the instruction book issued by the manufacturer of the truck concerned.

The Driver's Duties

Daily Duties

1—Fill specified grease cups.
2—Turn down all grease cups.
3—Oil specified parts.
4—Examine oil gage.
5—Examine spring clips.

Weekly Duties

1—Fill all grease cups.
2—Oil steering column.
3—Fill worm gear housing.
4—Oil the magneto every 500 miles.
5—Oil pins and forks on brake and control rods.
6—Clean engine.

Bi-Weekly Duties

1—Pack universal joints.
2—Clean steering gear ball joints and pack with grease.

Monthly Duties

1—Drain and refill crankcase every 2000 miles.
2—Inspect and fill gearset case.
3—Pack front hubs with grease.
4—Clean spark plugs.
5—Inspect, clean and tighten all parts.

Daily Duties

In the first place there are certain grease cups on every gasoline truck which must be filled every day. To a certain extent these will vary in number and position according to the make of the truck, but a diagram and a full explanation which will give their position will almost invariably be found in the manufacturer's instruction book. Generally speaking, these cups will be found on the fan, on the steering column, on the transmission universal joints, on the water pump shaft, on the clutch shifter flange bearing, or on any or all of these. The driver must fill and turn these grease cups all the way down every day.

Second, the driver, or whoever is in charge of the work, must turn down all the other grease cups on his truck every day. Their location will, of course, be given in the manufacturer's instruction book.

Third, certain parts of the truck must be oiled every day. The more important of these for the general run of trucks are the following: Moving parts in the radiator suspension, fan bearing, pedal shafts, control shaft and brake shaft, clutch shifter shaft, brake bellcrank shaft, etc. These will also be found specified in the manufacturer's instruction book.

Fourth, the driver should examine the crankcase oil gage on his dashboard to be sure that there is a sufficient level of oil in the crankcase. If not, he will, of course, fill up the crankcase to the required level as indicated.

Fifth, he should examine, and, if possible, tighten the spring clips. This is always important but is especially so if the truck is carrying very heavy loads.

Sixth, the driver will save himself possible future trouble by going over all visible ignition connections and assuring himself that all nuts on these are tight.

Seventh, he must be sure to fill up the radiator with clean water every morning, and oftener when the engine is heating and the water boiling or steaming. He should also fill up the gasoline tank, straining the gasoline through a chamois. The weekly, bi-weekly and monthly duties which a driver should perform will be fully dealt with in a later issue of THE COMMERCIAL VEHICLE.

1919 Biggest Truck Year—305,000 Trucks Made

Bigger 1920 Production May Result In Increased Prices to the Owner Through Possible Parts Shortage

THIS motor truck production chart means much to the fleet owner. Aside from its significance to the truck industry as showing the coming of the motor truck into its own, the increase in production from year to year, the effect of the war and the phenominal increase made during 1919, it gives valuable information to the fleet owner if he can interpret this information correctly.

In the first place, the 1919 production of 305,000 trucks has been made possible solely by the speeding up of the factories of the parts makers to the maximum. With the estimated production of 370,000 trucks in 1920 these parts makers will have to speed up still more.

Prices May Increase

The only thing which may tend to retard the great 1920 truck production will be the output of truck parts or units. Thus the inevitable working of the law of supply and demand may result in higher truck prices before the year 1920 is ended. This price increase, if it comes, will be entirely independent of the conditions in the labor and material markets in which at the present time there is no indication of lower prices.

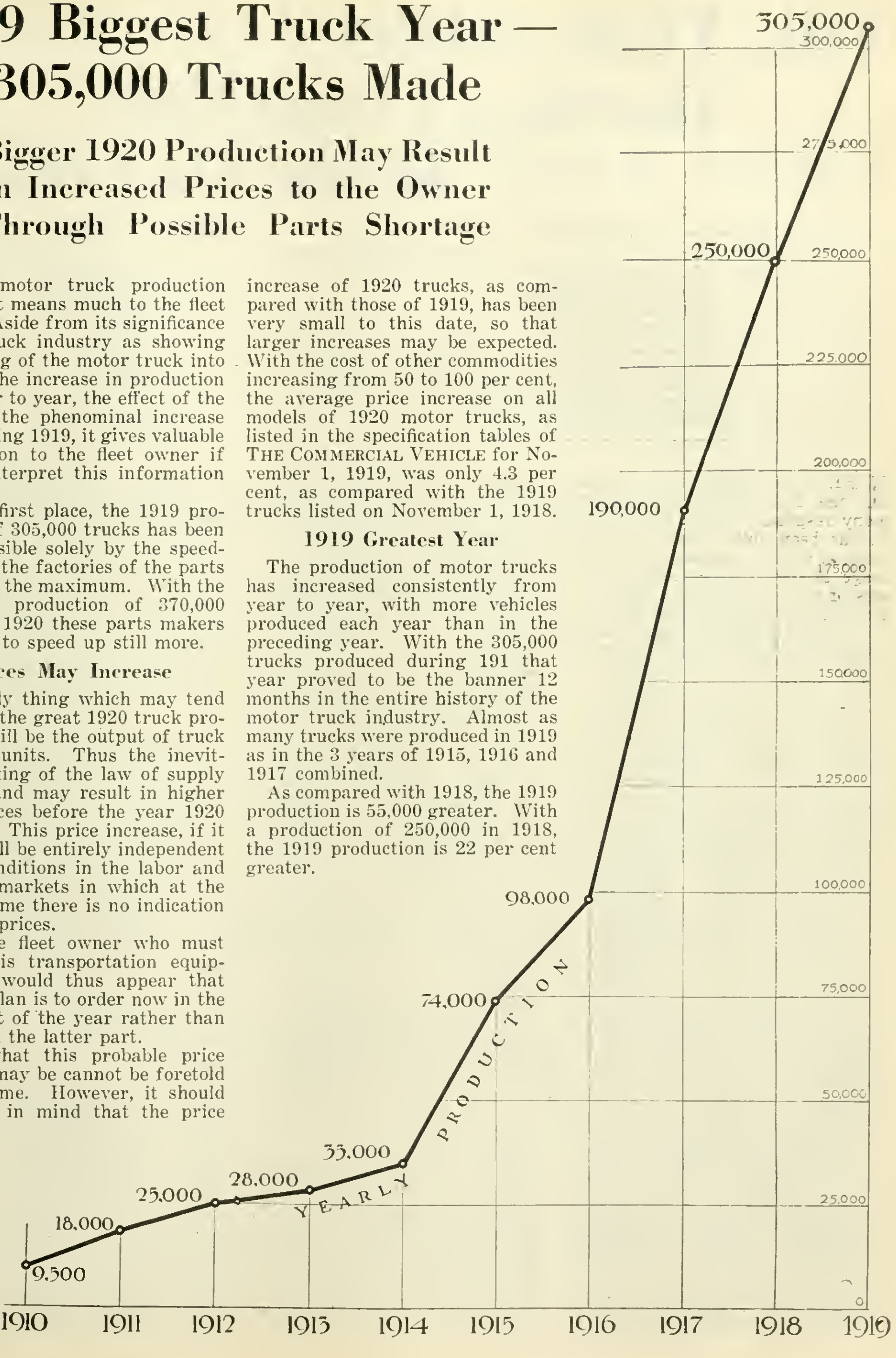
For the fleet owner who must add to his transportation equipment, it would thus appear that the best plan is to order now in the early part of the year rather than wait until the latter part.

Just what this probable price increase may be cannot be foretold at this time. However, it should be borne in mind that the price increase of 1920 trucks, as compared with those of 1919, has been very small to this date, so that larger increases may be expected. With the cost of other commodities increasing from 50 to 100 per cent, the average price increase on all models of 1920 motor trucks, as listed in the specification tables of THE COMMERCIAL VEHICLE for November 1, 1919, was only 4.3 per cent, as compared with the 1919 trucks listed on November 1, 1918.

1919 Greatest Year

The production of motor trucks has increased consistently from year to year, with more vehicles produced each year than in the preceding year. With the 305,000 trucks produced during 191 that year proved to be the banner 12 months in the entire history of the motor truck industry. Almost as many trucks were produced in 1919 as in the 3 years of 1915, 1916 and 1917 combined.

As compared with 1918, the 1919 production is 55,000 greater. With a production of 250,000 in 1918, the 1919 production is 22 per cent greater.



THE YEAR 1919 Has Been a Good One for the Fleet Owner

1919 Accomplishments

Total 1919 Production	305,000
Total 1918 Production	250,000
Gain of 1919 Production over 1918	55,000
1919 Truck Exports	14,700
1919 Domestic Truck Consumption	290,300
Trucks in Domestic Service January 1, 1918	351,000
Trucks in Domestic Service January 1, 1919	480,000
Trucks in Domestic Service January 1, 1920	674,300
Planned Production for 1920	370,000

THE year 1919 has been a good one for the fleet owner in many respects. In the first place, he has been able to buy a better truck at a price increase on the average of only 4.3 per cent in excess of those prevailing at the beginning of the year. This is very low considering that many other commodities have risen in cost anywhere from 100 to 200 per cent.

The improved truck which he has been able to purchase has been better than its predecessor in general balance and particularly in improved engine design with hot-spot manifolds to increase the mileage per gallon from present day fuel. Then, too, the average trucks of 2-, 2½-, 3½- and 5-ton capacity are now fitted with four-speed gearsets instead of those of the three-speed type. This has given the truck driver one additional speed with an especially low gear reduction in first speed for starting heavy loads or pulling through rough going. Electric starters and lights have increased to a small extent. Similarly, pneumatic tires have progressed in their development as one means of speeding up the motor truck and enabling it to cover more ground and do more work in a day.

While the truck owner has been faced with the increased cost of labor and materials, the cost of labor has not gone up more than in other lines of industry. In many instances the drivers' and helpers' wages have increased less than in other lines of work.

The effect of the great war and the motorized equipment used in the military operations has left an indelible stamp on the commercial use of motor trucks. Not alone have many of the improved points of design of the Class B war truck been incorporated into the commercial models, but the war has shown the conservative business man many more uses for motor trucks than were dreamed of in 1914.

The fleet owner should also be thankful for the greatly increased amount of road construction work begun during 1919 after almost two years of inactivity. More money was appropriated during 1919 for new road work and for the maintenance of roads already built than ever before in the history of the world. The war has also had its effect on teaching the lessons of the great importance of improved highways, and the voting public seems convinced that we must have new and better and wider types of roads to care for the future demands of highway transportation.

While 1919 was the banner year in road appropriations in this country, the effect of these appropriations will be more actively felt during 1920 when much of the road work started last year will be opened to highway truck traffic.

While license fees in most States have been increased, and while in some instances evidences of discrimination against the motor truck have cropped out, on the average, the 1919 motor truck laws have been conservative and well founded. The fleet owner who derives considerable advantage from the construction and maintenance of good roads must be willing to pay for a certain proportion of the work. Viewed from a selfish angle, he will probably get back many times the cost of increased fees in low operation and maintenance charges resulting from improved highways.

In the industry itself, the year 1919 has been one of great production, for more motor trucks were produced than in any previous year in the history of the manufacture of commercial vehicles. Still more trucks will be produced in 1920. Information from manufacturers seems to indicate a larger 1920 production than the production chart given on another page of this issue would indicate to be a normal growth.

With the great farm market for motor trucks only scratched and with a continued growth of the use of trucks in large industrial centers, it seems that the demand will exceed the supply. The only factor which may affect the increased 1920 production will be the ability of the parts manufacturers to expand their facilities to meet the requirements of the assemblers. If this cannot be done, the law of supply and demand may operate to increase truck prices.

**EDITOR'S NOTE: Notwithstanding that the Editor has received information from truck manufacturers which shows that the total planned production for 1920 is 425,000, the figure of 370,000 trucks is considered more conservative in view of the possible inability of truck parts manufacturers to increase their facilities to turn out parts for 120,000 more trucks in 1920 than in 1919, or an increase of approximately 39 per cent in 1 year.*

OWNER CONFERENCES Are Biggest Features of BOTH TRUCK SHOWS

FOR the fleet owner, the most important features of the two motor truck shows to be held in New York and Chicago respectively from January 3 to 10 and January 24 to 31 are the Highway Transport Conferences to be given each night at the two places of exhibition. Interesting addresses on vital topics of truck operation will be rendered by men who are considered experts in their particular lines. This will be the first occasion when meetings of this kind have been attempted to give the present and prospective fleet owner an opportunity of increasing his fund of truck operation knowledge at the same time he is looking over the new truck models.

The two 1920 shows are again held under the auspices of the national organization of truck manufacturers, whereas last year both shows were engineered by the dealer organizations in the two cities.

Both truck shows this year are unusual from another viewpoint in that they are in nowise combination shows in connection with passenger cars and are not held in the same buildings as the passenger car shows on the weeks following. Instead, both shows will be held in the largest structures available in New York and Chicago, and both show sites are a considerable distance from the buildings where the passenger car shows have been held in years past.

In other words the 1920 motor truck shows will have to stand or fall on their own merits.

In New York City, this decision has resulted in the selection of a show site entirely off the Island of Manhattan, where every national motor truck show has been held in previous years. The Eighth Coast Artillery Armory is in the Bronx Borough, approximately seven or eight miles from the Grand Central Palace, where the passenger car show is being conducted during the same week. Although at first thought the location of the armory may seem too far away from the business center of the city, it is well served by the subway and elevated systems, both of which deposit those who wish to attend at the very door of the armory. The armory floor is 300 by 600 ft., with a clear span from wall to wall without a post. It is thus one of the largest exhibition buildings of its kind in the world and the truck exhibits will be laid out without crowding and with especially wide aisles to prevent congestion and to facilitate the inspection of all of the exhibits without inconvenience.

For the Truck Owner at New York

Monday, January 5, Motor Vehicles in Passenger Transportation, Replacing Street Cars With Motor Buses, Motor-bus Operation.

Tuesday, January 6, Increasing Motor Haulage Efficiency, Cost Accounting, Routing and Dispatching, Loading and Unloading Devices, Incentives for Drivers and Helpers.

Wednesday, January 7, A Rural Motor Express, Its Opportunities as an Investment and Business Career, Its Advantages to the Shipper, Its Benefits to the Producer and Consumer.

Thursday, January 8, Aids to Motor Truck Efficiency, Trailers, Pneumatic Tires.

Friday, January 9, Motor Truck and Railroad Freighting Cost, Range and Service Comparisons, Connecting Farms and Markets.

Saturday, January 10, Highways and Motor Transport, Relation of Roads to Operating Cost, Progress in Highway Improvement, Constructing Roads for Motor Truck Traffic.

For the Truck Owner at Chicago

Monday, January 26, Motor Truck and Railroad Freighting, Cost and Service Comparisons, Economic Range of the Motor Truck.

Tuesday, January 27, The Farmer's Haulage Problems, The Horseless Farm, Connecting Farms and Markets, Farm Power.

Wednesday, January 28, Rural Motor Express, Its Opportunities as an Investment and Business Career, Its Advantages to the Shipper, Its Benefits to the Producer and Consumer.

Thursday, January 29, Highways and Motor Transport, Relation of Roads to Operating Cost, Progress in Highway Improvement, Constructing Roads for Motor Truck Traffic.

Friday, January 29, Increasing Motor Haulage Efficiency, Cost Accounting, Routing and Dispatching, Loading and Unloading Devices, Incentives for Drivers and Helpers.

Saturday, January 31, Aids to Motor Truck Efficiency, Trailers, Pneumatic Tires.

However, the big advantages of this new type of show to the present or prospective fleet owner are the Highway Transport Conferences. The general topics to be discussed each evening at the New York and Chicago shows are given in the two boxes on this page.

Last-minute information as we go to press gives the subjects of the particular papers to be read each night and their authors as follows:

MONDAY EVENING, JANUARY 5

Educational Institutions and Highway Transport, by Dr. P. P. Claxton, Commissioner of the Bureau of Education, Washington, D. C.

Ship by Truck, by Ernest Farr, Firestone Tire & Rubber Co., Akron, Ohio.

Replacing Street Cars with Motor Buses, by the Hon. Grover A. Whalen, Commissioner of Plants and Structures, City of New York.

TUESDAY EVENING, JANUARY 6

Cost Accounting, Routing and Dispatching, by S. S. Merrithew, Packard Motor Car Co., Detroit.

Loading and Unloading Devices, by Joseph Husson, Editor, THE COMMERCIAL VEHICLE.

Incentives for Drivers and Helpers, by H. B. Weaver, Consulting Engineer.

WEDNESDAY EVENING, JANUARY 7

Opportunities of Rural Motor Express, by Thomas Snyder, Chairman Indiana Highway Transport Committee.

Advantages of Rural Motor Express to the Shipper, by the Hon. Peter G. Ten Eyck, Chairman New York State Highway Transport Committee.

Benefits of Rural Motor Express to the Producer and Consumer, by James E. Boyle, Professor of Rural Economy, Cornell University.

THURSDAY EVENING, JANUARY 8

Trailers, by F. Van Z. Lane, Transportation Engineer, Packard Motor Car Co.

Pneumatic and Solid Tires, by A. F. Masury, Chief Engineer, International Motor Co.

Designing Buildings to Facilitate Motor Transport, by George H. Pride, President Heavy Haulage Co., New York City.

FRIDAY EVENING, JANUARY 9

Connecting Farms and Markets, by U. S. Senator Arthur Capper of Kansas.

Cost, Range and Service Comparisons, by W. J. L. Banham, Traffic Manager Otis Elevator Co.

SATURDAY AFTERNOON, JANUARY 10

Relation of Roads to Operating Costs, by Arthur H. Blanchard, Professor of Highway Engineering and Transport, University of Michigan.

Progress in Highway Improvements, by H. Eltinge Breed, former President, American Road Builders' Assn.

Constructing Roads for Motor Truck Traffic, by F. G. Thompson, Highway Engineer, State of New Jersey.

Seventy Truck Makes at the New York Show

Show Twice as Large in Number of Vehicles To Be Shown as That of 1919

SEVENTY makes of trucks comprising 288 vehicles will be on exhibition at the opening of the New York Motor Truck Show on January 3 at the Eighth Coast Artillery Regiment Armory in the Bronx. Unlike previous shows the majority of vehicles shown will be equipped with bodies. There will be 148 trucks mounted with bodies and 140 chassis. One new truck will make its first appearance, that being the Graham 1½-tonner, made by Graham Bros., Evansville, Ind. Up to this time they have centered their manufacturing facilities on an adapter. Three trailer and two body makers will have exhibits at the truck show.

Among those listed as new models will be the four-cylinder 3½-ton Autocar; the Graham 1½-tonner; the Sterling 5-tonner with its six-speed gearset; the 3-ton Packard built for use with pneumatics; the 1-ton Federal and the 5-ton Ward La France. At the accessory exhibits will be found a number of new parts that are making their first appearance to the public. Among these are the new Flint driving axle, the Parker silent internal gear-driven axle and the aluminum truck wheel made by the Aluminum Castings Co., Cleveland. One of the new accessories making its first appearance at the show this year is the Peters crankshaft grinder, made by the Aluminum Brazing Solder Co., Philadelphia.

New 3½-Ton Autocar

Like the previous 2-ton model, the new four-cylinder power plant of the Autocar is located under the driver's seat. The truck is equipped with solid tires. A complete description of this new model will appear in the next issue of THE COMMERCIAL VEHICLE.

The 1½-ton internal gear-driven model to be shown by Graham Bros. has been designed to carry a full 1½-ton load at a speed of 20 to 25 m.p.h. Accessibility is a factor which has received careful attention and such refinements as Disteel wheels and pneumatic tires are standard equipment. The price of the chassis is $2,295; its wheelbase is 133 in.; the tires are 35 by 5 all around. The Continental four-cylinder engine has a bore of 3¾ in. and a stroke of 5, giving a hp. rating of 22.5. Equipment includes starting and lighting, two side lights and a tail light with license bracket, electric horn, Prest-O-Lite battery, engine-driven tire pump, Odometer, governor, Moto-

The Eighth Coast Artillery Regiment Armory, in which the New York motor truck show will be held. Here seventy makes of trucks and 288 vehicles will be on exhibition meter, front fenders with mud skirts and short runningboards, tool box with tool kit and jack.

The 5-ton Ward La France has been built for heavy duty work. Its engine which is 5 by 6¼ is the slow-speed type, making only 900 r.p.m. at 15 m.p.h This new model is fitted with standard equipment including a bumper, horn, radiator shutters, Motormeter and Kelly-Springfield tires.

The feature of the new Sterling 5-tonner is its six-speed gearset. In the new Sterling the three speeds of a standard transmission are multiplied by a two-speed jackshaft which gives the truck direct drives with six graduating speeds forward and two backward. This double range—the lower for power and the higher for speed—enables the driver to operate the truck at all times at its greatest efficiency under the varying road conditions. Sufficient power is developed with the lowest of the six speeds for pulling out of gravel pits, running over soft ground and climbing steep inclines. When the going is good a higher range of speeds may be used. An important advantage of this multiplicity of speeds is the resulting fuel economy. With the truck running on what is called the "High-High," the highest of the six speeds which is a direct drive, a rate of 15½ to 17 m.p.h. may be obtained.

Packard Built for Pneumatics

The Packard 3-tonner which is fitted all around with giant pneumatics is equipped with a 5-ton engine to give the extra power needed to accommodate the added speed through the use of pneumatics. The chassis price is $5,500. The model to be exhibited at the show is fitted with a box body covered with a six-post canopy top. This model is also fitted with a Babcock vestibule all-steel cab, designed to give the driver protection in all kinds of weather. The cab may be locked, being provided with a compartment in which tools, important papers or other articles may be left safely. The cab is installed on a three-point spring suspension, which helps to eliminate the abrupt jolts and jars to which a driver is subjected when the cab is fastened directly to the chassis.

The 1-ton Federal has been put on the market aften an absence of about two years. The new model to be exhibited is featured with disc wheels, pneumatic cord tires and electric lights. The price of the chassis is $2,300. The disc wheels are dished and tapered and have straight side rims with bolted outer flanges so that the tires can be changed with the minimum of effort. The electrical equipment includes a generator, battery and electric side, tail and dash lights. The battery is provided with a cushion mounting on frame brackets and an electric starter can be furnished optional at an additional cost.

The Parker axle is an improved truck axle of the internal-gear type, embodying many features. A multi-disk brake, completely inclosed within the axle and operating in an oil bath, is one of the big features of this axle. The design of the Parker axle makes possible an absolute oil-tight, dirt and grit-proof enclosure of all operating parts. The driving bevels, differential and driveshafts operate in an oil bath. Accessibility is another feature. A full floating driveshaft makes possible the removal of either brake unit or dif-

New York Truck Show Exhibits

TRUCK	MAKERS	ADDRESS
1. Acason	Acason Motor Truck Co	Detroit
2. Ace	American Motor Truck Co	Newark, Ohio
3. Acme	Acme Motor Truck Co	Cadillac, Mich.
4. Armleder	O Armleder Co	Cincinnati, Ohio
5. Atterbury	Atterbury Motor Car Co	Buffalo, N. Y.
6. Autocar	Autocar Co.	Ardmore, Pa.
7. Bethlehem	Bethlehem Motors Corp	Allentown, Pa.
8. Brockway	Brockway Motor Truck Co	Cortland, N. Y.
9. Clydesdale	Clydesdale Motor Truck Co	Clyde, Ohio
10. Commerce	Commerce Motor Car Co	Detroit
11. Corbitt	Corbitt Motor Truck Co	Henderson, N. C.
12. C. T.*	Commercial Truck Co	Philadelphia, Pa.
13. Day-Elder	Day-Elder Motors Co	Newark, N. J.
14. Defiance	Turnbull Motor Truck & Wagon Co	Defiance, Ohio
15. Denby	Denby Motor Truck Co	Detroit
16. Diamond-T	Diamond-T Motor Car Co	Chicago
17. Dodge Bros	Dodge Brothers	Detroit
18. Dorris	Dorris Motor Car Co	St. Louis, Mo.
19. Federal	Federal Motor Truck Co	Detroit
20. F. W. D	Four Wheel Drive Auto Co	Clintonville, Wis.
21. Garford	Garford Motor Truck Co	Lima, Ohio
22. Gramm-Bernstein	Gramm-Bernstein Co.	Lima, Ohio
23. Graham	Graham Bros.	Evansville, Ind.
24. Huffman	Huffman Bros. Motor Co	Elkhart, Ind.
25. Hurlburt	Hurlburt Motor Truck Co	New York City
26. Indiana	Indiana Truck Co	Marion, Ind.
27. I. H. C	International Harvester Co	Chicago
28. Jackson	Jackson Motor Corp	Jackson, Mich.
29. Jumbo	Nelson Motor Truck Co	Saginaw, Mich.
30. Kelly-Springfield	Kelly-Springfield Motor Truck Co	Springfield, Ohio
31. Keystone	Commercial Car Unit Co	Philadelphia, Pa.
32. Kissel	Kissel Motor Car Co	Hartford, Wis.
33. Koehler	H. J. Koehlers Corp	Newark, N. J.
34. Maccar	Maccar Co.	Scranton, Pa.
35. Master	Master Trucks, Inc	Chicago
36. Maxwell	Maxwell Motor Co	Detroit
37. Nash	Nash Motors Co	Kenosha, Wis.
38. Oldsmobile	Olds Motor Works	Lansing, Mich.
39. Oneida	Oneida Motor Truck Co	Green Bay, Wis.
40. Packard	Packard Motor Car Co	Detroit
41. Paige	Paige-Detroit Motor Car Co	Detroit
42. Pierce-Arrow	Pierce-Arrow Motor Car Co	Buffalo, N. Y.
43. Rainier	Rainier Motor Corp	New York City
44. Reo	Reo Motor Car Co	Lansing, Mich.
45. Republic	Republic Motor Truck Co	Alma, Mich.
46. Rowe	Rowe Motor Truck Co	Lancaster, Pa.
47. Sandow	Sandow Motor Truck Co	Chicago
48. Sanford	Sanford Motor Truck Co	Syracuse,. N. Y.
49. Sayers	Sayers & Scoville Co	Cincinnati, Ohio
50. Schacht	G. A. Schacht Motor Truck Co	Cincinnati, Ohio
51. Schwartz	Schwartz Motor Truck Co	Reading, Pa.
52. Selden	Selden Truck Corp	Rochester, N. Y.
53. Service	Service Motor Truck Co	Wabash, Ind.
54. Standard	Standard Motor Truck Co	Detroit
55. Sterling	Sterling Motor Truck Co	Milwaukee, iWs.
56. Stewart	Stewart Motor Corp	Buffalo, N. Y.
57. Sullivan	Sullivan Motor Car Co	Rochester, N. Y.
58. Tower	Tower Motor Truck Co	Greenville, Mich.
59. Transport	Transport Truck Co	Mt. Pleasant, Mich.
60. Three Point	Three Point Truck Corp	New York City
61. Triangle	Triangle Motor Truck Co	St. Johns, Mich.
62. Union	Union Motor Truck Co	Bay City, Mich.
63. Velie	Velie Motors Corp	Moline, Ill.
64. Vim	Vim Motor Truck Co	Philadelphia, Pa.
65. Walker*	Walker Vehicle Co	Chicago
66. Walter	Walter Motor Truck Co	New York City
67. Ward*	Ward Motor Vehicle Corp	Mt. Vernon, N. Y.
68. Ward La France	La France Motor Truck Co	Elmira, N. Y.
69. Wilson	J C Wilson Co	Detroit.
70. Winther	Winther Motor Truck Co	Kenosha, Wis.

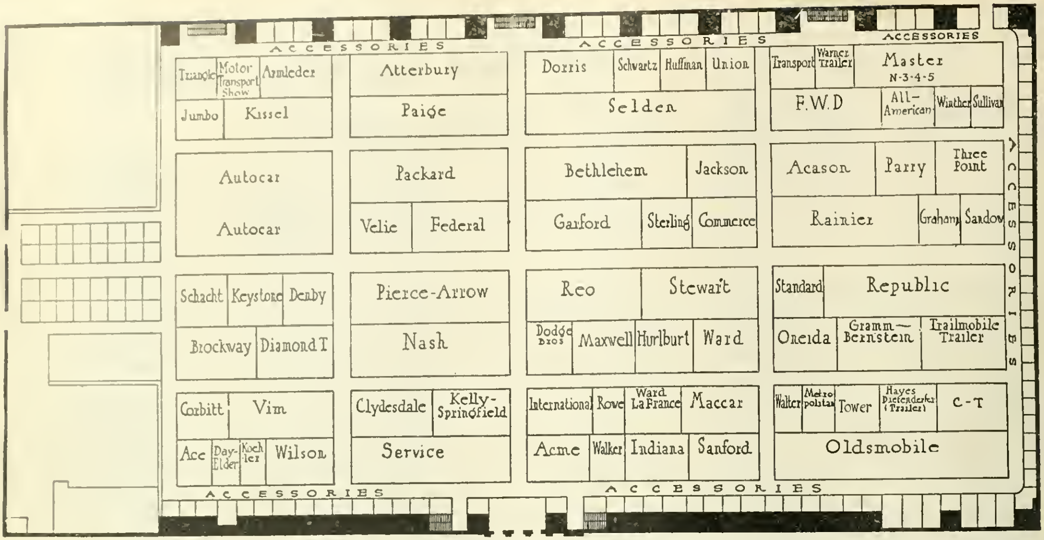
*Indicates an electric truck.

TRAILERS

1. Highway	Hayes-Diefenderfer Co., Inc	New York City
2. Trailmobile	Trailmobile Co.	Cincinnati, Ohio
3. Warner	Warner Mfg. Co	Beloit, Wis.

BODIES

1. Metropolitan	Metropolitan Body Co., Inc	Bridgeport, Conn.
2. Parry	Parry Mfg. Co.	Indianapolis, Ind.



WHERE THE TRUCKS ARE TO BE DISPLAYED AT THE MOTOR TRUCK SHOW, 8th COAST ARTILLERY ARMORY, JAN 3-10

Floor plan of the New York motor truck show, which will be held at the Eighth Coast Artillery Regiment Armory, in the Bronx, from Jan. 3 to 10

ferential unit without disturbing the wheels, internal gears or case surrounding these gears. The wheels are demountable without disturbing the internal gears or the gear case.

In the new Flint driving axle, made by the Flint Axle Co., Flint, Mich., the final reduction is through a train of spur gears at the wheel, three equally spaced pinions being mounted on studs in the hub casings and rotating between a fixed ring gear and the drive gear on the end of the main shaft. Because of this reduction in the hub the bevels and consequently the bevel gear housing in the center of the axle are small, giving high road clearance. The bevel gear reduction is 2.14 to 1. The axle is of the full floating type. The thorough lubrication of the axle parts is a feature emphasized by the manufacturers. The heavy oil used is free to flow from one wheel to another, flooding all bearings and gears.

Aluminum truck wheels made by the Aluminum Castings Co. are the latest product to be fabricated from the light metal. Lynite wheels designed to reduce unsprung weight and to facilitate the operation of wheel-changing are now on the market. The tests have demonstrated the ability of the wheels to resist fatigue, and further tests have been conducted for the purpose of bringing out the strength of the wheels as regards side thrust and radial compression. The wheels weigh approximately one-half as much as those of other types, and it is claimed by the Aluminum Castings Co. that they have the advantage of affording easy tire changes for the reason that they do not rust and consequently the locking ring and the tire are never frozen in place. The Lynite wheel is a one-piece aluminum alloy casting made in either spoke or disk type designs. Due to its properties it decreases the weight below the springs materially, and it is contended that by the use of Lynite wheels tire mileage is increased materially.

The feature of the Peters grinder, made by the Aluminum Brazing Solder Co., Philadelphia, is that it is so constructed that it removes only the high spots on a crankpin that is out of round, thus saving metal in the shaft with a resultant greater strength and considerably reducing the necessity for rebabbitting. The tool is split and hinged so that it can be put on and taken off the pin, and the cutters are operated by a screw plate which moves all of them in or out at the same time and the same amount. There are eight silver steel cutters which are ground at the ends to allow for the fillet, and the cutters extend far enough to prevent chips from clogging and scratching the surface of the pin. The price is $75.

The parts and accessory makers that will have exhibitions at the truck show will include the Aluminum Brazing Solder Co., Philadelphia; Aluminum Castings Co., Cleveland; American Bosch Magneto Corp., Springfield, Mass.; American Chain Co., Bridgeport, Conn.; American Machine Co., Newark, Del.; American Taximeter Co., New York City; Apollo Magneto Corp., Kingston, N. Y.; Arrow Grip Mfg. Co., Glens Falls, N. Y.; Bausch Machine Tool Co., Springfield, Mass.; J. V. Bendus, New York City; Buda Co., Harvey, Ill.; Byrne, Kingston & Co., Kokomo, Ind.; Challoner Co., Oshkosh, Wis.; Continental Motors Corp., Detroit; Dayton Steel Foundry Co., Dayton; Joseph Dixon Crucible Co., Jersey City, N. J.; Duplex Engine Governor Co., Brooklyn, N. Y.; Eastern Machine Co., South Easton, Mass.; Eisemann Magneto Co., Brooklyn, N. Y.; Empire Axle Co., Dunkirk, N. Y.; Flint Motor Axle Co., Flint, Mich.; Franklin Machine & Tool Co., Springfield, Mass.; Gray & Davis, Inc., Boston; Robert H. Hassler, Indianapolis, Ind.; Hercules Motors Mfg. Co., Canton, Ohio; Hero Mfg. Co., Philadelphia; Houpert Machine Co., Long Island City, N. Y.; Hudson Motor Specialties Co., Philadelphia; Jaxon Steel Products Co., Jackson, Mich.; Lauraine Magneto Co., New York City; Mead-Morrison Mfg. Co., East Boston, Mass.; Merchant

(*Continued on page* 453)

CHICAGO TRUCK SHOW WILL DISPLAY 65 MAKES

Will be Half Again as Large as in 1919—Stockyard Amphitheatre Replaces Coliseum

SIXTY-FIVE makes of motor trucks and fifty-two makes of motor truck parts and accessories will be exhibited at the exclusive motor truck show which opens in Chicago on January 24 and closes on January 31. The exhibition will be held at the International Amphitheater, located near the stockyards. This show will be the largest that has been held in that city. Last year when the exhibition was held at the Coliseum and the Annex, forty-two makes of trucks and forty-three makes of motor truck parts and accessories were on exhibition. Four trailer and four body makers will have exhibitions at the Chicago show. One new maker of trucks, Graham Bros., Evansville, Ind., will have an exhibit at the show. This new truck is a 1½-tonner.

Four-Cylinder Autocar

The following companies will exhibit new models of trucks, as described more fully further on in this article: Autocar Co., Ardmore, Pa.; Graham Bros., Evansville, Ind.; Packard Motor Car Co., Detroit, and the Federal Motor Truck Co., Detroit. Among the accessory and parts makers that will show new models will be the Aluminum Castings Co., Cleveland; the Flint Motor Axle Co., and the Parker Axle Co., Indianapolis, Ind.

The new Autocar model is equipped with a four-cylinder engine and is of 3½-ton capacity. Like the previous 2-ton model, the power plant is located under the driver's seat. The truck is equipped with solid tires all around.

The 1½-ton internal-gear-driven model shown by Graham Bros. has been designed to carry a full 1½-ton load at a road speed of 20 to 25 m.p.h. Accessibility is a factor which has received careful attention and such refinements as Disteel wheels and pneumatic tires of truck type are standard equipment. The price of the chassis is $2,195. Its wheelbase is 133 inches and the final drive is internal gear. The tires are 35x5 all around. The Continental engine employed has a three-bearing crankshaft; a constant level lubrication system maintained by a plunger pump, and thermo-syphon cooling through a finned-tube removable-core radiator with a pressed steel case. An Eisemann magneto furnishes the ignition and a combination gear-driven generator furnishes current for electric head and tail lamps. A Stromberg carbureter is fitted and the engine speed is controlled by a Monarch suction type governor. Clutch and gearset are of Fuller make and are in unit with the engine. The drive is through a two-shaft, three universal joint propeller shaft, which is supported in the center by a heavy bracket containing a self-aligning double-row ball bearing. The Torbensen rear axle has nickel-steel gears and the entire load is borne by a drop-forged I-beam dead axle. Disteel disk wheels are fitted and the equipment includes electric head and tail lamps, electric horn, storage battery, engine-driven tire pump, odometer, speed-governor, Motometer, set of tools and jack.

Featuring disk wheels, pneumatic cord tires and electric lights, the new series Federal 1-ton truck is to be marketed at $1,300 in the chassis, this price not including war tax or freight. The engine is L-head design with four cylinders, 3¾ by 5 in., developing 30 h.p. at normal engine speed. Ignition is by high tension magneto, the carbureter of float feed type and the speed is controlled by a centrifugal hydraulic governor.

New Federal 1-Tonner

The engine is cooled by a fan and water pump, the radiator having a detachable core and pressed steel tanks which are made rust-proof. The use of pressed steel for the radiator tanks is not absolutely new in Federal design, but it has effected a very considerable saving in weight at the front end, and as it has been highly successful it is continued in this new model. Gasoline is fed to the carbureter from a 10-gal. tank which is mounted on the chassis under the seat, the fuel going through a filter to a vacuum system on the dash. The clutch is a dry-plate member, the rings being faced with asbestos fabric and the whole being enclosed in a bell housing. The gearset is mounted amidships on two frame cross members and provides three speeds forward and one reverse. Annular bearings are used throughout the gearset. A novelty in truck design is the mounting of a power tire pump on the outside of the gearset housing. With the gearset mounted in the center there are two propeller shafts, both of which are tubular and provided with two universal joints each.

The rear axle is of worm type containing a one-piece pressed steel housing and allowing a gear ratio of 6.2 to 1. The brakes are duplex expanding, operating on drums 15 by 3 in. located on the rear wheels. The radius rods are provided with spherical joints and the front axle with a drop forged I-beam section member with tapered roller bearings for the wheels.

New Packard 3-Tonner

The new Packard 3-ton model to be shown at the Chicago show is equipped with a 5-ton engine to give the extra power needed to accommodate the added speed made possible through the use of giant pneumatics. A Kellogg tire pump is part of the equipment. The new model is fitted with a box body covered with a six-post canopy top and a Babcock vestibule all-steel cab, designed to give the driver protection in all kinds of weather. The cab may be locked, being provided with a compartment in which tools, important papers or

Chicago Truck Show Exhibits

	TRUCK	MAKER	MAKER'S ADDRESS
1.	Acason	Acason Motor Truck Co	Detroit
2.	Acme	Acme Motor Truck Co	Cadillac, Mich.
3.	All-American	All-American Truck Co	Chicago
4.	Ace	American Motor Truck Co	Newark, Ohio
5.	Armleder	O. Armleder Co	Cincinnati, Ohio
6.	Atterbury	Atterbury Motor Car Co	Buffalo, N. Y.
7.	Autocar	Autocar Co	Ardmore, Pa.
8.	Bethlehem	Bethlehem Motors Corp	Allentown, Pa.
9.	Clydesdale	Clydesdale Motor Truck Co	Clyde, Ohio
10.	Commerce	Commerce Motor Car Co	Detroit
11.	D-E	Day-Elder Motors Co	Newark, N. J.
12.	Denby	Denby Motor Truck Co	Detroit
13.	Dependable	Dependable Truck & Tractor Co	Galesburg, Ill.
14.	Diamond-T	Diamond-T Motor Car Co	Chicago
15.	Dodge Bros	Dodge Bros.	Detroit
16.	Dorris	Dorris Motor Car Co	St. Louis, Mo.
17.	Famous	Famous Trucks, Inc	St. Joseph, Mich.
18.	Federal	Federal Motor Truck Co	Detroit
19.	Garford	Garford Motor Truck Co	Lima, Ohio
20.	Gary	Gary Motor Truck Co	Gary, Ind.
21.	Gramm-Bernstein	Gramm-Bernstein Co	Lima, Ohio
22.	Graham	Graham Bros	Evansville, Ind.
23.	Hall	Lewis-Hall Iron Works	Detroit
24.	Hendrickson	Hendrickson Motor Truck Co	Chicago
25.	Huffman	Huffman Bros. Motor Co	Elkhart, Ind.
26.	Hurlburt	Hurlburt Motor Truck Co	New York City
27.	Indiana	Indiana Truck Co	Marion, Ind.
28.	I. H. C.	International Harvester Co	Chicago
29.	Jackson	Jackson Motor Corp	Jackson, Mich.
30.	Jumbo	Nelson Motor Truck Co	Saginaw, Mich.
31.	Kalamazoo	Kalamazoo Motors Corp	Kalamazoo, Mich.
32.	Kissel	Kissel Motor Car Co	Hartford, Wis.
33.	Maccar	Maccar Co	Scranton, Pa.
34.	Master	Master Trucks, Inc	Chicago, Ill.
35.	Maxwell	Maxwell Motor Co	Detroit
36.	Mutual	Mutual Truck Co	Sullivan, Ind.
37.	Nash	Nash Motors Co	Kenosha, Wis.
38.	Oldsmobile	Olds Motor Works	Lansing, Mich.
39.	Oneida	Oneida Motor Truck Co	Green Bay, Wis.
40.	Packard	Packard Motor Car Co	Detroit
41.	Paige	Paige-Detroit Motor Car Co	Detroit
42.	Parker	Parker Motor Car Co	Milwaukee, Wis.
43.	Patriot	Hebb Motors Co	Lincoln, Neb.
44.	Pierce-Arrow	Pierce-Arrow Motor Car Co	Buffalo, N. Y.
45.	Rainier	Rainier Motor Corp	New York City
46.	Reliance	Reliance Motor Truck Co	Appleton, Wis.
47.	Reo	Reo Motor Car Co	Lansing, Mich.
48.	Republic	Republic Motor Truck Co	Alma, Mich.
49.	Sandow	Sandow Motor Truck Co	Chicago
50.	Schacht	G. A. Schacht Motor Truck Co	Cincinnati, Ohio
51.	Selden	Selden Truck Corp	Rochester, N. Y.
52.	Service	Service Motor Truck Co	Wabash, Ind
53.	Signal	Signal Motor Truck Co	Detroit
54.	Standard	Standard Motor Truck Co	Detroit
55.	Stewart	Stewart Motor Corp	Buffalo, N. Y.
56.	Tower	Tower Motor Truck Co	Greenville, Mich.
57.	Transport	Transport Truck Co	Mt. Pleasant, Mich.
58.	Union	Union Motor Truck Co	Bay City, Mich.
59.	United	United Motors Co	Grand Rapids, Mich.
60.	Velie	Velie Motors Corp	Moline, Ill.
61.	Vim	Vim Motor Truck Co	Philadelphia, Pa.
62.	Walker*	Walker Vehicle Co	Chicago
63.	Walter	Walter Motor Truck Co	New York City
64.	Wilson	J. C. Wilson Co	Detroit
65.	Winther	Winther Motor Truck Co	Kenosha, Wis.

*Indicates an electric truck.

TRAILERS

Fruehauf Trailer Co	Detroit
Highway Trailer Co.	Edgerton, Wis.
Trailmobile Co	Cincinnati, Ohio
Warner Mfg. Co	Beloit, Wis.

BODIES

1.	Lee	Lee Loader & Body Co	Chicago
2.	Metropolitan	Metropolitan Body Co., Inc	Bridgeport, Conn.
3.	Oberchain-Boyer	Obenchain-Boyer Co.	Logansport, Ind.
4.	Parry	Parry Mfg. Co	Indianapolis, Ind.

other articles may be kept safely. The cab is mounted at three points, thus helping to eliminate the abrupt jolts and jars to which a driver is subjected when the cab is fastened directly to the chassis.

New Aluminum Wheel

The Aluminum Castings Co., Cleveland, has brought out an aluminum truck wheel which will be shown at the Chicago show. It is called the Lynite wheel and is calculated to reduce unsprung weight and to be of material benefit in changing wheels or tires. Tests on these wheels have demonstrated the ability of the wheels to resist fatigue. Further tests have been conducted for the purpose of bringing out the strength of the wheels as regards side thrust and radial compression. The wheels weigh approximately one-half as much as those of other types and it is claimed by the company that they have the advantage of affording easy tire changes, because they do not rust and the lock ring and tire do not freeze in place.

Flint Axle Unique

The final reduction in the new Flint truck axle is through a train of spur gears at the wheel, three equally spaced pinions being mounted on studs in the hub casings and rotating between a fixed ring gear and the drive gear on the end of the main shaft. Because of this reduction in the hub, the bevels and consequently the bevel gear housing in the center of the axle are small, giving high road clearance. The bevel gear reduction is 1.14 to 1.

The axle is of the full floating type. The thorough lubrication of the axle parts is a feature emphasized by the manufacturer. The heavy oil used is free to flow from one wheel to another, flooding all bearings and gears. The axle is built at a standard tread of 56 in. and has a carrying capacity on the spring seats, which are 40 in. between centers maximum, of 3800 lbs. The spring seats may be adjusted also to 38 or 39 in. centers.

Hyatt rolling bearings are fitted in the wheels and back of the pinion on the pinion shaft. New Departure ball bearings are used at the outer end of the pinion shaft and at the differential. The gear reductions are 7¼ to 1 or 8.8 to 1 on low, according as a bevel gear ratio of 2.14 to 1 or 2.647 to 1 is used. The gears in the hubs are of 6.8 pitch and have ¾-in. faces. Hardened steel cut gears are used throughout. The axle is manufactured by the Flint Axl Co., Flint, Mich.

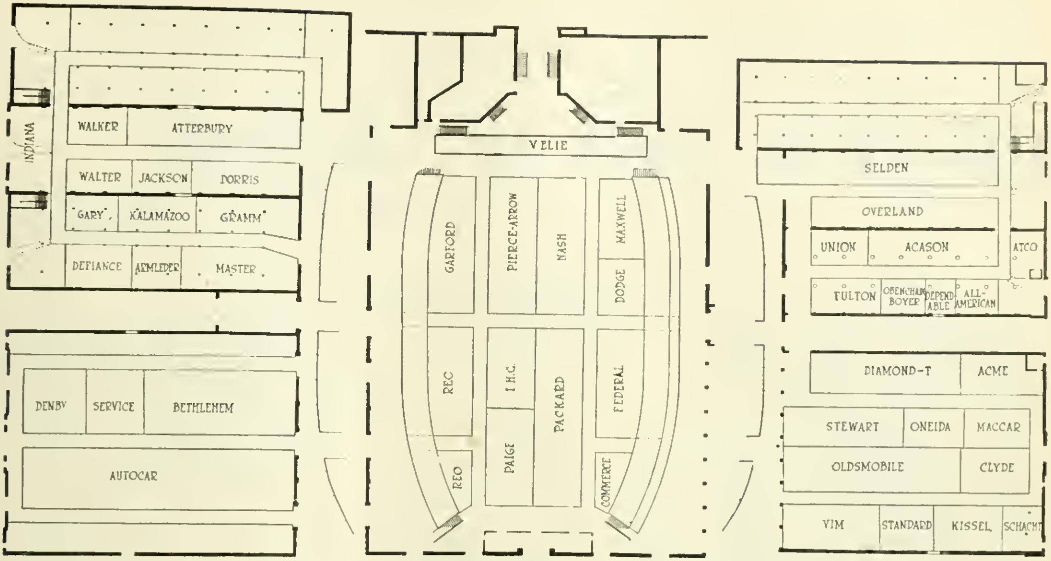
New Parker Axle

The Parker axle is an improved truck axle of the internal-gear type, embodying many features. A multi-disc brake, completely enclosed within the axle and operating in an oil bath is one of the big features of this axle. The design of the Parker axle makes possible an oil-tight, dirt and grit-proof enclosure o nall operating parts. The driving bevels, differential and driveshafts, operate in an oil bath. Accessibility is another feature. A full floating driveshaft makes possible the removal of either brake unit or differential unit without disturbing the wheels, internal gears or case surrounding these gears. The wheels are demountable without disturbing the internal gears or the gear case.

Parts and Accessories

The following parts and accessory makers will exhibit at the Chicago:

Aluminum Castings Co., Cleve-



Plan view of the Chicago truck show, which will be held at the International Amphitheater, Jan. 24 to 31

land; American Bosch Magneto Corp., Springfield, Mass.; American Chain Co., Inc., Bridgeport, Conn.; American Machine Co., Newark, Del.; American Taximeter Co., New York City; F. A. Ames Co., Owensboro, Ky.; Apollo Magneto Corp., Kingston, N. Y.; Arrow Grip Mfg. Co., Glens Falls, N. Y.; J. V. Bendus, New York City; Buda Co., Harvey, Ill.; Buell Mfg. Co., Chicago; Byrne, Kingston & Co., Kokomo, Ind.; Challoner Co., Oshkosh, Wis.; Clark Equipment Co., Buchanan, Mich.; Cleveland Heater Co., Cleveland; Continental Auto Parts Co., Columbus, Ind.; Continental Motors Corp., Detroit; Dayton Steel Foundry Co., Dayton, Ohio; Jos. Dixon Crucible Co., Jersey City, N. J.; Duplex Engine Governor Co., Inc., Brooklyn, N. Y.; Eastern Machine Co., S. Boston, Mass.; Eisemann Magneto Co., Brooklyn, N. Y.; Empire Axle Co., Dunkirk, N. Y.; Ericsson Mfg. Co., Buffalo, N. Y.; Flint Motor Axle Co., Flint, Mich.; Franklin Machine & Tool Co., Springfield, Mass.; Gray & Davis, Inc., Boston, Mass.; Hercules Motor Mfg. Co., Canton, Ohio; Hero Mfg. Co., Philadelphia, Pa.; Horizontal Hydraulic Hoist Co., Milwaukee, Wis.; Hudson Motor Specialties Co., Philadelphia; Humil Corp., New York City; Iron City Products Co., Pittsburgh; Jaxon Steel Products Co., Jackson, Mich.; Lauraine Magneto Co., New York City; Mead-Morrison Mfg. Co., East Boston, Mass.; Merchant & Evans Co., Philadelphia; Pantasote Co., New York City; Parker Axle & Products Corp., New York City; Parry Mfg. Co., Indianapolis, Ind.; Russel Motor Axle Co., Detroit; A. Schrader's Son, Inc., Brooklyn, N. Y.; Sewell Cushion Wheel Co., Detroit; Splitdorf Electrical Co., Newark, N. J.; Standard Steel Castings Co., Cleveland; Stromberg Motor Devices Co., Chicago; Torbensen Axle Co., Cleveland; Vaporizer Utilities Sales Corp., New York City; Waukesha Motors Co., Waukesha, Wis.; Wellman-Seaver-Morgan Co., Akron; West Steel Casting Co., Cleveland, and the Wheeler-Schebler Carburetor Co., Indianapolis, Ind.

70 Truck Makes at New York

(Continued from page 450)

& Evans, Philadelphia; Motor Compressor Co., Newark, N. J.; Pantasote Co., New York City; Parker Axle & Products Corp., New York City; Parry Mfg. Co., Indianapolis, Ind.; Robertson Cradlelock Wheel Co., Chicago; Russel Motor Axle Co., Detroit; A. Schrader's Son, Brooklyn, N. Y.; Sewell Cushion Wheel Co., Detroit; Splitdorf Electrical Co., Newark, N. J.; Standard Steel Castings Co., Cleveland; Stromberg Motor Devices Co., Chicago; Torbensen Axle Co., Cleveland; Vacuum Oil Co., New York City; Vaporizer Utilities & Sales Corp., New York City; Wellman-Seaver-Morgan Co., Akron, Ohio; West Steel Casting Co., Cleveland; Wheeler-Schebler Carburetor Co., Indianapolis, Ind.; Af-Ford-Able Sales Co., New York City; Minneapolis Steel & Machine Co., Minneapolis, Minn.; Service Engineering Co., New York City; U. S. Specialty Co., Boston, Mass., and the Wisconsin Motor Mfg. Co., Milwaukee, Wis.

Indiana to Build Roads

INDIANAPOLIS, IND., Dec. 27.—Approximately 133 miles of road will be constructed throughout the state of Indiana during 1920. This is revealed in a review of the operations of the new state highway commission for the state fiscal year ending Sept. 30, 1919, prepared under the direction of L. H. Wright, director for the State Highway Commission. The cost of construction is estimated at $4,739,238, or an average of $35,683 a mile. A statement accompanying the report shows total expenditures of $116,020.87 and a balance of $1,145,609, of which $38,541.66 is in the administration fund.

It was originally planned, according to Mr. Wright, to construct at least 400 miles of hard surface road during 1920, surveys and a part of the plans having been worked up. "But we find," he states, "that the 133 miles will take up all of our available funds."

Read How Big Baker Decided to Buy Trucks for Work in Certain Zones

GETTING RID OF HORSES
in the Bakery Business

Only Trucks Make Possible the Large Expansion of Business Area

GETTING rid of a fleet of horse wagons in the bakery business, preparatory to the installation of a fleet of motor trucks to take care of a proposed increase in territory, is a process that must be considered from the viewpoint of nine cardinal principles. These principles apply to any bakery business, no matter how varied the delivery conditions may be. An example of how these principles have been worked out may be cited in the experience of the Shults Bread Co., operating 165 trucks and 890 horses in New York City and the surrounding territory.

That company has found that the delivery of its bread to the retail grocery store within a radius of 30 miles is best done by the zone system. The zones are divided into three circles of diameters of 12½ miles; 20 miles, and beyond up to 60 miles. All deliveries within the 12½-mile zone are taken care of by horse wagons, and from there on to the 20-mile zone by Fords and Ward electrics of 750 lb. and ½-ton capacities. The territory beyond the 20-mile and up to the 60-mile zone is taken care of by Lippard-Stewarts, Hurlburts and Autocars of 1½ to 2-ton capacity and by several converted Mercers and Loziers.

In addition, the company recently added twelve 2-ton Packards to its fleet. These are used in the territory beyond the 20-mile zone. Three 5-ton Macks are used in construction work and in the haulage of supplies to the fourteen baking plants maintained by that company.

The main office is in Brooklyn, N. Y., and the fourteen plants operated throughout the 150 square miles of territory are located as follows: Four in Brooklyn; four in New York City; three in Hoboken, N. J., one in Mt. Vernon, N. Y., and one in West New Brighton, Staten Island, N. Y. These are widely separated so as to cover the entire territory.

No. 8

This is the eighth in a series of articles on the principles to be considered in getting rid of horses in different industries. The first seven articles in this series were published as follows:

No. 1 Coal......Aug. 15
No. 2 Paper......Sept. 1
No. 3 Lumber...Sept. 15
No. 4 Groceries...Nov. 1
No. 5 Express....Nov. 15
No. 6 Florist......Dec. 1
No. 7 Beverages..Dec. 15

Article No. 9, on getting rid of horses delivering oil will appear in a coming issue.

Nine of these plants use motor trucks for the bread delivery. The five remaining plants take care of a business that is limited to their particular districts within a radius of 6½ miles, the deliveries being made by horse wagons. One Brooklyn plant uses thirty-two Ward electrics; one Lippard-Stewart; one Ford and an Autocar. Another Brooklyn plant uses nine Lippard-Stewarts; three Fords and nine Autocars. The plant at Mt. Vernon uses one Lippard-Stewart; ten Fords and seven Autocars. The Jamaica plant uses thirteen Lippard-Stewarts; two Fords and eleven Autocars. The West New Brighton plant, recently built, is furnished with a fleet consisting of three Lippard-Stewarts; three Macks; three Fords and eight Autocars. The Macks have been used to haul building materials and supplies to the Staten Island plant.

Considering Costs

1—The first principle to be considered in the installation of a fleet of motor trucks is the cost of delivery. The Shults company has found that the horse wagons are more economical to operate in the short-haul deliveries within a radius of 6½ miles from the plant. The bread delivery schedules can be maintained with that type of delivery just as well as with the trucks. On the other hand, several fleet owners, such as the Horn & Hardart Co., operating the Automat restaurants in New York City, have found that it is much cheaper to operate electrics within this zone. The Hygeia Distilled Water Co., operating a fleet of electrics, has found that though the horse wagons were reliable in the spring and fall months, they often caused a disarrangement of the delivery schedule in the hot summer because of the heat and in the winter because of the snow and slippery pavements. Another point to be considered is the fact that in the bakery field the use of horse wagons is limited to the local territory only and cannot in any way meet any expansion of territory outside of the city limits. As the bread business is one that is founded on these territorial expansions, it is apparent that the horse wagons cannot fit into its scope. The logical answer to this question is in the determination of the time saved in delivery and the number of such small deliveries per day. A motor truck can take care of all of the short hauls necessary each day and still be useful for the long hauls, thus being busy all of the time.

2—The area of delivery is the next principle to be considered by a baker who contemplates the installation of motor trucks in place of horse wagons. This principle brings out more forcefully the utility of the truck in long and short hauls. The Shults trucks start out on their routes at 12 o'clock midnight. The time of their return depends upon the length of the routes and the number of stops made. The Fords and Ward electrics make from two to three trips a day, the electrics being held down to 45 miles a day on account of the battery limitations. The horse vehicles make on an average of two trips a day within the 12½-mile zone. One trip is made by the larger trucks in the territory beyond the 20-mile zone. The electrics and Fords, covering a bigger zone, make as many deliveries per day as the horse wagons, the number of stops being forty. The number of stops on the long routes averages eighty.

3—The third principle that must be considered is the tonnage or number of loaves to be delivered. Though this point has been partially covered in the first principle, still it does not take into consideration the haulage of raw materials from the warehouses to the plants. With fourteen bakeries to be supplied, the Shults company has found that motor trucks are more efficient and reliable for taking care of the daily turnover of the plants. A large truck is needed for this warehouse delivery so as to cut down the number of trips. The three 5-ton Macks are not only used for construction work but also in the haulage of supplies to the bakeries.

4—The average size of the load, the fourth principle to be considered, though covered in the first and third principles, does not include the size of the truck and the type of body. It will be noted that all of the short deliveries are taken care of by the Fords and Ward electrics of 750-lb. and ½-ton capacities. These two sizes are best suited for this work on account of the speed that can be maintained on the routes and the number of extra trips that have to be made. The territory beyond the 20-mile zone served by the Fords and electrics demands the use of larger trucks on account of the heavier loads carried because of the greater length of the routes. The bread is loaded in boxes, there being 100 loaves, each weighing 1 lb., to a box. The trucks carry from ten to twenty boxes. The design of the bodies enables quick loading and unloading. In order to cut down any wasted effort on the part of the drivers, each truck body is equipped with a side door. This door is placed on the side on which the driver sits, directly back of the cab, and enables the driver to quickly unload the bread placed in the forward part of the body. It obviates the need of going around to the back of the truck and hauling out empty boxes to get at those in the front end of the body. A majority of these side doors are of the sliding type, while a few pivot on hinges, swinging open from the side.

5—The fifth principle takes into consideration the loading of the trucks. A baker whose business dates back long before the advent of motor trucks will find that his loading facilities are not adequate to harmonize with the efficiency of motor truck use. Nine times out of ten the loading platform will have to be elevated to accommodate the higher bodies of the trucks and enlarged to meet any expansion of the fleet. In any case, the platform should be large enough to take care of the loading of all of the trucks at one time. The Shults platforms are flush with the truck body floors, thus minimizing any lifting effort when the boxes are being loaded into the trucks. The time occupied in loading is about ½ hr. As the bread is delivered in most cases before the stores are opened, the boxes are locked if the entire contents of the box are delivered at one store. On the other hand, should there be a call for less than a full box of bread, the loaves are lifted out and placed in another box which has been set on the sidewalk in front of the store by the store help. The bread remaining in the box on the truck is delivered with the box, if possible, at one of the next stops, and the box on the sidewalk is placed on the truck. This is also done when the full contents of the box are delivered. Lifting the bread out of one box and depositing it in another is a waste of time, and as a result is avoided as much as possible.

E. B. Bianchi, foreman in charge of the Hoboken service station of the Shults Bread Co.

6—The design and location of the garage must next be considered. With three to four trucks, a baker may house his trucks in some neighboring garage. Thought must be given, however, to cutting down the wasted mileage to and from the garage. This also applies to those who are planning the erection of their own garage. This should adjoin the bakery, if possible, or form a part of it. In the conversion of a horse wagon fleet into a motor truck fleet, the baker can often convert his horse stables into a garage. Attention should be paid to the lighting conditions and the elimination of the excessive number of roof columns frequently found in stables. A well designed garage should eliminate any waste of time when the trucks go out on their deliveries. There should be no maneuvering on account of columns, etc.

Five of the Shults plants have specially-built garages which adjoin the bakery plants. The Brooklyn plant, which uses the thirty-two Ward electrics, stores the trucks in the same building occupied by the plant. Facilities for charging the batteries have also been installed at that plant. The other garages are located in Hoboken, Mt. Vernon, New York City, Jamaica and West New Brighton.

7—Truck maintenance is dependent on the size of the fleet. The establishment of a private service station is the result of a process of development in the size of the fleet. From an economical point of view, an owner of three or four trucks may not find it worth while to maintain his own trucks. There might not be enough work to keep a mechanic or two busy all of the time. In a case of that kind, it would be better for him to have this work done in a local repair shop or service station. On the other hand, as the fleet grows to eight or ten trucks, he must consider taking care of such work as engine repairs, tire changes, etc.

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MAINTENANCE OF Nationwide Fleet of TOBACCO TRUCKS

Owned Trucks Cheaper than Hired Vehicles When They Can Be Kept Busy Continuously

MOTOR trucks in the service of a fleet owner have three main needs from the point of view of maintainance. They must be garaged; they must be cared for; and they must be repaired. There are other needs, of course, such as spare parts, tire replacement, overhaul, etc., but the above three are the main needs, or problems, because the efficiency of the whole maintenance scheme depends upon whether these three problems are solved well or ill—economically and efficiently, or in a costly and slovenly manner.

Exactly the method by which the owner of one or two truck garages maintains and repairs them is not of supreme importance, provided the work is done and done well. He cannot go very far wrong in the matter of costs and the probabilities are that, owing to local conditions, not more than one or two methods are open to him.

Garaging Tobacco Trucks

But when these two trucks are increased to half a dozen and these are multiplied into fleets of that size in many of the large towns in the eastern states, the loss resulting from a single unnecessarily expensive method is highly cumulative and may prove very costly.

Again, in the latter case, local conditions and circumstances may allow of many different methods of solving the above three problems, from which the trucking department must make its choice. Nor is the best choice in one town necessarily the best choice in another, though this refers more to garaging than to either of the other two problems.

At present the great majority of the American Tobacco Co.'s trucks are garaged on the company premises. In many cases the factories are laid out in a way which makes the construction of a garage a comparatively simple and inexpensive business. For example, two factory buildings may be close to-

The American Tobacco Co.'s New York factory is shown on the left. The loading platform extends nearly the whole length of the building, and trucks back up to it between the pillars, as shown. On the right is a view of the warehouse, which is across the street from the factory. Note the truck and salesman's car emerging from the garage on the ground floor. Note also the elevator for transporting hogsheads and other warehouse goods to the floors above gether, as is the case in Richmond and Louisville. In both these cities it was only necessary for the company to build a cement floor in the space between the two buildings, roof it over and supply a front and rear wall, a very considerable saving in construction costs.

Where this is not possible the company has in many cases built a small garage on its own premises where ground was available. Failing this, it has leased small plots of ground near its factories on 20-year leases and built garages on these grounds.

The above, however, are almost always cases where factories are located in towns or smaller cities. In these towns and small cities rents are reasonable, as a rule, except in the best business, retail and residence sections. The factories are not situated in these higher rent districts and, therefore, the ground which the company leases near its factories in these towns for the construction of garages, can usually be obtained for a reasonable rent.

Another Method

In the larger cities, however, the situation is different. For example, garage rent in New York works out at about $30 or $35 per truck anywhere in Manhattan. In Richmond or Louisville, where ground rent is lower, garage rent works out at about $4 or $5 per truck per month, where a garage is built by the company on owned or leased ground. Moreover, it is practically impossible, in many cases of factories located in large cities, to obtain ground near the factories which is suitable for the construction of a garage.

In large cities the garage question is usually solved in another way. At the Kinney Duke Branch, one of the American Tobacco Co.'s factories located on West Twenty-second Street, New York City, one of the company's warehouses is situated immediately across the street from the factory. The ground floor of this warehouse has been transformed into a modern storage garage, with excellent lighting, heating and washing facilities, but little or no repair facilities. A large elevator, at one side of the garage entrances, gives access to the upper floors of the warehouse. This arrangement means a considerable increase on the insurance premium for the warehouse. But the increased premium and the value of the lost warehousing space together do not equal the cost, either of building a separate, company-owned garage or of garaging the company's trucks in a public garage nearby.

Interior view of the warehouse garage shown on the opposite page. The garage is used for storing salesmen's cars during the daytime and trucks at night. Lighting, floor space and drainage are excellent, although the building was not originally designed as a garage

On the other hand, although this method of garaging trucks is highly convenient, the cost of the lost warehousing space and the increased insurance premium on the warehouse would, in smaller cities and towns, prove together more costly than the construction of a small garage elsewhere but close to the factory.

From the above it is readily seen that one method of garaging trucks is cheaper and more convenient in certain localities while another method proves more economical in others.

Care of the Trucks

The installation of company-owned trucks is a comparatively recent matter with the American Tobacco Co. But young as the trucking department is, it has thoroughly recognized the importance of *intelligent* care of the trucks on the part of the drivers. An ounce of prevention is worth a pound of cure, and if the trucks are to be maintained in good condition, it is highly important, not only that the drivers be instructed to give the closest attention to the oiling, greasing and general care of the trucks, but that some one in authority satisfy himself that the men have the requisite knowledge to carry out this work. It is no use telling even a willing man to oil his truck regularly unless he knows where and how to oil it. One neglected bearing will burn out and lay up a truck, besides doing other damage, no matter how much oil has been applied to the other bearings. On the other hand, if every running part on a truck could be maintained in a bath of oil the truck would probably outlive its owner.

This side of the maintenance problem has been taken care of by the American Tobacco Co. in two ways: First, instruction, and Second, supervision.

In every garage maintained by the company there is, or will be, a large placard or chart, clearly indicating the oiling and greasing points on trucks and the frequency with which these should receive attention. Other duties, such as emptying and refilling the crankcase, filling up the differential with grease, etc., are also given. All drivers are shown this chart; it is explained to them in detail and they are instructed to study it.

Second, every garage is maintained by a foreman who is in charge of the drivers, and a mechanic who is in charge of the trucks. While the drivers are oiling and greasing their trucks one or other of these two men is always present, supervising the work.

In addition to this supervision, there is a double check on this work. Before the trucks leave the garage each day they are given a

(Continued on page 462)

Eliminating Mistakes in Making Deliveries in the Poultry Business

Special Bins and Careful Training of the Drivers Pay Big Dividends

CAREFUL training and supervision of the trucking staff; the division and classification of territory; a simple system of distributing and assigning delivery orders, and the alternating of route assignments, are four methods which have helped the Nathan Schweitzer Co. to build up an efficient and successful department for the delivery of cooked meats in New York City and environs.

Building up the best possible delivery fleet for a business like that of the Nathan Schweitzer Co. is not a simple matter. It means far more than merely installing a fleet of motor trucks and hiring drivers and helpers to work on them. In the first place, the fleet must be made up of the trucks best adapted to the special delivery requirements of the business. In the second place, the staff of drivers and helpers must be carefully and thoroughly trained.

Training Methods

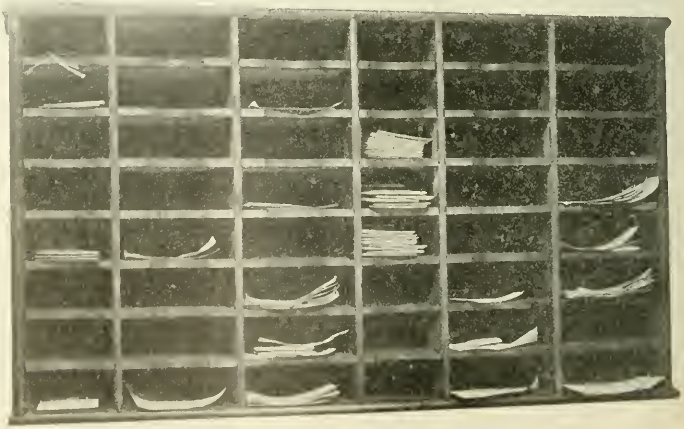
The Nathan Schweitzer Co. fleet is made up of three 3/4-ton White trucks; seven 2-ton Autocars and two 3-ton Packards. The White trucks are employed in making special or rush deliveries, a considerable number of which have to be dealt with daily. The Autocars make the city deliveries, that is, they handle the bulk of the general deliveries of the company. Collections from and to some of the steamship wharves are made by the two Packards, which are also used for collecting freight shipments and transporting goods to the freight yards for the company's out-of-town freight deliveries.

Each one of the above trucks is manned at all seasons by one driver and one helper, when the truck is in operation. Almost all these men were originally hired as helpers. On rare occasions, William Schweitzer, the delivery superintendent, finds it necessary to hire an additional driver, but the company's usual procedure is to recruit its drivers from the staff of helpers already installed.

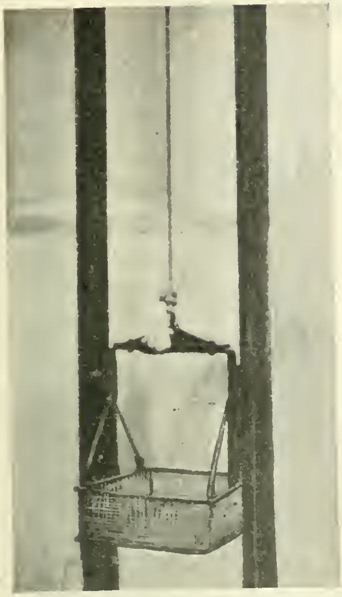
There are four important reasons why this method is more satisfactory than hiring outside drivers: First, a helper promoted to a driver is already thoroughly conversant with the requirements of the work he is to do, that is, the routes, the class of goods handled, the idiosyncrasies of his truck and the necessity for neatness, courtesy and dispatch in making deliveries. Second, he knows and is known by the other men with whom he works and he has already assimilated the spirit of enthusiastic co-operation which the company endeavors to foster in its delivery staff. Third, he has not to overcome the hostility, however slight, which a new driver has to face when he is installed over the heads of other men who have been with the company longer. And fourth, as the man's new job is a promotion rather than a new position, his self-respect is increased accordingly; and with it, the company has found, his gratitude, enthusiasm and anxiety to do good work increase in proportion.

Therefore the company has installed the following system. Each helper, while still acting as a helper, is given opportunities to learn driving. As soon as he considers himself efficient, he is encouraged to take out a driving license. Then, after he has been with the company for a year, he is given a thorough road test. If he has taken out a driving license and if he passes his road test satisfactorily, he is then given an opportunity as a driver and, if satisfactory, is paid a driver's full wages.

In this way not only are the helpers given a goal of promotion to work for, but the company has ample assurance that its drivers are highly efficient; for it does not allow a driver to handle one of its



The wall pigeon hole system by which orders are filed according to routes. Each driver has his own three pigeon holes. The file is 3 ft. long by 2 ft. high and is 8 in. deep. It was made at a merely nominal cost



The Schweitzer company's Lamson carrier, used to convey orders quickly to the stock floors above the main floor. The carrier saves waiting for elevators or running up and down stairs

trucks until satisfied by observation that he is a fully qualified and skilled man.

In addition, both drivers and helpers whose work is satisfactory receive a bonus every 3 months; drivers are given $25 and helpers $15 as a bonus for good work. This also serves to foster ambition, cooperation and efficiency among the men of the delivery staff.

Both drivers and helpers are supplied by the company with two uniforms, including cap and leggings. One of these is for summer wear and the other for winter. The company supplies these uniforms free of charge to the men, but the men must see that they are kept clean and in good repair. The result is a generally smart appearance and a clean truck.

Division of Territory

The question of routing has already been handled at some length in a previous issue of THE COMMERCIAL VEHICLE. But this question is such an important one from the point of view of efficiency that it seems pertinent to mention again here certain points which have a direct bearing on the success of the delivery department.

The entire territory served by the Nathan Schweitzer Co. is divided up into regular routes. What these divisions are, a glance at the accompanying chart will show. It should be noted that there are main divisions such as East New York, West New York, downtown, Brooklyn, etc. Also that East New York and West New York are again divided into smaller routes.

The confines of divisions and sub-divisions do not change because the business has no peak load period and it is not necessary, therefore, to reroute the trucks into smaller routes for a period of greatly increased deliveries.

WEST SIDE			EAST SIDE		
Bills	Rush	Ordinary	Bills	Rush	Ordinary
126	th Street	North	L	ong Island	
87	th Street to	125th Street	117	th St. North	
48	th Street	to 86th Street	59	th Street to	116th Street
14	th Street to	47th Street	14	th Street to	58th Street
8	th Street to	14th Street	B	rooklyn	
D	own Tow	n	N	ew Jersey	
	Will Call			Freight	

This chart is a key to the illustration on the opposite page Note that by this system of pigeon holes, orders are delivered automatically to the drivers for the routes concerned. Each driver thus always knows where to find his orders

View of the Nathan Schweitzer establishment, showing one of the 2-ton Autocars. The upper floors shown are used for stocks other than meat

One of the main delivery difficulties of the company is the number of rush orders with which it has to deal. Very often an order will be received for a large consignment of meat, game and poultry which must be delivered immediately. It is therefore necessary to keep a certain number of trucks of lighter capacity always ready to go out on rush orders. However, there are two factors that help out in this difficulty. Many of these rush orders embrace a large number of parcels, barrels, etc., so that the truck does not set out loaded so greatly under capacity as might first appear, nor is this method of making a single delivery so uneconomical.

Secondly, the large size of the usual individual consignment means that a fully loaded truck on an ordinary route has comparatively few calls to make and can complete its trip quickly. In fact, the ¾-ton truck averages five trips a day and the 2-ton trucks three trips a day. Just here enters the importance of a good route division and classification. The routes are so divided that each one includes one or two of the custom-

(Continued on page 461)

Adapting the Motor Truck to the Book Publishing Business

DRIVER TRAINING IS IMPORTANT AID

THE MacMillan Co. is one of the largest book publishing firms in the world. The company trucks work on a schedule which keeps them busy practically all the time during business hours. Probably no fleet of trucks of the same size in operation to-day is called upon to handle a greater volume of trucking. Yet the work is done regularly, smoothly and efficiently. The trucks are in good condition and the men are proud of themselves, their trucks and the system under which they work.

This desirable state of affairs is not due to the possession of extraordinarily efficient trucks or very highly paid drivers. It is due to the fact that the MacMillan Co. has adapted the motor truck to the requirements of its business.

The MacMillan Co. publishes books of fiction, religion, medicine, juvenile books, school text books, college text books, poetry, art, etc. The delivery fleet handles 75 per cent of the output of all the departments. Practically all the firm's publications are printed outside New York. Most of them are bound outside of New York. In order to fill the thousands of orders coming into the main office, all these books, except about 25 per cent which are shipped direct from the binders, must be collected at the main office.

Flexible Organization

The MacMillan Co. fleet consists of four trucks, two 3-ton Packards with stake bodies and solid tires, mainly used for collecting and delivering cases of books shipped by steamship or railroad; one 2-ton Packard with wire screen sides and rear, solid top and solid tires, used for local large package and case delivery; and one 1-ton Peerless with panel body and pneumatic tires, used for distant small deliveries, uptown in New York and in Brooklyn, and for enclosure house deliveries.

The driving staff of the fleet consists of a foreman and five drivers. These men between them, handling the loading, unloading, driving and deliveries of all packages carried by the company's fleet.

Practically any member of the driving staff can drive any truck in the fleet if called upon to do so. Therefore, if two or three men are required to accompany one of the heavy Packards to collect an unusually heavy shipment, any one of the remaining three members of the staff can operate any one of the other trucks at a moment's notice.

As a result, there is never any delay when a truck is required, due to the driver being absent; it is not necessary to maintain a staff large enough to supply a driver and one or two helpers to each truck; and the men work together without petty jealousies and competitive friction. On the other hand, the technical assignment of a certain man to a certain truck assures the oiling and care of that truck.

The MacMillan Co.'s 2-ton Packard emerging from the alley running to the shipping room. The sides and back of this truck are of wire netting, but curtains running the entire length of the truck body can be let down in inclement weather

Special Routing Methods

Many book stores send orders simultaneously to various publishers and have these sent to and forwarded by the enclosure house. A certain volume of the MacMillan Co.'s shipments are of this class. Conditions at the enclosure house are unusually congested, with trucks delivering books from the different publishers, and a driver often has to wait his turn for some time before pulling up to the loading platform. Therefore, the small Peerless truck is always assigned to this class of delivery, as the least possible carrying capacity is tied up when it is inactive.

Each morning the foreman learns from the shipping clerk what deliveries have to be made that day. He knows the capacity of his trucks and the length of his runs and he can plan his day's campaign accordingly, without interference from anyone in the organization, less familiar with the requirements of the work.

Of course, the fact that the vast majority of the goods handled are for, or from, out of town, simplifies his work somewhat. For example, he knows all the runs to the freight and steamship yards; he knows the amount of the shipment expected or to be sent and he knows the facilities available or the difficulties of loading and unloading. It is therefore possible for him to estimate the number of men, the number of trucks and the time required for each freight or steamship delivery.

Special Loading Methods

At present the MacMillan Co. trucks are loaded under somewhat difficult conditions. There is a small loading platform at the entrance to the shipping room which opens into an alley. But the alley is too small to admit the heavier Packards. Therefore, the 2-ton Packard backs into the alley for its loads and is able to load quickly for local large package deliveries.

Poultryman Eliminates Delivery Mistakes

(*Continued from page 459*)

ers from whom rush orders are more frequently received. Therefore, because of the number of daily trips made over the ordinary routes, a rush order for goods will often find a truck just about to start for the locality to which the rush goods are consigned. That truck then makes the rush delivery first of all after reaching its route and it is not necessary to send out a special truck on that single rush delivery.

On the whole, the 2-ton trucks average eighteen deliveries, or calls, per trip, and their loads run anywhere from twenty-five barrels to 125 boxes and baskets. The ¾-ton trucks, when not on regular routes, carry anywhere from two to forty packages and make one rush delivery at a time, but after the rush delivery has been made they make other deliveries in the same locality, so that the regular truck on that route may not be sent out at all at that time. No iron-bound system can be laid down for these special circumstances and their efficient handling depends upon the careful supervision of the delivery superintendent.

Assigning Delivery Orders

A glance at the illustration on page 459 will best indicate the system of assigning delivery orders. Each order is made out in duplicate. One copy goes to the upper floors of the building where the goods are stored and from it the goods are collected. The other goes to a compartment file on the wall in the office where it is placed in the compartment reserved for the route concerned. When a driver returns from a trip he goes at once to this wall file and takes out his bills, his rush orders and his ordinary delivery orders for the next trip, these three being filed in three compartments all on the same level, as a glance at the picture and chart will show. As the three classes of papers are in three different compartments, the driver does not have to sort them and can see at a glance how many rush orders he has; that is, which deliveries must be made first on reaching his route.

Alternating Route Assignments

In a business of this class, where deliveries are made over and over again to the same address, there is one psychological factor which is apt to cause trouble. His careful and thorough supervision of the whole delivery system has shown the delivery superintendent that drivers and helpers who make calls at the same place day after day naturally become well acquainted with the people responsible for taking in and receipting for the deliveries. This familiarity may breed contempt and to a certain extent strained relations may ensue, or it may lead to incipient friendships and lengthy discussions on topics of the day or matters more personal. In either case the result will probably be complaints from the customer concerned and will certainly be delay on the part of the truck. This last again means complaints from other customers further along the routes whose goods arrive late.

In order to avoid this state of affairs, William Schweitzer assigns a different driver and a different truck on each route each working day, going straight through the fleet in this manner. By this system no driver or helper goes out on the same route twice in the same week, and the chances of his becoming familiar with customers are greatly lessened. Moreover, every man on the delivery staff becomes familiar with every route instead of only one, and is able to take over any route at any time without notice.

Getting Rid of Horses in the Bakery Industry

(*Continued from page 455*)

When a fleet reaches the size of that of the Shults company and is widely separated, it is best to split up the maintenance work. The Shults company repairs its trucks at two service stations, located at the Hoboken and Jamaica garages. These two service stations are completely equipped, being able to take care of all of the heavy repairs needed on the 165 trucks. All light repairs are taken care of at the other garages. An article describing the maintenance methods of the Shults company appeared in the Dec. 1, 1919, issue of THE COMMERCIAL VEHICLE.

8—The success or failure of truck operation is dependent upon the type of driver employed. Inefficient driving has doubled the duties of the repair department of the Shults Bread Co. The drivers are also salesmen because they sell bread to the company's customers. Naturally, it is to their advantage to make all of the deliveries possible, since they are paid a salary plus a commission on the amount of bread sold. In their eagerness to do so, little thought is given to careful driving. The trucks are run at as high rates of speed as possible, so that every customer will be visited. A large number of the trucks make from 90 to 100 miles a day. When it is figured that this mileage is covered day in and day out, all during the week, it is natural that the wear and tear on the trucks will be considerable. The Shults company has found, however, that the best drivers of its motor trucks are men who formerly drove the horse vehicles, as they are familiar to the conditions peculiar to the bread field.

9—With a fleet of trucks operating in widely separated places, as in the case of the Shults Bread Co., it is natural that in order to keep tabs on the maintenance and operation, there must be a centralized system of supervision of these two departments. This supervision is divided into three main departments. The first, or main, department is the executive committee, which buys the trucks, designs the bodies and purchases equipment. Under the supervision of this executive committee come the general manager and the garage superintendent. The general manager supervises the operation of the trucks and horse wagons through individual plant managers. The garage superintendent supervises the maintenance of the trucks through each garage foreman. These two men make the rounds of the plants each week to see that the operation and maintenance work are up to the required standard.

National Drug Distribution by Trucks

(*Continued from page* 439)

The 3-ton Packard is used in Philadelphia for a similar purpose.

The gasoline trucks are housed in a garage owned by the company. This garage is modern in every respect, being 110 ft. deep and 125 ft. wide. It is made of brick and concrete. It is stated that enough money is made from rental to outside trucking firms to more than pay for the upkeep of the garage. Two mechanics and the foreman take care of the maintenance work of the gasoline trucks. The electrics are housed in the Exide garage, where they are also repaired.

The gasoline trucks are thoroughly inspected every week for wear and tear and should any repair work be needed, are kept off the delivery routes. The trucks are kept in good running condition by this systematic method of inspection. A well-equipped machine shop and stockroom permit of quick repairs, the mechanics being able to take care of most of the work. The 3-ton Packard used in Philadelphia for the delivery of ice cream and syrups is run in to New York once every year for a complete overhauling.

Eight of the Packard trucks are now in the truck operating efficiency test of the Packard Motor Car Co. and as a result the performance of each is bringing good results. The drivers are kept on edge on the matter of careful driving, etc. A monthly analysis of the operation of one of the trucks shows that its cost per unit mile was 15 cents. Another's record showed 17 cents. The highest was 33 cents.

A record is kept of the operation of the trucks by means of a daily trucking sheet, filled out by each driver. On it the driver indicates the number of trips he has made during the day; the number of empty barrels, etc., carried; the time consumed in loading and unloading; the signature of the store manager; the weight of the goods carried; odometer reading; the gasoline reading at the start and finish of a trip; oil consumption; ferriage charges; weather conditions, the number of stops and the total mileage.

From the data embodied in the foregoing report, the traffic manager and the garage superintendent draw up their own monthly reports. The garage superintendent, when in need of parts, etc., makes a requisition for them and sends it to the purchasing department, which in turn takes care of the purchase.

As stated before, the loading and unloading of the trucks is supervised by two shipping clerks at the warehouse. Each night a report is made up showing the amount of material that will be shipped the next day. This report is sent to the traffic manager, who in turn after viséing it notifies the garage superintendent of his requirements for the day in the way of trucks.

Demountable Bodies Used

The twelve trucks used at the warehouse are equipped with demountable bodies, a valuable asset in the saving of time. The bodies are removed by overhead hoists and left suspended in the air during the process of loading or unloading. With these hoists one man can remove a loaded body and replace it with an empty one in six minutes' time.

Loading and unloading are done at separate platforms, placed at opposite sides of the warehouse. Sidewalk work has been eliminated by placing these platforms inside the building. The three electrics and three Packards are used for taking care of all incoming materials, the unloading platform accommodating four trucks at one time. Three extra bodies are in process of being unloaded at one time. The fourth place is held open for incoming trucks, so that they will not have to wait in line before disposal of their bodies. All material sent to the warehouse is taken by elevators to the stockrooms where it is segregated preparatory to shipping it out again to the drug stores.

Seven trucks with two extra bodies are used for shipments to the stores. The loading platform accommodates three trucks at one time. As in the case of the unloading platform, one place is kept open for incoming trucks to dispose of their bodies. Chutes are used to convey the materials down to the loading platform. After reaching the ground floor, the shipping clerks and their assistants take charge of the loading of the demountable bodies.

Though this system of splitting up the incoming and outgoing shipments has proved a big success, as far as saving time is concerned, it has not solved the problem of taking care of the unloading of outside trucks, which come to the warehouse from local concerns. Often as many as ten trucks at one time have to wait their turn to unload while the Liggett platforms are crowded with its own trucks. The traffic manager is at present considering the addition of a new platform to take care of these shipments.

Ice cream and syrup shipments to the local drug stores are sent out from the company's own plant in another part of the city. The truck used for this work is equipped with a body large enough to carry 150 5-gal. cans of ice cream and 1,000 jugs of syrup.

Maintenance Problems of Tobacco Trucks

(*Continued from page* 457)

rapid inspection by the mechanic in charge. When they arrive at the factory for duty they are again rapidly inspected, this time by the foreman. Both inspections are for oiling, greasing and general appearance.

Lastly, either the foreman or the mechanic, or both, make a more thorough inspection of all the trucks each week. In this way slight defects are caught and corrected before serious damage can result.

The Personal Factor

Nor is the personal factor neglected, where care of the trucks is concerned.

The work of the individual driver and the condition of his truck are carefully noted by both the foreman and the mechanic. Moreover, a large degree of personal contact is maintained between the drivers themselves and the higher authorities in the trucking department.

It has been very noticeable, in the general work of the small fleets, that certain drivers are always ready for duty, with their trucks in good condition. In almost every case of this kind, personal contact has shown the trucking department authorities that the driver in question has a mechanical bent. When this is found

(*Continued on page* 476)

TEAR OUT

THE TWO FOLLOWING PAGES

IF you are more interested in the operation articles in this issue than in the Repairshop Shortcuts shown on the two following pages, tear out these pages and send them to your truck maintenance superintendent. He and his mechanics may be able to save hundreds of dollars yearly by carrying out the ideas expressed on these two pages.

PIN UP THESE TWO PAGES IN YOUR GARAGE SHOP

Better Truck Repair and Maintenance

No. 58—Tool for Fixing Brake Shoe Springs

MANY a mechanic has expended a lot of unnecessary energy and language over the brake shoe springs on a truck. These springs are very awkward to handle and the simple tool illustrated herewith will prove a boon to mechanics who are struggling to attach these springs. It consists of a simple pair of tongs, opening instead of closing and so constructed as to grip the spring at its ends. Holes should be drilled about $\frac{1}{8}$ of an inch deep on the outside surface of the jaws of the tongs, so as to prevent the spring from slipping off or up on the jaws.—GEORGE HERON, The Boston Store, Chicago.

TO help motor truck owners and operators to save money in the maintenance and repair of their trucks, THE COMMERCIAL VEHICLE *prints on these two pages better methods of maintaining trucks and the latest ideas in making quick repairs.*

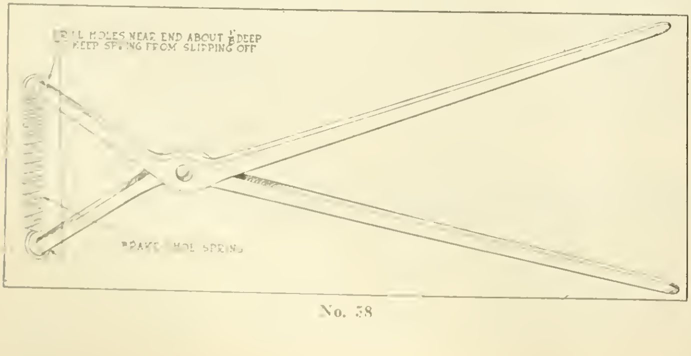
THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 59—Tackle for Installing Engines

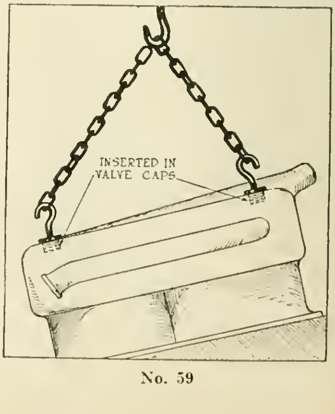
TACKLE which can be used for removing an engine which is to be repaired, or replacing it when repaired, is almost essential to a repair shop mechanic's outfit. But it is almost as essential that the tackle be designed both for convenience and for ready adjustment to different types of engines. Certain makes of engines can be lifted out or replaced while in a horizontal position, while others have to be canted or tilted slightly. Others, again, have to be lifted straight up and then canted while being removed. The tackle shown in the accompanying illustration has features which render it readily adjustable to lifting requirements of this kind. The two hooks at the ends of the chain finish in thread screws which can be screwed into the valve caps of the motor. These hooks can be inserted in the two end valve caps. The chain which connects the two hooks is purposely constructed of large links. If the engine is to be lifted out in a horizontal position, the lifting hook is inserted into the center link of the chain, so that the two sides of the chain are of equal lengths. On the other hand, if the engine is to be canted, the lifting hook can be inserted into any link in the chain so as to bring the engine at any angle desired. A small chain with a large ring in the center cannot be used in this way. It then becomes necessary to change the screw hooks to other valve caps to get the right lifting angle. By the above design this extra labor becomes unnecessary. — GEORGE HERON, Boston Store, Chicago.

No. 60—Device for Removing Wheels

WHEN it is desired to remove a rear wheel from a heavy truck, the truck should first be driven onto a level floor. One side of the axle should then be jacked up enough to raise the wheel about 2 or 3 in. from the floor. When the hub cap has been removed and the wheel loosened with a wheel puller, a 1 x 12 in. board about 3 ft. long should be inserted under the wheel. Under the board should be arranged a number of lengths of small pipe to act as rollers. These


DRILL HOLES NEAR END ABOUT 1/8 DEEP
KEEP SPRING FROM SLIPPING OFF
BRAKE SHOE SPRING

No. 58



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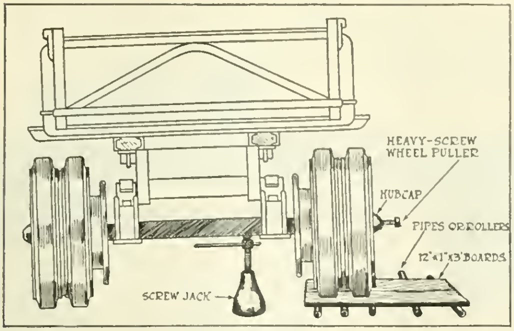

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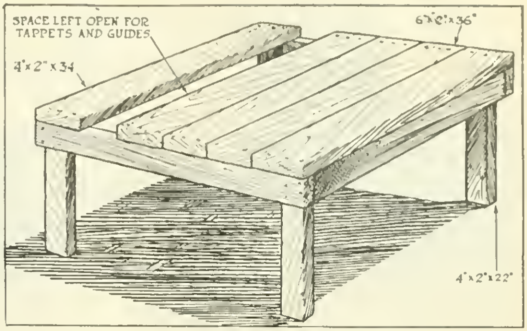


No. 61

pipes can conveniently be from ½ in. to 1 in. in diameter. Any old worn piston pins which may be on hand serve very well for this purpose. When rollers and board are in position, the jack screw should be lowered until the wheel settles firmly onto the board, because, as the axle tapers, the wheel will loosen further as it starts to ride outward on the board and the rollers. With this device one man can easily remove the largest of wheels. When repairs are completed the wheel can be replaced in the reverse manner. If the wheel is keyed on the axle, the key should be turned up to the top of the axle. In this way the wheel will slip on more easily.—LUTHER JOSLIN, Oxona, Texas.

No. 61—Table to Hold Cylinder Blocks

THE table shown in the accompanying illustration is designed to hold a cylinder block when work is going forward on the cylinders or valves. As a rule, cylinder blocks are placed on top of a workbench for this work, which not only brings the block too high for good lighting or convenient work but tips the block at an uncomfortable angle for grinding valves.

The above-mentioned table has many advantages. — GEORGE HERON, The Boston Store, Chicago.

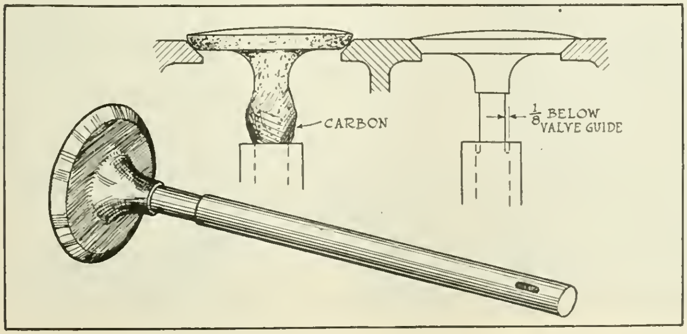
No. 62—Machined Valve Stems Do Not Stick

IF the proper lubricating oil is not used on some engines, a lump of carbon will form on the valve stems between the heads of the valves and the valve stem guides. This causes each valve to stick, or splits the valve guide in the exhaust chamber.

The above trouble may be overcome to a great extent by machining the valve stem down 1/16 in. in diameter. This should be done for ½ in. along the valve stem, the machined part to project ⅛ in. above the lower shoulder. Shoulders should be straight. Facing the top of the valve guide with a hollow mill will make a still better job of it. As a rule, the forming of this carbon lump produces a rounded edge or surface on the valve guide toward the top of the guide.—GEORGE HERON, The Boston Store, Chicago.

No. 63—Compress Rings to Insert Piston

THE following is a simple method of holding piston rings in place while inserting the piston into the cylinder from the top or through the crankcase. The first requirement is a sheet of tin, long enough to overlap the diameter of the piston by about ⅜ of an inch and wide enough to cover all the piston rings. Allow about ½ in. for both laps. Each lap being ¼ in. long gives one a round edge, which makes it easier for slipping the sleeve over the rings. In putting on the piston ring retainer or compressor a piece of paper should be first wrapped around the piston. Next, wrap or bend a sheet of tin over the paper, fasten a piece of hay wire around this, near each end, and solder the seam. When this is completed remove the wires and solder the ends. The paper is placed underneath the tin to prevent the whole retainer being made too small so that it will not slip on or off the piston easily. In some crankcases the play space for the rings between piston and cylinder wells is very limited.—GEORGE HERON, The Boston Store, Chicago.



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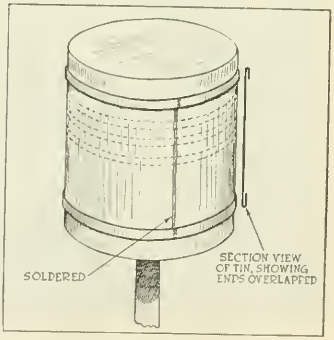
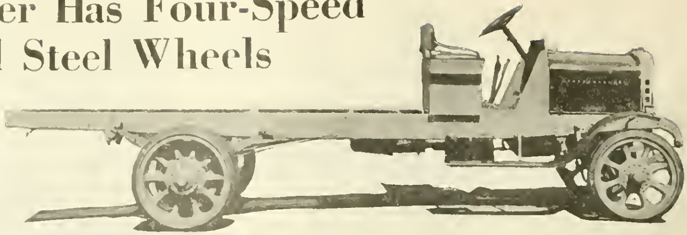


No. 63

New 5-Ton Master Has Four-Speed Gearset and Steel Wheels



The new 5-ton Master has a clear body length of 168 in.

ACCESSIBILITY and sturdiness are the big features of the new 5-tonner recently added by the Master Trucks, Inc., Chicago. The new worm-driven model has been designed for heavy duty work. With the standard wheelbase of 170 in. the price is $4,890; the extra wheelbase of 194 in. adds $100 to this price.

The new model carries the new Buda ATU model with 4¾ by 6½-in. bore and stroke. The cylinders are cast in pairs and are of the L-head type. The valves are of tungsten steel with effective working diameter of 2¼ in., which makes for high power and easy scavenging of cylinders. The cylinder head is removable, which makes valve-grinding comparatively simple. The crankshaft is carried in three extra large bronze-shell, babbitt-lined bearings, the front 2¼ by 4⅛ in.; center, 2½ by 3⅞ in., and the rear, 2⅝ by 4¾ in. The connecting rod bearings are made of chrome-vanadium steel, and the camshaft bearings are die-cast babbitt.

Lubrication is by positive force feed, a gear pump forcing the oil under pressure to the main bearings and thence through a passage drilled in the crankshaft to the connecting-rod bearings. The radiator, which is of Master make, is of the tubular type, the core being removable. The frame and tanks are cast iron, which makes for strength and ragidity and protects the cooling section from shocks and strains with flexibility secured by the use of strong spring supports. Circulation is effected by a centrifugal pump. Extra large water spaces around the cylinders and valves insure adequate cooling under all conditions. A Master 1½-in. carburetor, fitted with a Pierce governor and air adjustment on the dash, is used. Ignition is furnished by an Eisemann magneto with automatic advance.

MASTER SPECIFICATIONS

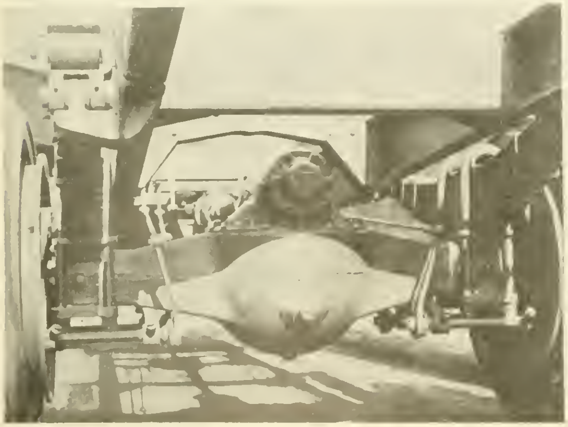
Capacity, tons	5
Price	$4,890
Wheelbase, in.	170
Tires, front	36 x 6
Tires, rear	40 x 6
Bore, in.	4¾
Stroke, in.	6½
N. A. C. C. hp.	36.2
Speed, r.p.m.	1000
Speed, m.p.h	10.6
Gear ratio in high gear	10.25 to 1
Final drive	Worm

Wheels are steel and tires are solids, single in the front and duals in the rear. With the short wheelbase, the chassis weight is 8,000 lbs., and with the long, 8,200 lbs. Each chassis is equipped with a driver's seat with cushions; three lamps; folding crank; tool box; tool kit; front mudguards and runningboards, and a siren whistle. The standard color is gray lead in two coats. Color painting may be had at extra cost. Starting and lighting is supplied at an extra cost of $150.

The truck is assembled from standard parts, such as a Parish & Bingham frame; Smith metal wheels; Buda engine; Brown-Lipe clutch and gearset; Timken front and rear axles; Detroit springs; Ross steering gear, and Spicer and Detroit universal joints.

Power is transmitted to the worm gear axle through the clutch, the four-speed gear set suspended at three points amidships, and a two-piece tubular propeller shaft fitted with four universal joints. Driving torque and propulsion are both taken through the springs.

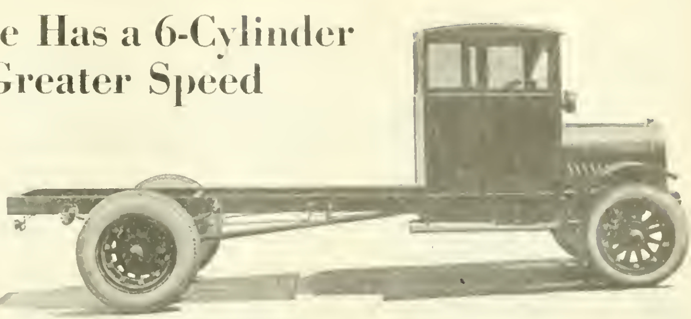
Timken roller bearings are used in the gearset, rear axle and on both hubs on the front axle as well as on the steering knuckle heads. The front is of straight I-beam construction with no center drop. The beam is 2¼ in. deep with ½-in. webs.



A Timken worm-driven rear axle is used on the new Master 5-tonner. The brakes are dual internal-expanding

The frame of the 5-ton Master is of pressed steel with a 10-in depth

2½-Ton Kankakee Has a 6-Cylinder Engine for Greater Speed


The new Kankakee 2½-tonner has a six-cylinder Continental engine for greater speeds. Pneumatic tires are furnished at extra cost

KANKAKEE SPECIFICATIONS

Capacity, tons	2½
Price	$2,465
Wheelbase, in.	170
Tires, front	34 x 4*
Tires rear	34 x 6*
Bore, in.	3½
Stroke, in.	5¼
N. A. C. C. hp	29.45
Speed, r.p.m.	2400
Speed, m.p.h	30
Gear ratio in high gear	7.4 to 1
Final drive	Int.-Gear

*Solids.

THE Kankakee Automobile Co., Kankakee, Ill., has entered the truck field with a 2½-ton internal-gear-driven model, designed for long distance hauling. It is equipped with a six-cylinder engine to meet the demand for high speed under load. The truck is capable of making 30 m.p.h. at 2,400 r.p.m. of the engine.

Equipment includes an all-weather cab with a dashboard, electric headlights mounted on the front of the cab, rear light, horn, speedometer, front fenders and runningboard. Delco ignition, together with starting motor and generator, is standard equipment.

The loading space behind the cab measures 12 ft. 4 in. The tread is 56 in. in the front and 59⅞ in. at the rear. The wheelbase is 170 in. The body is built to order to suit the needs of the operator.

The frame is unusual in construction. It is built entirely of straight channel sections, with an approach toward straight-line drive. The side members of the frame are constructed of rolled steel, of 6-in. channel. The cross members are of the same material. There are six cross members in the frame, the second member from the front acting as a support for the front end of the engine.

The chassis is assembled of well-known units, including a Continental engine, Bimel wood wheels, Willard battery, Zenith carburetor, Borg & Beck clutch, Muncie gearset, Shuler front and Russel rear axles, Temme springs, Ross steering gear, and Acme universal joints.

The cylinders of the six-cylinder powerplant are cast in block with the valves placed at the right. The engine is a unit with the gearset. Water is circulated by means of a centrifugal pump through a cellular type of radiator. Fuel is fed to the carburetor by vacuum from a tank located under the driver's seat.

Winther 1½-Tonner Featured by Internal 4-Wheel Drive

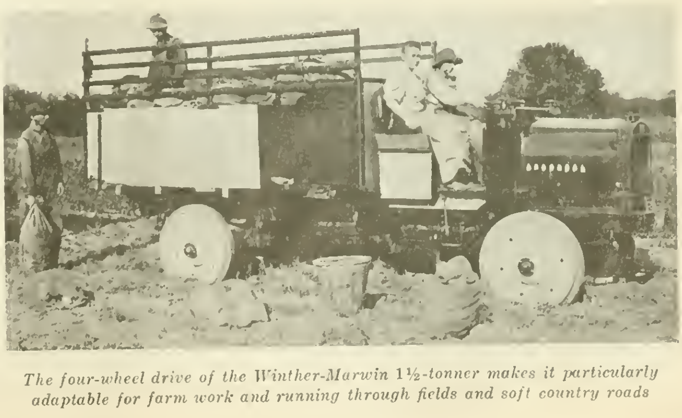
WINTHER-MARWIN SPECIFICATIONS

Capacity, tons	1½
Price	$2,375
Wheelbase in.	132
Tires, front	32 x 4
Tires, rear	32 x 4
Bore, in.	3¾
Stroke, in.	5
N. A. C. C. hp	22.5
Speed, r.p.m.	1500
Speed, m.p.h.	17
Gear ratio in high gear	8.8 to 1
Final drive	Int.-Gear-4

THE Winther Motor Truck Co., Kenosha, Wis., has brought out a model especially adapted for farming purposes. It is of 1½-ton capacity and is four-wheel driven. The Farm Special model, as it is called, is especially adaptable to rough going in the country districts and is also large enough to take care of most farm work. Equipment includes a seat, side and tail lights, tools, jack and runningboards. An all-weather cab is supplied at an extra cost of $100. A combination grain and stock body costs $120 extra. Pneumatic tires, electric starting and lighting, Prest-O-Lite equipment and pig tail hooks are supplied at extra cost.

The new model is made up of well-known units such as a Wisconsin engine, Eisemann magneto, Stromberg carburetor, Fuller clutch and gearset, Clark rear internal-gear-driven axle, Harvey springs, Lavine steering gear, and Arvac universal joints. The frame, wheels, radiator tank and front axle are made by the Marwin Truck Corp. The wheels, which are cast steel and of disk construction, are mounted with solid tires all around.

The cylinders of the four-cylinder powerplant are cast in block with the valves placed at the left. Water circulation is effected by means of a centrifugal pump and a vertical finned-tube radiator.


The four-wheel drive of the Winther-Marwin 1½-tonner makes it particularly adaptable for farm work and running through fields and soft country roads

Heil Four-in-One Combination Coal Body Keeps Trucks Moving

Lubrik Oil Cup—Loktite Chain Holder—Neverlost Rim Lug—Presto Windshield Cleaner—B & D Compressor

FLEET owners handling contracting materials, coal or lumber, who wish to keep their trucks moving during the slack periods of the year, may do so by equipping their vehicles with a four-in-one combination coal body, which may also be transformed into one for carrying lumber, castings, pipe, etc. In that way, the trucks may be rented to outside firms during the slack periods or may be used by the owners when they handle all three together. The four-in-one body shown in the accompanying illustration was built by the Heil Co., Milwaukee, Wis., and is mounted on a 5-ton Indiana truck. It is fitted with two sets of removable sides; double-acting tailgate; chain spreader device; sliding door in tailgate; hinged doors in the sides and a manual tailgate control. The body is fitted with a substantial subframe and a Hydro hoist.

The body has a coal capacity of 180 cu. ft. water level and 210 cu. ft. with crown, estimating coal at 50 lbs. per cu. ft. The hinged door and swing door each has a 6-in. spillway fitted with hooks for holding the standard 17-in. coal bag. The doors in the side of the body are always placed as close to the rear as possible to utilize the dump hoist to the maximum. The tailgate is reinforced with an angle iron and bar.

With both sets of sides removed, boxes, crates, cement and the like can be hauled. The tailgate may also be suspended level with the platform, thus increasing the loading space and making possible the hauling of lumber, castings, pipe, etc.

As the body is fitted with a Hydro hoist, all of the loading space is utilized and the load is properly distributed.

The weight of the body is 2,500 lbs.; the length is 11 ft.; the width 6 ft., and the height for gravel 17 in. and coal $32\frac{3}{4}$ in. The price is $475. Other prices range from $330 for the 2-ton size to $570 for the 7-tonner.

Lubrik Oil Cup

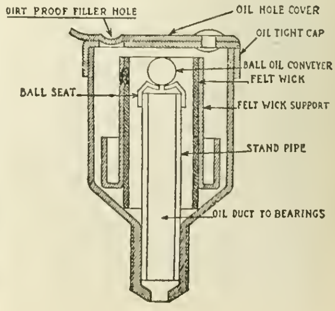
A DUST-PROOF oil cup which depends for operation upon sufficient movement of the cup to agitate a ball oil conveyor to permit oil to flow to the bearing is being made by the Coe-Stapley Mfg. Corp., New York City. The quantity of oil fed is governed by the size of the ball and the speed of the truck. Oil is carried up from the well by capillary action through a wick to the ball conveyor. The conveyor collects oil by being thrown against the ball. The price is $1. The cup is fitted with a dirt-proof filler hole, as shown in the accompanying illustration.

Loktite Chain Holder

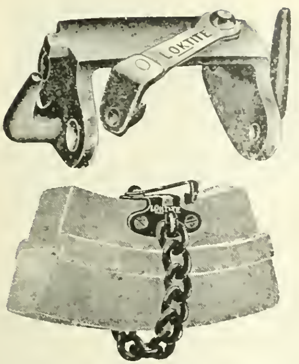
A NON-SKID chain holder for use on trucks equipped with solid or pneumatic tires has been recently put on the market—the Loktite truck chain holder as it is named; the chain may be locked or taken off the felloe of the wheels by the use of the thumb and finger. There is only one part to the Loktite; once fastened on the felloe of the wheel it can remain there permanently. With the locking device it is impossible to lose a chain, except when the chain wears in two or breaks. Then the inside half drops off the holder and prevents the possibility of getting caught in the brake mechanism. The outside half of the chain stays fast to the holder and gives the driver the alarm that the chain is broken.

Loktite chains have a special twist so they lay flat on the tires. As a result there are no straight links to cut in the edge of the tires and no special hooks or special links to fasten to the holders. A set of twelve clamps, including the screws, costs $16.25. Twelve lengths of chain cost $4.08, a single length costing 34 cents. These prices cover clamps and chains made specially for $\frac{3}{4}$-, 1- and $1\frac{1}{4}$-ton trucks which are equipped with wheels having a felloe $2\frac{3}{4}$ in. wide and $1\frac{1}{2}$ in. to 2 in. deep. Staples & Seefeld, Milwaukee, Wis., make the device.

A coal company may transform its truck into one for carrying lumber, castings, etc., with a Heil "Four-in-One" body



Agitation of the ball in the Lubrik oil cup permits oil to flow to the bearing



A chain used for non-skid purposes may be taken off by the use of thumb and finger with Loktite chain holder

Neverlost Rim Lug

TRUCK owners will appreciate the advantages which are represented in a new tire lug which has been designed to overcome all the faults of the ordinary type. As every fleet owner knows, the lugs at the present time must be removed entirely when tires are changed. With the Neverlost lug, the lug never becomes separated entirely from the rim, a hinged joint serving to let the lug swing free from the rim bolt, but holding it to the rim nevertheless. When the nut lug combination is removed, it drops out of the way as is shown by the dotted lines in the accompanying illustration. While in the drawing the swivel pin is shown below the nut, in some types of lugs the pin is placed at the side so as not to weaken the fellce of the wheel. The manufacturer is the Automatic Products Co., New York City.

Windshield Cleaner

THE difficulties encountered by truck drivers when running during a rain when their windshields are constantly covered with water through which it is almost impossible to see have been responsible for the design of a new type of windshield cleaner. It is made with two chemically treated felt pads which are pressed against either side of the windshield by means of oil-tempered, spring steel holders. These spring holders insure uniform tension, prevent rattling and keep the cleaner from dropping down in the line of vision.

Both sides of the windshield glass are cleaned at the same time with the Presto-Felt cleaner.

One application, it is stated, is sufficient during any storm. Another feature of the device is that both sides of the glass are cleaned at the same time, thus preventing dust or steam from gathering on the inside of the windshield, as it does in the case of a closed cab.

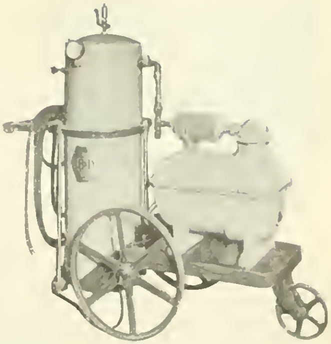
The Presto-Felt windshield cleaner is made in one model only, yet it is designed to fit all types of windshields. It can be attached in either of three ways: clamping over the top of the windshield frame; bolted through the frame, or bolted directly through the glass. All necessary parts are furnished with each cleaner for attaching in either of the three ways. The price complete is $2. It is made by the Presto-Felt Mfg. Co., Toledo, Ohio.

B. & D. Electric Compressor

FLEET owners whose trucks are equipped with pneumatic tires and who wish to save time during the inflation of these large tires will be interested in the new No. 46 portable automatic electric compressor outfit, recently put on the market by the Black & Decker Mfg. Co., Baltimore, Md.

The same outfit can also be used in the machine shop for operating pneumatic tools, for paint spraying, machinery blowing, etc. When used as such, the cylinder has a larger bore, so that the machine delivers 12 cu. ft. per minute with a guaranteed pressure of 75 lb. When used for inflating tires, the compressor delivers 6 cu. ft. per min. with a guaranteed pressure of 200 lb.

The machine is air-cooled, being lubricated by grease. The cooling chamber at the top of the compressor is provided with fins to dissipate the compression heat. The automatic switch starts the compressor when the pressure in the tank drops to 150 lb., and automatically stops it when the tank pressure has reached 200 lb. In conjunction with the automatic switch there is an automatic unloader which prevents the possibility of overloading the electric circuit when the motor is started. The average inflation time of a 44 by 10-in. tire was 6.3 min.

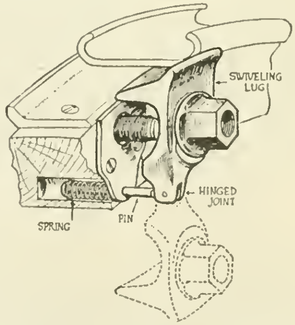


The B. & D. electric compressor delivers 12 cu. ft. of air per min.

The carriage of the outfit is provided with lugs so that it can be quickly converted into a stationary outfit by merely removing the wheels and handle. When this outfit is desired, allowance of $15 is made for the wheels and handle, making the net price $485.

Burd Piston Ring Directory

THE Burd High Compression Ring Co., Rockford, Ill., has issued a most complete piston ring directory. It is a book of 112 pages, listing over 600 sizes and oversizes of Burd piston rings, covering practically every make and model of gasoline engine. Piston ring specifications for over 1,500 models of passenger cars and trucks are given. The correct size for nearly every truck engine will be found. Complete instructions for ring installations, etc., are also given.



The Neverlost lug never becomes separated entirely from the rim

The Editor's Viewpoint

1919 In Retrospect

LOOKING back on the year 1919 it has been a good year for the average motor truck owner in that he has discovered many new advantages of the motor truck. Many of these were the result of truck use in the Great War, which, taken all in all, has proved to be the greatest single influence ever interjected for the advancement of all forms of highway transportation.

The war has also brought home forcibly the need for wider and better highways. And if the truck owner must pay a fair proportion of the cost of these new roads he should not complain. When license fees are increased within reason he should not feel that he is being discriminated against, for in the long run he will probably save more than the increased cost of the fees by the reduced expense of truck operation and maintenance resulting from the improved highways.

During 1919 the fleet owner has been fortunate in obtaining trucks without serious delay and at a price which increased far less than machinery in many other different lines of industry.

Then, too, there has been a gradual development in the better design of motor trucks, and this has resulted in a lower cost of operation and maintenance than would have been possible without these improvements. True, drivers' and helpers' wages have been increased, but not in proportion to the wage increases in many other lines of work.

These increased wages have also brought home to the large fleet owner the necessity for better organization of his truck operating personnel in order to keep down as low as possible the cost of doing a unit of work. In this connection, there has come a better understanding, especially with large fleet owners, that the work of truck operation and truck maintenance are radically different, require differently-trained men and should be performed by separate departments.

1919, The Year of Roads

AS prophesied in the Jan. 1, 1919, issue of this magazine the year 1919 saw greater road development than in any other year in the history of the United States. While the actual road work carried through was far less than that proposed, the difference in the work will undoubtedly be completed during the present year and make it of even greater importance.

Road building appropriations made from all sources during 1919 totaled $340,394,536. In Federal-Aid roads alone projects to cost $91,495,797 were approved. Of these, projects valued at only $18,048,441 were executed. This shows that the actual accomplishment has been far less than that planned at the beginning of the year.

The fate of the proposed Federal Highway Commission to supervise the construction and maintenance of a national system of highways and to expend the Federal-Aid moneys now passing through the Bureau of Public Roads of the Department of Agriculture is still undecided. Several bills have been introduced for the creation of such a commission but each bill has been amended and amended again so that nothing definite has been accomplished.

Real Truck Shows

HIGHWAY transport conferences at the two 1920 motor truck shows in New York City and Chicago will make these shows different from any national truck shows ever held in this country before. As these conferences are designed to impart valuable information to the truck purchaser and to the fleet owner, all truck owners should attend them and also send their operating and maintenance superintendents.

In years past, motor truck shows have been more or less of failures from the truck owners' viewpoint. This has not been surprising in view of the fact that the shows were engineered more for the truck maker, dealer and distributor than the prospective truck purchaser.

This year conditions are different. Both truck shows will have to stand or fall on their own merits. The success or failure of the shows from the fleet-owner viewpoint will depend entirely upon the attendance of the fleet owner at the conferences, now that those in charge of the shows have provided a means for dissemination of real operating and maintenance knowledge.

After the War, The Truck

ONE of the progressive motor truck manufacturers has very well expressed the future development in truck use by saying that as after the Civil War came the great development of our railway systems, so after the Great War will come the real development of the motor truck.

This expresses so well the possibilities which the future holds in store for the motor truck that we may at this time attempt to foresee what the future has in abeyance for the commercial vehicle.

If highway transportation follows railroad development it is not too much to suppose that perhaps within the next decade we will have stock companies operating highway transport fleets of 500 or even 1000 trucks. Then truck operation will be on a much more scientific basis than it is at present. Truck operation and truck maintenance will be perfected to the highest degree. There will be no small leaks in operating or maintenance expenses for the unwarranted waste of even the smallest amount, for $1 lost per truck per day would amount to $300,000 for a 300-day operating year.

When the day of the gigantic and well-organized transportation fleet arrives, the greatest economic development of the nation will be made possible, for then every small city, town and village not now accessible by boat or rail lines will be linked together.

If we are to judge by the development in the use of trucks during the past year this view has more of realism than fancy. Of all the forces which have advanced highway transportation by motor truck, none has been more potent than the Great War. It has cramped ten years of development into one year and brought home under the stress of a national crisis the great economic advantages of highways and the vehicles of commerce which must run over them if the roads are to be of their greatest value.

Future Owner Tasks

WHILE many fleet owners have bettered their method of truck operation and maintenance during the past year, there are many things still to be attained. Discussing the subject briefly, there is still room for tremendous development along two distinct lines, those of truck operation and truck maintenance.

Many thousands of trucks are still operated on the antique, slow and inefficient horse-pace methods. The owners of these vehicles, forced to buy trucks when horses were unavailable or became too expensive to operate, have simply employed the motor truck as a substitute for the horse. Instead, the motor truck is a modern business builder.

It cannot become this business builder to the fullest extent unless the equipment used in conjunction with it and the methods of loading and unloading employed are speeded up in the same ratio as the speed of the truck is greater than that of the horse.

There is still much to be done in the loading and unloading of trucks. Far too many trucks spend a third or a half of their working day with their wheels not turning. Under these conditions the truck becomes nothing more than a warehouse on wheels whereas the purpose for which it is built is not to be a warehouse but to move goods as rapidly as possible from one place to another.

It becomes more and more of a business builder as the ratio of the actual time in motion approaches the total possible time in motion. There is hardly any given set of truck-operating conditions in which the motor truck cannot be made to earn greater profits or save more money, if serious thought is given to the method of operation, including routing, dispatching, loading and unloading.

There is also still much to be attained in motor truck maintenance. The cost of truck maintenance cannot be reduced by an undersized machine shop or barnlike garage. Economy is secured only when adequate equipment is provided and this adequate equipment costs money.

The Fleet Owners' Forum

Makers of Hoists and Truck Engine Stands

To the Editor, COMMERCIAL VEHICLE:

Will you please give us the names of concerns which manufacture the following truck garage equipment:

1—Hoists or cranes for lifting engines out of truck chassis.

2—Stands for testing engines.—P. L. CRIBLET, Baltimore, Md.

The following list gives the names and addresses of firms prominent in the manufacture of portable cranes such as can be used for lifting engines out of truck chassis:

Canton Foundry & Machine Co., Canton, Ohio
Cleveland Chain & Mfg. Co., Cleveland, Ohio
Keystone Garage Equipment Co., Boston, Mass.
Klemme Mfg. Co., A. C., Davenport, Iowa
Franklin Moore Co., Winsted, Conn.
New Jersey Foundry & Machine Co., New York, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
U. S. Auto Bumper Co., Chicago, Ill.
United Engine & Mfg. Co., Hanover, Pa.
Weaver Mfg. Co., Springfield, Ill.
Wengraf Auto Hoist Co., Naugatuck, Conn.

Some prominent makers of engine repair stands are as follows:

Central Brass & Fixture Co., Springfield, Ohio.
Continental Auto Parts Co., Knightstown, Ind.
Hershell-Spillman Motor Co., North Tonawanda, N. Y
Showalter Mfg. Co., Springfield, Ohio.
United Engine & Mfg. Co., Hanover, Pa.

Articles on How to Get Rid of Horse Wagons

To the Editor, COMMERCIAL VEHICLE:

I note on page 90 of the Sept. 1, 1919, issue of THE COMMERCIAL VEHICLE that there is an article entitled "Getting Rid of a Mixed Fleet of Horses and Trucks." I will appreciate it if you will tell me in what other issues of THE COMMERCIAL VEHICLE similar articles have appeared regarding the replacement of horses by either gasoline or electric trucks.—A. P. LEKHART, Utica City Ice Co., Utica, N. Y.

A second article on "How a Lumber Merchant in a Small Town Got Rid of His Horses" was published on pages 140 and 141 of THE COMMERCIAL VEHICLE for Sept. 15, 1919. Other articles telling how concerns in different lines of industry have replaced their horse-drawn equipment by trucks have been published as follows:

No. 3 Lumber	Sept. 15
No. 4 Groceries	Nov. 1
No. 5 Express	Nov. 15
No. 6 Florist	Dec. 1
No. 7 Beverages	Dec. 15
No. 8 Bread	Jan. 1

DEVOTED to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

Where to Get Repair Links for Truck Chains

To the Editor, COMMERCIAL VEHICLE:

Will you please advise where I can buy twist link chains for renewing cross chains for heavy truck chains? Can you tell me where the best wheel or non-skid chains are obtainable? —R. A. LIVESEY, Pedro, W. Va.

Below is a list of makers of tire chain repair links:

American Auto Products Co., Washington, D. C.
Zinke Co., Chicago, Ill.

Some of the most prominent chain makers are the following:

American Chain Co., Bridgeport, Conn.
Arrow Grip Mfg. Co., Glens Falls, N. Y.
Challoner Co., Oshkosh, Wis.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Never-Skid Mfg. Co., New York City.
Rowe Calk & Chain Co., Plantsville, Conn.
Standley Skid Chain Co., Boone, Iowa.
W. E. Townsend Co., New York City.
United Sales Co., Minneapolis, Minn.
Foley Traction Rim Co., Inc., Minneapolis, Minn.

Companies Which Make Truck Camping Outfits

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us the names of manufacturers making complete camping outfits to mount on motor trucks?—O. H. WENTCHER, Wichita, Kan.

Below is a list of companies which manufacture complete camping outfits to mount on motor trucks:

Auto Bed Camp Mfg. Co., Kansas City, Mo.
Baker & Lockwood Mfg. Co., Kansas City, Mo.
F. J. Burch Mfg. Co., Pueblo, Colo.
Carnie-Goudie Mfg. Co., Kansas City, Mo.
Cleveland-Akron Bag Co., Cleveland, O.
Compac Tent Co., Indianapolis, Ind.
Cruiser Motor Car Co., Madison, Wis.
Gustav De Bretteville, San Francisco, Cal.
Des Moines Tent & Awning Co., Des Moines, Iowa.
Enterprise Bed Co., Hammond, Ind.
Genesee Mfg. Co., Flint, Mich.
J. C. Goss Co., Detroit, Mich.
Holden Mfg. Co., St. Paul, Minn.
Schaefer Tent & Awning Co., Denver, Colo.
Stoll Mfg. Co., Denver, Colo.
Strong Bungalow Co., Hartford, Conn.
Tentobed Co., Chicago, Ill.
Way Sagless Spring Co., Minneapolis, Minn.

Fit Ford with Pneumatics All Around for Speed

To the Editor, COMMERCIAL VEHICLE:

Will you please give us your advice as to what size of pneumatic tire to fit on a Ford truck chassis in order to improve the riding qualities and also get more speed with the same r.p.m. of the motor. I would think one-half way between the present truck tire and passenger car tire would be about right. My load will be about 800 or 900 pounds, exclusive of the body, which will be as light as possible and still sufficiently substantial to stand hard usage.—F. M. GRANT, P. O. Box 411, Ekalaka, Mont.

We think it would be a good plan to retain the 30 x 3½ pneumatic tires now fitted as standard equipment on the front wheels of the Ford model TT 1-ton truck. If you wish to replace the 32 x 3½ solid tires fitted on the rear wheels of the same truck as standard equipment, a 32 x 4-in. pneumatic would probably be the best size to use. A 32 x 4-in. pneumatic tire has a maximum weight carrying capacity of 500 pounds as against 410 pounds for a 3½-in. pneumatic. While you say your load will only be between 800 and 900 pounds, and while all of this is not supported on the two rear tires, we would think it best to use the 4-in. tire instead of the 3½ to allow for overloads which you will undoubtedly encounter. With a 4-in. pneumatic tire the inflation pressure for a tire of the cord construction should be about 36 lb. per square inch and about 40 lb. per square inch for an ordinary fabric tire.

Books Published on Care of Motor Trucks

To the Editor, COMMERCIAL VEHICLE:

Can you recommend a book on the care of motor trucks which we can keep for ready reference? We should like to have information on the construction and operation of trucks.—ROBERT PLOWE, Chicago.

THE COMMERCIAL VEHICLE during its life of twelve years has published more information on the construction and operation of gasoline and electric motor trucks and tractors than any other one publication. In fact, that is the only kind of information which it has published, since THE COMMERCIAL VEHICLE is devoted exclusively to the subject of motor trucks and motor trucking problems. Bound volumes of THE COMMERCIAL VEHICLE would undoubtedly give you more information on the subject of trucks and truck use than any other one publication which we know of.

There are very few books written on the same subject. Those that we know of include the following:

"The Motor Truck as an Aid to Business Profits," by S. V. Norton. The book was first published by the A. W. Shaw Co., Chicago, Ill., during the year 1918, and sells at $7.50 net.

"Horse, Truck and Tractor," by N. H. Casson, L. W. Ellis and R. W. Hutchinson, Jr., published by F. G. Browne & Co., Chicago, Ill., in 1913. The price of the book is not known.

"Motor Truck in Business," by Waldemare Kaempffert, published by the McClure Publications, Inc., New York City, during 1917, and distributed gratis.

There is considerable information regarding the design and construction of motor truck chassis and the combination of truck parts in **"The Modern Gasoline Automobile. Its Design, Construction, Maintenance and Operation,"** by Victor Pagé, published by the Norman W. Henley Publishing Co., New York City, in 1918. The book sells at $3 per copy.

Truck Life Figured in Miles, Not Years

To the Editor, COMMERCIAL VEHICLE:

Will you please give us any data which you may have on the average life in years and also in mileage of motor trucks in the class of Service, Packard, Pierce-Arrow and White.—CRAMER-KRASSELT CO., C-K Bldg., Milwaukee, Wis.

We should say that it is becoming customary to gage the life of a truck by the number of miles it will run rather than the number of years. This is due to the fact that as a general thing a truck wears out in proportion to the number of miles it is run. Some trucks which cover a small mileage yearly will undoubtedly last longer than those which cover a greater mileage, so that the mileage basis gives a more scientific method of estimating truck life and truck cost.

The total mileage which any of the trucks which you mention might be expected to cover before being worn out is a very difficult question to answer because of the great variety of work in which trucks are engaged. As a general rule, however, the mileage life is assumed to be somewhere between 100,000 and 150,000 miles. The White Co. has recently advertised that it has many trucks which have run far in excess of 100,000 miles and are still giving service. The Packard Co. figures that its trucks should give at least 150,000 miles of good service if maintained with proper care and supervision.

Closed Cabs for Two Makes of Trucks

To the Editor, COMMERCIAL VEHICLE:

Will you kindly inform us as to the name and address of the manufacturer who makes winter closed cabs ready to be installed on the Pierce-Arrow and Packard Trucks?—PROSPECT HILL BOTTLING CO., Somerville, Mass.

We are advised by the Pierce-Arrow Motor Car Co., Buffalo, N. Y., that it manufactures its own closed cabs at its Buffalo factory.

The H. H. Babcock Co., Watertown, N. Y., furnishes closed cabs for all models of Packard trucks at a set price of $230.

Data on Friction of Solid Tires on Roads

To the Editor, COMMERCIAL VEHICLE:

I am desirous of obtaining certain information relating to the tractive effort or rolling friction coefficient of solid rubber tires on various road surfaces; that is, what relations exist between tractive effort in pounds at the rim of the driving wheel of a motor truck or other motor vehicle, total load on the wheels, speed of the truck and power of the engine or motor when operating over the various good and bad conditions of streets and roads.

This information is to be used for the theoretical calculation of the power required to drive certain capacity trucks over or through various road conditions at given speeds, employing solid rubber tires.—L. R. YEAGER, Columbus, Ohio.

The following are the accepted figures for coefficients of road friction for solid rubber tires of the usual compound:

Hard, level asphalt	0.0100
Wood pavement	0.0115
Level macadam	0.0115–0.0300
Plank road	0.0090
Cobble stones	0.0175
Good dirt road	0.0110–0.0200
Ordinary dirt country road	0.0200
Sand	0.2000

The tractive resistance of average roads against solid rubber tires is generally assumed to be 60 lb. per ton of weight on the wheel. Speed and motor-power do not materially affect these figures, excepting that there is a certain percentage of slip at high speeds, and that too sudden application of power will, of course, prevent the tires taking hold of the road. In motor trucks, however, these points may be neglected.

There are two formulas used to determine the ability of a vehicle, one of these being what is usually called the Roadability formula:

$$A = \frac{B^2\ S\ N\ R}{W\ D}$$

In which B is the engine bore in inches, S is the engine stroke in inches, N is the number of cylinders, R is the total gear ratio, W is the total weight in pounds and D is the diameter of the driving wheels in inches.

This formula is useful chiefly as a comparison of the effectiveness of different designs. By figuring the ability of a given chassis of known efficiency a new design may be checked up with it by similarly figuring its ability.

A more scientific formula is that for which Cornelius T. Myers is responsible, known as the *TF* formula:

$$TF = \frac{28.2\ B^2\ N\ S\ R}{D\ W}$$

In which *TF* is the tractive factor, or pounds of push at the driving tires per pound of total weight of the truck and its load; N is the number of cylinders, B is the engine bore in inches, S is the engine stroke in inches, R is the total gear ratio, D is the diameter of the driving wheels in inches and W is the total weight in pounds.

To use this formula it is necessary to determine the tractive resistance which has to be overcome. On a level road this will equal the total weight of the truck and load multiplied by the road-friction coefficient given at the top of the answer to this inquiry, which most nearly represents the road condition encountered. If there is a grade, its percentage, expressed in decimals, should be added to the road resistance coefficient.

Thus, for example, suppose we have a truck weighing, with its load, 9800 lb. to move over a fair macadam road with a 4-per cent grade. Then:

$$\begin{aligned} \infty &= 0.0175 \\ \text{Grade} &= 0.04 \\ \hline & \ 0.0575 \end{aligned}$$

0.0575 = Total road resistance per pound of total weight. Total weight = 9800. Then 9800 × 0.0575 = 563½ lb.

From this it is possible to work back to the truck design by substituting in the *TF* formula all of the factors which are fixed and immutable, and then trying different values for the variable ones until the desired *TF* is secured.

To Issue Mack Paper

NEW YORK CITY, Dec. 24.—The International Motor Co., manufacturer of Mack trucks, will publish a new completed house organ called the *Mack Bulldog.* The first issue will appear in February. The adaptation of the motor truck to the different fields of business will be a prominent feature of the magazine.

Stroudsburg Transfer Co.

STROUDSBURG, PA., Dec. 26.—The Stroudsburg Transfer Co. has been formed to do business in Stroudsburg and Pittston, Pa. Light hauling will be done for the present with a few trucks. In the spring the concern intends expanding its fleet.

Plan New Body for Federal Roads

Bill Calls for Five-Man Commission to Build New Road System

WASHINGTON, Dec. 22.—A revised bill for the establishment of a National Highway System and the creation of a Federal Highway Commission, has been introduced in the Senate by Senator Townsend. The bill, which closely follows the earlier bills which were introduced by Senator Townsend for the same purpose, would create a Federal Highway Commission of five commissioners appointed by the President with the consent of the Senate, each being appointed with regard to the geological conditions of the United States, and under the provision that not more than three commissioners shall be members of the same political party. The commission will establish, construct and maintain a national system of highways, composed of connecting interstate roads, which shall be the most practicable routes and constructed with consideration for the location of agricultural and industrial production centers. The system may include the highways connecting water ports and the highways of Mexico and Canada. They will not include highways in a municipality with a population of 5000 or more.

The Commission will have authority to make the necessary surveys and maps, either directly or through contract with state highway departments; will have the power to hire labor and purchase supplies and maintain equipment and will work as co-operatively as possible with the highway departments in the selection of highways.

A portion of the national highway system in each state shall be equal to 1 per cent of the total highway mileage in each state where that will suffice to offer at least two highways connecting with the national highways in adjoining states. Where it will not be sufficient, the commission will have the power to increase the mileage of the national systems as much as is necessary to provide two such highways. It may select any highway or part of a highway for its national highway system that has been constructed by the state or county municipality. In consideration of the benefits to be derived by each state from the establishment of a national highway system it will be a condition preceding construction of the highways selected for the national system that the existing right of way of a highway will be transferred by the state to the United States Government. Permission is given to railroads or canal companies to convey property to the government for the purpose of this act if it has been acquired by grant from the United States.

The use of only such durable types of surface and materials will adequately meet the future traffic needs is authorized, and the commission will have the authority and power to determine the types of construction, methods and maintenance. All highways in the national system unless impractical because of physical conditions, excessive cost or legal obstacles shall have a right of way of not less than 66 ft. in width and a wearing surface of an adequate width of not less than 20 ft.

Appropriations authorized by the act include $50,000,000, which will become available immediately; $75,000,000 for the fiscal year beginning July 1, 1920, and $100,000,000 for each of the 3 succeeding fiscal years. In all, $425,000,000 will be available until expended. Not more than 5 per cent of the appropriation may be used for administering the provisions of the act. The bill is now before the committee for post offices and test roads for consideration.

New Service Repair Station

PHILADELPHIA, Dec. 27.—The Service Motor Truck Co. is now represented in Eastern Pennsylvania and New Jersey by the Lansdale Motor Co., Philadelphia. A completely equipped service station will be opened at 1409 Melon Street, this city.

Coming Events

1920

Jan. 3-10....New York City, Motor Truck Show, 8th Coast Artillery Regiment Armory, 193rd St. and Jerome Avenue.

Jan. 17-24....Hartford, Conn., Truck Show, State Armory.

Jan 24-31....Chicago, Ill., Motor Truck Show, International Amphitheatre, Stock Yards.

Feb. 9-14....Louisville, Ky., American Good Roads Congress.

Feb 14-21....Detroit Motor Truck Show, Ford Service Building.

March 22-27..Wilkes-Barre, Pa., Motor Truck Show, Armory.

Truck Laws to Be Enforced in Pa.

Road Inspectors Will Stop Trucks for Overloading and Too Long Loads

PHILADELPHIA, Dec. 26.—Politicians' restrictions on motor traffic over Pennsylvania's highways as exemplified in the new state laws, which were interpreted to the members at the December session of the Motor Truck Assn. of Philadelphia, at the Hotel Adelphia, make it appear that truck owners, operators and dealers will have to see that the laws are amended.

Benjamin C. Eynon, State Registrar of Motor Vehicles, who made the principal business address of the evening, explained in a comprehensive manner the details of the new law, which, as more than one member remarked in substance after the meeting, seems aimed at stifling motor truck traffic in the state.

While his listeners were appreciative of his intepretation and clear explanation of the laws, there was consternation among the unprepared when Mr. Eynon announced that his department of the state government soon would put out numerous inspectors on the outskirts of cities to test trucks for overloading. He advised truck owners especially to keep within the new law which permits no overload beyond the manufacturers' certification of load capacity.

It was a source of comment after the meeting that, with the new plan of having inspectors stop trucks for testing, an owner hauling, for instance, a dozen pigs to market, could be inconvenienced and perhaps made to lose ½ day or more, by being compelled to remove the final pig which happened to tip the scale just over the lawful weight for the truck load, and that this practice might prove productive of no end of attempts to hold up motor truck owners in more senses than one. The new law also means that telegraph poles and other articles of like length cannot be hauled by motor truck without a trailer attached, as the length of the load is limited.

Detroit Show Feb. 14-21

DETROIT, Dec. 27.—Detroit's 1920 truck show, staged by the Detroit Automobile Dealers' Assn., will be held Feb. 14 to 21 in the eight-story Ford service building.

Motor Trucks Versus the Railroads

Railways Use Coercion to Get Back Freight Hauled By Road

BOSTON, Dec. 20.—A good illustration of how the railroads are going after business they lost during the war was told by George H. O'Brien, who has a big transportation company at Norwood, Mass., to the members of the Motor Truck Club of Massachusetts at their meeting last night. He said during the war he bought a 5-ton truck to haul rubber goods to Providence for shipment to New York by boat. The railroad could not handle it. With the armistice the contracts dropped. Business picked up again. Then he lost the trucking job with the rubber company. He tried to find out why. The railroad officials had gone to the company and promised a freight car every day for the haul to Providence with their goods. O'Brien figured the cost and cut the railroad figure by 2½ cents per hundred delivered at New York. But his offer was not accepted. The general manager was willing to use the truck, but the president would not agree.

Mr. O'Brien after several efforts secured an interview with the president. He agreed that the motor truck could do the work better, in fact the railroad was not living up to its agreement to give him a car a day. "Here's my position," he told O'Brien. "Sometimes a shipment comes in by freight, and the car lays down at the junction a mile away because there is not time to shunt it to our siding. It may have just some particular goods we are all out of and need badly to keep our factory going. The railroad people allow me to send down a team, break the seal and take away what I want to keep my plant going. Now if I went back to your trucking line when I wanted some goods they would hold me up. And I'd have to stop. I'd like to use the truck, but you see how I'm fixed."

And O'Brien, with his investment of a big truck, lost the job. But he skirmished around and got other business.

Lights on Penn. Trucks

PHILADELPHIA, Dec. 26.—The Motor Truck Assn. of Philadelphia has been informed by the State Highway Department that owners of large trucks unable to procure adequate lighting appliances because of manufacturing difficulties, will be granted registration licenses on their promise that they will get lights as soon as possible.

Representatives of the Motor Truck Assn. informed Commissioner Sadler that large trucks are not supplied with lights other than oil signal lamps on each side and that electrical devices for them have not been found generally practical.

"Manufacturers, in view of the Pennsylvania laws," said Mr. Sadler, "it seems to me, should begin to supply adequate lights and their engineers should develop a practical lighting system. There is the law; I cannot modify it."

The Commissioner called attention to the fact that many trucks from the cabs of which drivers are unable to see back of them, are not equipped with fender mirrors or other mirrors. The law in this particular, asserts Commissioner Sadler, will be strictly enforced.

New Cameron 1-Tonner

NEW YORK CITY, Dec. 27.—With the idea in mind of taking care of the demand for a high-speed, light delivery truck, the Cameron Motors Corp., this city, has brought out a 1-ton model, equipped with a six-cylinder air-cooled engine. The new truck is capable of making 30 m.p.h. fully loaded. The truck is equipped with 36 by 6 cord pneumatics mounted on metal disc wheels. Other equipment includes Bijur starting and lighting; Torbensen internal-, gear-driven axle; Connecticut high-tension ignition and Borg & Beck clutch. The price is $2,400.

Montreal Owners Organize

MONTREAL, QUE., Dec. 24.—Commercial vehicle owners of this city have organized a special section of the Automobile Club of Canada to look after their interests. A committee has been formed consisting of several owners of fleets, who will look into the question of legislation, especially with regard to the prohibition of the use of trailers in this city and also the law which prevents the use of anything heavier than a 3-ton truck on the provincial highways In addition to this, the committee will prepare statistics relative to the operating costs of different makes of commercial vehicles and their application to various businesses.

Plan to Study Tunnel Exhaust Gases

Experimental Tunnel to Investigate Problems of Ventilation

WASHINGTON, Dec. 27. — The proposed construction of vehicular tunnels in several of the large cities of this country and particularly the tunnel between New York and New Jersey, has created a problem regarding the amount of carbon monoxide likely to be discharged by motor vehicles in such tunnels. As a result, the Bureau of Mines has requested $100,000 from Congress to conduct experiments. At the same time Yale University will conduct an experimental tunnel and co-operatively attempt to determine whether the poisonous gases thrown off by motor vehicles would be detrimental to life or seriously endanger it in a long tunnel. The Bureau of Mines will conduct its experiments at Pittsburgh.

The problem has been concretely developed by the proposed tunnel under the Hudson River and between New York and New Jersey, which will be 9,000 ft. long, with an estimated number of 2,000 passenger cars and trucks passing through per hour during the rush periods. The quantities of poisonous gas given off by this long line of machines is now an unknown quantity, and must be determined before the tunnel construction can be undertaken and the proper ventilation may be installed.

In discussing this matter with Congress, Van H. Manning, Director of the Bureau of Mines, emphasizes the need for vehicular tunnels and points out the rapid increase in the use of motor trucks which will eventually demand tunnel and subway construction.

Riker Reorganized

NEW YORK CITY, Dec. 15.—In connection with the reorganization of the Locomobile Co. of America, maker of the Riker trucks, it is stated that the new company will be known as the Locomobile Co. Emlen S. Hare, president of the Mercer Motor Co., will head the Locomobile company, which plans building a line of trucks ranging in size from ¾- to 5-ton capacities. At present only 3- and 4-ton sizes are made. H. S. Church, formerly truck engineer of the Packard company, will be chief engineer of the reorganized company.

Michigan Merchants for Ship-by-Truck

Nineteen Routes Help Them to Compete with Firms Using Lake Boats

GRAND RAPIDS, Mich., Dec. 24.—What Ship-by-Truck can mean to wholesalers is well illustrated in Grand Rapids, Mich., where its nineteen routes, operating thirty-two motor trucks, have the staunch support of wholesale dealers in fruits, groceries and drugs. These Grand Rapids dealers are backing the truck lines because, by speeding their consignments to neighboring Michigan towns, it permits them to compete with Milwaukee wholesalers.

Last spring the Grand Rapids men found that Milwaukee wholesalers were making substantial inroads on their business. Lake transportation was making it possible for the Wisconsin dealers to get their shipments into the territory more quickly than could the Grand Rapids houses. They were sending it into Michigan port cities that had the best railroad facilities, and it was being speeded along to its destination with little delay. Grand Rapids dealers, dependent entirely upon the railroads, were not so fortunate in obtaining quick deliveries. Then the Ship-by-Truck idea came along; they adopted it, and now they claim they are far outdistancing their rivals.

In Grand Rapids the Ship-by-Truck work is done through a central terminal. This terminal, which was fostered by the local Firestone Ship-by-Truck Bureau, operates under the name of the Associated Truck Lines of Grand Rapids. It was started in June, 1919. By the first of the following September, it had outgrown its original quarters and was forced to move to a larger place. Today more than 170,000 lbs. of freight is leaving its two loading platforms daily. Incoming freight representing return loads, is 60 per cent as great. The shortest route is 22 miles long. The longest is 50 miles.

Deliveries to Muskegon and Grand Haven, the two principal cities in which Milwaukee competes with Grand Rapids, are made by 5 p.m. of the day an order is received in Grand Rapids provided the order is telephoned in before noon. Deliveries are made to Kalamazoo the same day an order is received, if it is telephoned to the wholesale house before 10 a.m.

Delivery by the wholesaler to the terminal station saves the motor truck the time that would be required in making a pick up. This is the big advantage found in the central terminal system. It expedites the handling of incoming freight in the same manner, the consignee or his agent calling at the terminal for it.

In addition to that at Grand Rapids, central terminals for motor trucks are successfully operated in Minneapolis, St. Paul, and Louisville.

Maintaining Tobacco Trucks Nationally

(*Continued from page 462*)

to be the case, the men are given facilities for self-instruction in the care and repair of motor truck parts. They are also encouraged to make their own slight adjustments or road repairs on their trucks.

In other cases certain drivers are found to be constantly applying to the garage mechanic for small repars. Of course it is better that these defects be reported rather than neglected. But a series of small defects usually points to a slovenly or unintelligent driver. Such men are not allowed to touch their engines and are usually replaced, when this is possible, by other men who have a more mechanical turn of mind and can, therefore, take a more intelligent interest in the care of their trucks.

Motor Truck Repairs

Almost all of the American Tobacco Co.'s factories are equipped with machine shops, fitted with drills, stands, lathes, hoists, etc. These machine shops maintain, repair, and in certain cases construct, the factory machinery. They are all staffed by a number of capable mechanics. At present, then, all smaller repairs on the company's trucks, which cannot be handled in the garage, are turned over to the factory machine shop.

However, the stemmeries and leaf branch factories are not usually equipped with machine shops and in these cases more serious minor repairs on trucks are handled by the local manufacturers' or dealers' service stations.

For major repairs the company relies entirely at present on service stations. But the company will eventually handle these.

Truck Grocery Store for Ohio Farmers

Carries Everything Sold by Well-Stocked Store to the Farmer's Door

CLEVELAND, Dec. 27.—The motorized grocery store has made its appearance in Ohio and is first making itself indispensable to the people in the rural districts of the state. The motorized grocery is the creation of A. B. Flory, Canton, who owns a chain of thirty groceries in the northern part of the state. It consists of a motor truck on which is carried everything that a well-stocked grocery store sells. It operates on regular schedule in the district about Canton.

Farmers are enabled to buy groceries at their gates, and the truck serves them in a dual way by purchasing their farm produce. Starting out in the morning with its shelves well stocked with groceries, the truck returns in the evening, cleaned out of its original stock but brimful of eggs, butter, poultry and other farm products.

"The truck saves the farmer a trip to the city in both ways," said its proprietor. "The ship-by-truck idea is an excellent one, and my motorized grocery is a most practicable application of the plan."

Several of the trucks are in operation. Each is 16 ft. long, 6½ ft. wide, has plenty of windows for light and ventilation and is equipped with shelves, bins, cash register, refrigerator, scales and counters. Business has been so good it is planned to triple the number of trucks in operation.

100 Buses for Philadelphia

PHILADELPHIA, Dec. 27.—One hundred gasoline motor buses to operate on Broad Street from League Island, the seat of the Philadelphia Navy Yard, and the Parkway for a 5-cent fare and free transfers over the entire system, is a plan now under consideration by the Public Service Commission. Application for a certificate of public convenience for the transportation concern has been made by General Russell Thayer. The company has not been named. The plan is to invest $1,000,000 in 100 gasoline buses, each seating thirty passengers. The application is an indication of the growing appreciation of motor buses as a means of passenger transportation in congested districts.

The Commercial Vehicle
Read by Fleet Owners

THE CLASS JOURNAL COMPANY, Publisher

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The Commercial Vehicle
Read by Fleet Owners
Vol. XXI Jan. 15, 1920 No. 12

ROUNDHOUSE MAINTENANCE

Necessary with Newspaper Trucks

READ HOW BONUS ELIMINATED RECKLESS DRIVING

By F. Eugene Spooner

THE problems in the maintenance of a fleet of trucks in the wholesale newspaper and magazine delivery field are similar to those of a railroad system. Like the locomotive, a truck in the newspaper field must be run at a high rate of speed in order to make scheduled deliveries, and as a result must be inspected daily for wear and tear in the same manner that a modern locomotive is brought in daily to the roundhouse to be inspected.

This has been the experience of the Interborough News Co., a pioneer in the wholesale newspaper delivery business in New York City. That company has figured that it costs at least $5 to send a man out on the road to repair a truck that has broken down while loaded with an important delivery of newspapers. It means that another truck must be taken out of the garage, either to resume the delivery of the papers or to haul the truck back to the garage when the extent of its breakdown has gone beyond a roadside repair.

Rigid Daily Inspection

The time lost in the delivery of the load, the difference between the cost of the repair before the trouble has become serious and after it had become serious, must also be taken into account. Frequent roadside repairs, therefore, make serious inroads on a concern's income, no matter what field it is in. The Interborough News Co. has solved this problem by eliminating all would-be serious repairs through attention to the small ones. This is necessary in the newspaper field, if a fleet owner is to retain the prestige of making good on his delivery contracts.

Trucks that are run 40 to 75 miles day-in and day-out, as in the case of the Interborough vehicles, must necessarily come under a rigid daily examination before they are sent out on the road. Time lost on the road through repairs means money both to the fleet operator and to the newspaper using the trucks. Avoidance of this delay is therefore the biggest problem of the Interborough News Co.

As outlined in the Jan. 1, 1920, issue of THE COMMERCIAL VEHICLE, the inspection of these trucks is made by the traffic manager of the company. As the trucks do not go out on their deliveries until 12 o'clock noon, the traffic manager is given all the time necessary to thoroughly inspect the vehicles. The driver's reports made the previous day are gone over carefully and the suggestions for needed repairs or adjustments carefully checked. The tires are gone over for cuts, etc. If changes are necessary, the defective tires are replaced with good ones as a precaution against possible delay through blowouts, etc., happening during the afternoon deliveries. In the same manner, lamps, spark plugs, etc., are checked.

As the traffic manager's particular duty is to see that the customers of the Interborough News Co. are supplied with enough trucks to take care of their deliveries and that these deliveries are made on time, it is readily seen that his inspection of the running condition of the vehicles is a very important piece of work. The traffic manager has twenty-five trucks to look out for, the fleet makeup consisting of fourteen 2-ton Autocars, three 1-ton Fords, three ¾-ton Shaws, two 2-ton Packards, two 2-ton Shaws, and one 2-ton Signal. Eleven of the smaller trucks are used for the delivery of newspapers, twelve for magazine delivery, and two for express work.

The eleven smaller trucks are used for the delivery of the afternoon and evening editions of *The Evening Globe*, over 1300 news-stands being reached. These stands are located in Manhattan, Brooklyn and the Bronx. As *The Evening Globe* circulation department is located in the lower part of New York City, the use of a fast fleet of trucks is necessary in order that each edition off the press may reach the news-stands in the Bronx and other distant places as soon as possible. These 1300 news-stands are delivered to five times each day. The trucks after each trip return to the loading platform to take care of the deliveries of the next edition. The trucks are, therefore, away from the garage during the afternoon and part of the evening.

Drivers the Key

Being away from the garage and the supervision of the traffic manager and the repair shop superintendent places the responsibility of the operation of the trucks entirely in the hands of the drivers. This condition brings out more forcefully the necessity of having the trucks in first-class condition. The drivers must be able to take care of any small repairs when necessary. Beyond that point, assistance must come from the garage. Though that company has four spare trucks to call upon in emergency cases, the fact that a truck breaks down with an important delivery is enough to bring discredit upon the whole delivery system.

Occasionally, delay of a delivery may be blamed on the driver. In his eagerness to reach the news-stands on scheduled time, he will often handle his truck in a most reckless manner. This has resulted in smashups, violation of traffic rules, etc. For a time, the Interborough News Co.'s maintenance department spent most of its time in repairing trucks that had been damaged in smashups.

A. E. Greene, repair superintendent of the Interborough News Co.

Combating Recklessness

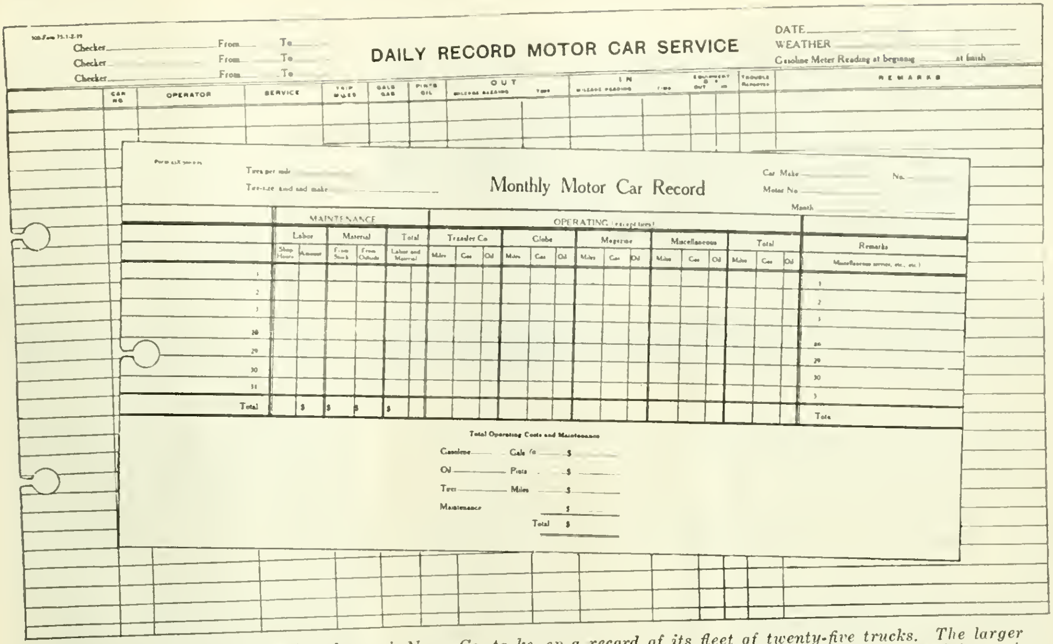
As as result, its repair costs mounted to a prohibitive figure. For a time that company tried to combat this profit-taking practice by warning its drivers of the dire results from careless driving. But this proved of no avail, as the repair work on damaged trucks was just as big as ever, and the suits for damages from injuries to pedestrians, etc., came in just as frequently as ever. The discharge of those who were frequent offenders did not bring results as the company soon found that its delivery system would be completely demoralized through a dearth of drivers.

The installation of a bonus system as described in THE COMMERCIAL VEHICLE of Jan. 1, 1920, solved the problem. Each month a bonus of $50 is offered those drivers who show the best records. This bonus is split up into three $10 prizes and four $5 prizes. To win the bonuses, the drivers must have no accidents during a period of 1 month; must see to their gasoline and oil supply daily, and keep their lamps clean and filled with kerosene. As accidents, oil supply and cleaned lamps are indirectly related to the problems encountered in the maintenance of a fleet of trucks, the importance of attention to these details is apparent.

The oil supply item is important, for it determines in an indirect way the productivity of a driver. Should he drive his truck with an inadequate supply of oil, ten chances to one, he will find his truck stalled on the road with a burned-out bearing or seized piston. This adds to the work of the maintenance department. The cleaning of the lamps and replenishing of the kerosene supply go hand-in-hand with the accidents item. Frequent collisions have occurred through faulty lighting. In addition, a driver runs the chance of being held up in traffic during the course of an important delivery through faulty lighting. Since the bonus scheme has been in operation that company has had few smashups, etc., and its drivers have been showing more judgment as regards speed and traffic regulations.

The results of the daily inspection are kept on a special form, as shown in the accompanying illustration. This form, after being filled out in the morning by the traffic manager is placed on a bulletin board in front of the checker's desk. Record is kept of the name of the checker, his time on duty, the date, weather conditions, gasoline gage reading of the garage supply in the morning and again at night, the number of each truck leaving the garage, the operator's name, the service rendered, the numbr of miles run, the gasoline and oil taken on, condition of equipment going out and also on the return, any trouble reported, and remarks in connection with any trouble that may have occurred during the day. The weather item is important because it enables the company to check up on accidents that may have occurred due to skidding on wet pavements. All drivers are cautioned to go slow, even at the expense of slow deliveries, when rainy or snowy weather sets in. This is done in order to eliminate possible collisions with other vehicles not equipped with non-skid devices.

The repair department is located



Checker______ From______ To______
Checker______ From______ To______
Checker______ From______ To______

DAILY RECORD MOTOR CAR SERVICE

DATE______
WEATHER______
Gasoline Meter Reading at beginning______ at finish______

	CAR NO.	OPERATOR	SERVICE	TRIP MILES	GALS GAS	PINTS OIL	OUT MILEAGE READING	OUT TIME	IN MILEAGE READING	IN TIME	EQUIPMENT O.K. OUT	EQUIPMENT O.K. IN	TROUBLE REPORTED	REMARKS

Tires per axle______
Tire-size and and make______

Monthly Motor Car Record

Car Make______ No.______
Motor No.______
Month______

	MAINTENANCE					OPERATING (except tires)															
	Labor		Material		Total	Traeder Co			Globe			Magazine			Miscellaneous			Total			Remarks
	Shop Hours	Amount	From Stock	From Outside	Labor and Material	Miles	Gas	Oil	Miles	Gas	Oil	Miles	Gas	Oil	Miles	Gas	Oil	Miles	Gas	Oil	Miscellaneous service, etc., etc.)
1																					1
2																					2
3																					3
28																					28
29																					29
30																					30
31																					31
Total		$	$	$	$																Total

Total Operating Costs and Maintenance

Gasoline______ Gals @______ $______
Oil______ Pints______ $______
Tires______ Miles______ $______
Maintenance $______
Total $______

The two forms used by the Interborough News Co. to keep a record of its fleet of twenty-five trucks. The larger sheet is for the daily operating data and the smaller for the cost record. One of the latter sheets is used for each truck. The maintenance and operating expenses, less tires, are kept separately

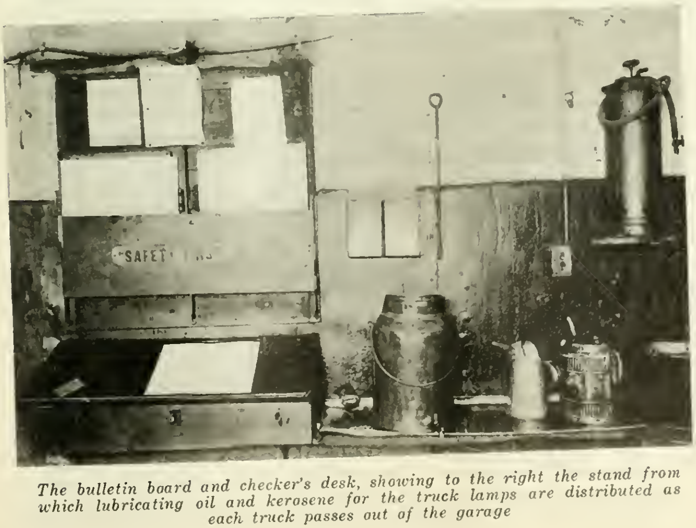
in the cellar of a five-story building. The trucks are stored in the basement and on the first and second floors. A 10 by 20-ft. elevator is used to convey the vehicles to the basement and upper floors. The three upper floors are used for stables and the storage of wagons used by the company. Sixty-two horses and forty-five wagons are used by the company for the delivery of newspapers in the various districts. They act as pick-ups for the motor trucks.

The Repair Personnel

All repair work is in charge of A. E. Greene, maintenance superintendent. His duty is to take care of all adjustments, wear and tear, and overhauling. The repair shop personnel consists of eight mechanics and the superintendent. The work is divided so that engine repairs, adjustments, etc., will be taken care of by mechanics specially trained for each class of work. On account of the attention paid to the small repairs, the trucks are able to remain on the road much longer than usual before they are called in for a complete overhauling. It is stated that the Interborough trucks stand up from 15 to 18 months before it is necessary to overhaul them. A Frevert arbor press, a drill press, and a Fairbanks 20-in. lathe are used for taking care of most every repair. Cylinder reboring, etc., is done by outside companies.

Though most of the repair work is done during the day, two mechanics are kept on a night shift to take care of repairs that cannot be finished the next morning and to also be ready to take care of any repairs needed on some of the trucks that are used on night deliveries. A completely equipped stockroom is kept. Spare parts equipment includes bearings, spark plugs, tires, piston rings, etc., as well as tools. Over $1,000 worth of Autocar parts are always kept

(Continued on page 485)



The bulletin board and checker's desk, showing to the right the stand from which lubricating oil and kerosene for the truck lamps are distributed as each truck passes out of the garage

NO SALT

Used in Ice for Packing Containers of Ice Cream

Chassis Corrosion Eliminated by New Type of Closed Body Lined with Copper and Used by Big Druggist

THE operation of a fleet of trucks for the delivery of ice cream and syrups presents various problems in connection with body designs and the best methods of carrying the ice cream cans and syrup jugs. Various schemes have been introduced to overcome the bad effects of salt water spray on the rear springs and other parts located in the path of the spray, but few of those instrumental in the design of these bodies have realized that the only way to overcome this difficulty is to entirely eliminate the salt in the ice. By lining the floors and the inside walls of closed bodies with copper, fleet owners in the ice cream business will find that the ice cream cans may be carried without the use of salt. Instead of packing the cans in wooden containers, the usual practice, the cans may be piled on loose ice evenly distributed over the floor space. In that way much space is saved by the elimination of the bulky wooden containers.

No Salt Needed

A good example of a body of this type is shown in the accompanying illustrations. This body is used by the Louis K. Liggett Co., New York City, on several of its Packard trucks of 4 and 6-ton capacities. That company has found that by lining its floors and wall sides with copper, it has been successful in retaining all of the refrigerating qualities of a combination of salt and ice. Furthermore, its repair department is not hampered by the deteriorating effects of the salt spray.

The Liggett company operates the largest chain of drug stores in the United States. In New York City and the surrounding territory that company operates over 75 stores, a majority of which receive ice cream and syrups. Two trucks of 4- and 6-ton capacities are used to take care of these deliveries. As will be noted in the illustrations, the bodies are of the closed panel type. The Liggett company has found that in order to keep the ice from melting quickly, it must be housed in a heat-resisting body that is also protected from air blasts in the hot summer days. As a result, it must be completely inclosed.

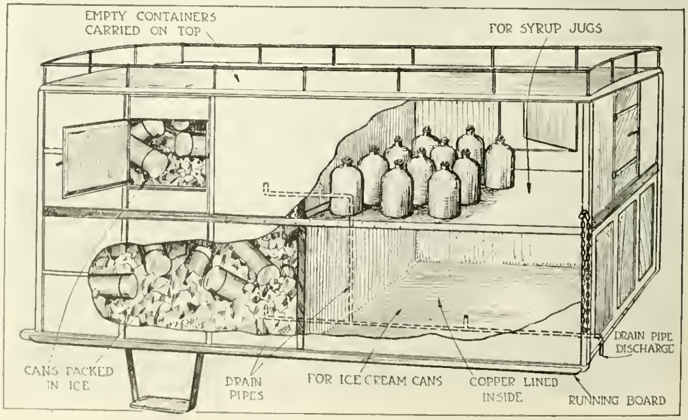
As a result of the large number of drug stores that must be visited daily, a large body is needed. The body used on the 6-ton Packard is 168 in. long; 72 in. high and 56 in. wide. Two floors are used, the main body floor and one 3 ft. above it running the length of the body. A wall from the roof to the body floor and located crosswise at the center of the body divides the body into four compartments. Three of these are used for carrying ice cream, the fourth being used for syrups. It is stated that 150 5-gal. cans may be carried in the three compartments and about 250 syrup jugs in the fourth compartment, or 1000 jugs when the four compartments are used for carrying the jugs.

The three ice cream compartments, located in the upper and lower front end and the lower rear end of the body, are equipped with drains for the melted ice to run through. The drain pipes run below the body to the rear end.

Doors Save Time

As will be noted in the accompanying illustrations, each compartment is equipped with two doors, located on either side of the body. The compartment used for carrying the jugs is equipped with a third door, located at the rear. The compartment beneath, used for ice cream, is equipped with a swinging tailgate. As a result, the driver loses little time during his deliveries in searching or reaching for the cans or jugs in inaccessible places. He is also aided in getting at the ice cream cans in the front compartments by steps on either side of the body. The tailgate is useful as a step for getting at jugs through the rear door. A running board extends the length of the body on either side to enable the driver to reach the upper compartment doors. Iron handles are conveniently placed on the sides of the body for the driver to hold onto.

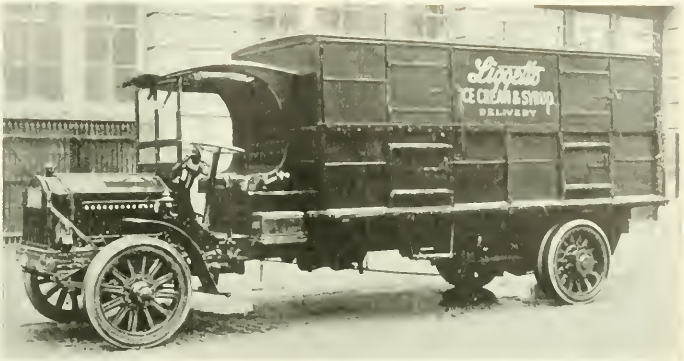
Empty cans are carried on the roof, being prevented from rolling



Broken-away view of the body, showing the four compartments, three for cans of ice cream and one for jugs of syrup. Each compartment is lined with copper off by a rail extending around the outside edges. The maker of this body is G. B. Marx, Greenpoint, L. I. The price is $1000.

Bodies Demountable

Another feature of these bodies is that they are demountable. Though the demountable feature is not made use of in eliminating waste time in loading the trucks, it does come in handy during a rush period at the warehouse when an extra truck or two is needed for the delivery of druggist supplies, etc. It is then a matter of five or six minutes to take off the ice cream body and to replace it with one used for the warehouse deliveries. A conventional type of cab with a permanent built-in windshield and side curtains is employed.



Exterior of the closed ice cream and syrup body shown in perspective on the opposite page. Note the side doors for rapid loading and unloading. The body is also demountable so that the chassis may be used in the delivery of drugs in case of emergency. By closing the body and lining the interior with copper, it is not necessary to salt the ice in which the cans of ice cream are packed

LOCATING ENGINE KNOCKS

ONE of the most difficult problems which the motor truck maintenance or garage superintendent must solve is the determination of the location of the various engine knocks and to distinguish between them. It requires considerable experience to be able to tell readily exactly what is loose. Each part which is not functioning properly has a peculiar sound of its own, and these sounds usually come in regular periods relative to the engine speed.

A loose connecting rod caused by worn bearings is one of the most frequent causes of engine knocks. It may be located, according to the December, 1919, issue of *Highway Transportation*, by running the engine slowly and cutting out each cylinder in turn. If a rod happens to be very loose, the knocks can be detected by turning over the engine by hand. A loose connecting rod produces a sharp bump or very heavy hollow sound.

The main bearing knocks are readily located by running the engine on two cylinders at a time, one on each side of the crank bearing under inspection. A hard bump will be noticeable throughout the engine and will be heard regularly when the two cylinders fire. Such knocks may be caused by end play in the shaft, loose fitting bearings or scored or burned-out bearings. In the latter two instances the engine will usually groan when it is started cold.

A loose piston pin can be told by its sharp metallic knock. It can be determined in any cylinder by speeding up the engine suddenly and then closing the throttle quickly. This will produce a double knock, which is very sharp and which might be better termed a rap. These knocks are caused by a crooked or a broken pin or perhaps by a tight or badly-worn member.

The Motor Truck

I am the Motor Truck—of damaged highways
Ruts and holes, the cursed beginning.
Yet hear my self defense—I claim
I'm far more sinned against than sinning.

I plod neglected, time-worn roads
Until my parts all ache with strain;
I haul freight cheaper, quicker, better;
I slave, I sweat, all for the nation's gain.

I am a public servant—patient,
Drudging utility of trade,
Yet they would stint me rather than
To build good roads to give me aid.

My railroad brother once outgrew
His rails by hauling increased freight;
He wasn't held down to the rails—
They built the rails to hold his weight.

Unbar the gates that hold me back,
If you would have me haul your loads.
I'll do my part if you'll do yours—
Just give me more and better roads.

By P. L. SNIFFIN,
International Motor Co.

A loose crankshaft is seldom encountered. It gives a rattling slap combined with a thud. In some cases only the thud is audible; in other cases the looseness of the bearings will permit the gears driven from the crankshaft to slap and rattle. Generally this trouble is very difficult to discover, due to the pressure of the valve springs. The trouble can be located, however, by sounding the gearcase and camshaft bearings.

A loose flywheel will produce a very heavy knock, which will appear regularly at low engine speeds. The tone or sound of the knock will be changed entirely as the engine is speeded up and the vibration of the shaft will produce a dull chattering knock. Trouble of this kind can be located by disengaging the clutch and rocking the flywheel back and forth.

A loose piston gives a very short knock, similar to valve slap, except that the clearness of the sound varies with the size of the cylinder and the metal used in the piston. It can be located by listening at each cylinder with a rubber tube with two ear-pieces similar to the doctor's stethoscope. Piston slap is caused by wearing of the cylinder walls or piston, by an undersized piston or one worn eccentric.

Keeping Track of a 136-Truck Fleet by a Panel Board

Visible Card Record for Operating and Cost Data

HOW many trucks has Superintendent Wilcox down at the new tunnel job?

"What capacities are they?

"There is some heavy sand on a bad grade on that road and it won't do to put one of those old Dinkledum trucks there. If there happens to be one there now, will you please pull it off and throw in that new 5-ton Spritely Clymer.

"Say, we just got a message that one of our trucks, license number B1000000 is laid up out on the north highway. Who is driving this truck and have you heard from him about any accident?

"Does Inspector Jacobson keep the car he uses at his garage out at his house, or at the department's central yard?

"How much more gasoline per mile do the 5-ton trucks use on the construction work up in the desert compared to those running on city paving?"

If you had charge of the distribution of 136 trucks and passenger cars whose service spread out over territory of several hundred square miles, from time to time you would have to give answers to yourself, or someone else, quickly, on questions running something like those presented above.

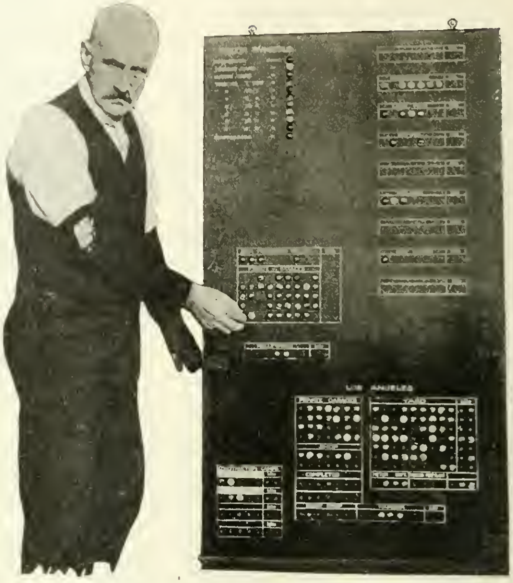
In a great many cases, the preliminary to the correct answer to each specific question is ascertaining just what vehicles are in a particular place, or just what place a particular vehicle is in.

B. E. Taney sits at his desk at the motor vehicle operating headquarters of the Los Angeles Water Department and gets this data by a glance at a plug board hung on the wall at the left of his desk.

It would be hard to imagine anything simpler than the board and the system of using it. As the illustration shows, each of the several localities where work is going on is represented by a ruled off space on the board. Below the label designating the name of each division is a row or several rows of holes. Each hole is bored all the way through the wood. It is about the same diameter as a match. The number of holes laid out for each locality is a little larger number than the greatest number of motor cars likely to be operated within the next few years.

The board is perforated, ruled off, and labeled in this way so that buttons representing the vehicles in service or idle, at each of the various divisions, may be placed in the rectangle representing that division.

There is a button-headed plug for each truck, touring car and roadster. Every new car has a serial number assigned to it the day it is purchased. This number is carried on a detailed historical expense record of the vehicle. it is moved about from job to job, or into the yard or shop, its button, bearing the same number, is moved about correspondingly on the record board. Each button is not only numbered, but for quicker reading, it is striped with color according to a definite code. The key to this code is set out at the upper left hand corner of the record board. Reference to the illustration shows how the buttons are striped in different ways to represent touring cars, roadsters, and various load capacities in the trucks.


B. E Taney, in charge of the 136 trucks and cars of the Los Angeles Water Department, and the panelboard by which he keeps track of his vehicles

Directly attached to the side of Mr. Taney's desk there is a supplementary visible card record. At the foot of each card, arranged on the permanently visible system, there appears the number of the truck, the same as appears on the button on the record board, and on the cost card. Next comes the license number and then the driver's name. The upper part of each card record in this file is a blank piece of paper, on which, from time to time, information as to present location or future time of release of a car from some duty or place, is reported. For example, a typical record on card No. 8 reads:

"In shop 2nd & Rose took No. 94, 8-20-19; 94 returned and took 8, 8-28-19."

Of course it is easy to translate this record on the card, meaning that the regular driver of No. 8 was given No. 94 while his truck was laid up a week for repairs.

It is easy to change these slips from time to time as they slide into slots at the upper corners, and are held in place by a piece of celluloid which protects the typewritten

The visible card record in which the operating data, the name and number of each truck, the driver's name, etc., are kept. The lower part of each card is always visible

(Continued on page 515)

DELIVERY FORMS

That Prevent Delays and Damages

Double Label and Consignee's Receipt Give Good Results in Deliveries of Large Book Publisher

TWO problems directly affecting the shipping room of the motor truck owner can be solved by the simple form system installed by the MacMillan Co. and illustrated below.

The first of these problems is the difficulty of ensuring the correct consignment of goods which are ordered by one party to be delivered to someone else. In the publishing business and in many other businesses handling deliveries, such as department stores and retail stores of all kinds, as well as wholesale houses, this class of order occurs frequently.

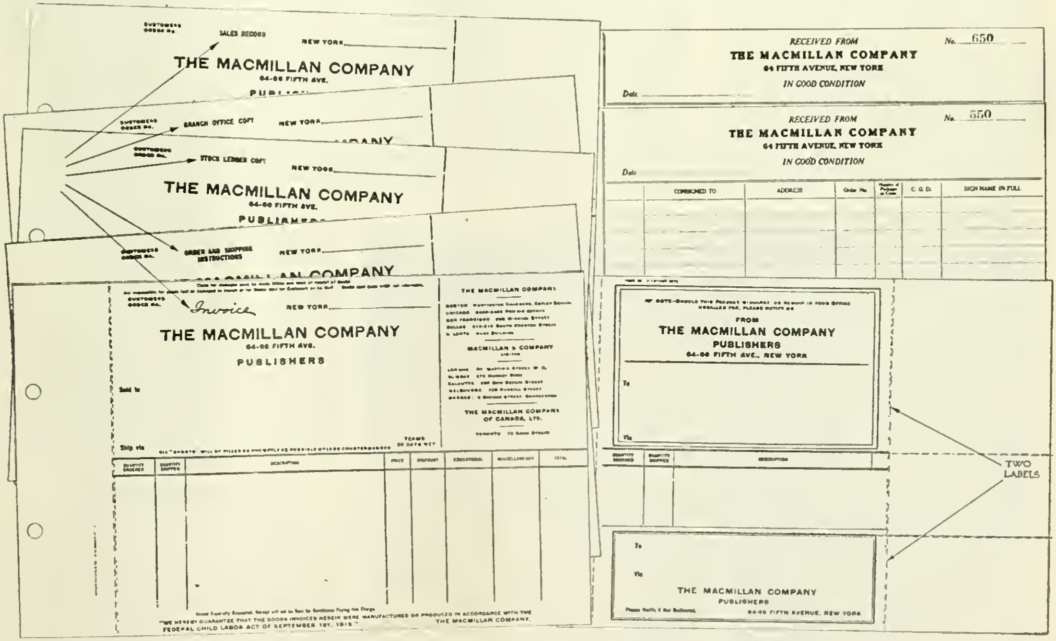
The second problem is that of protecting the company against claims on account of goods damaged in transit. This problem more directly affects mail order houses and other businesses shipping goods by express, railroad and parcel post in addition to the motor trucks of the delivery fleet. But it also affects retailers delivering by motor truck direct to the consumer.

The Double Label

In the illustration below, the five forms on the left and the lower form on the right are made out together, being carbon copies of one another. The lower form on the right serves exclusively as a label for the parcel. There are two labels as shown, the upper one being used for the usual shipment, where customer and consignee are one and the same, and the lower one being used when the books are billed to someone other than the consignee. In the case of a customer ordering books to be delivered to someone else, consignee's name and address are typed on the lower label and carboned through to all the forms on the left in the illustration.

The customer's name is typed on the upper label and so carboned through to all the other forms, but this label is destroyed at once, while the lower label accompanies the order form by means of which goods are collected from the stock floors, i. e., the second form from the bottom on the left. As the consignee's name and address appear on this form also, shipping instructions and freight receipts can be checked up with it, while the first form at the bottom on the left,

(*Continued on page* 514)


SALES RECORD
BRANCH OFFICE COPY
STOCK LEDGER COPY
ORDER AND SHIPPING INSTRUCTIONS
Invoice
TWO LABELS

CUSTOMER'S ORDER No.
NEW YORK
THE MACMILLAN COMPANY
64-66 FIFTH AVE.
PUBLISHERS
Sold to
Ship via
TERMS

THE MACMILLAN COMPANY
MACMILLAN & COMPANY
LIMITED
THE MACMILLAN COMPANY OF CANADA, LTD.

QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION	PRICE	DISCOUNT	EDUCATIONAL	MISCELLANEOUS	TOTAL

"WE HEREBY GUARANTEE THAT THE GOODS INVOICED HEREIN WERE MANUFACTURED OR PRODUCED IN ACCORDANCE WITH THE FEDERAL CHILD LABOR ACT OF SEPTEMBER 1ST, 1916." THE MACMILLAN COMPANY.

RECEIVED FROM
THE MACMILLAN COMPANY
64 FIFTH AVENUE, NEW YORK
IN GOOD CONDITION
No. 650
Date

RECEIVED FROM
THE MACMILLAN COMPANY
64 FIFTH AVENUE, NEW YORK
IN GOOD CONDITION
No. 650
Date

	CONSIGNED TO	ADDRESS	Order No.	Number of Packages or Cases	C. O. D.	SIGN NAME IN FULL

FROM
THE MACMILLAN COMPANY
PUBLISHERS
64-66 FIFTH AVE., NEW YORK
To
Via

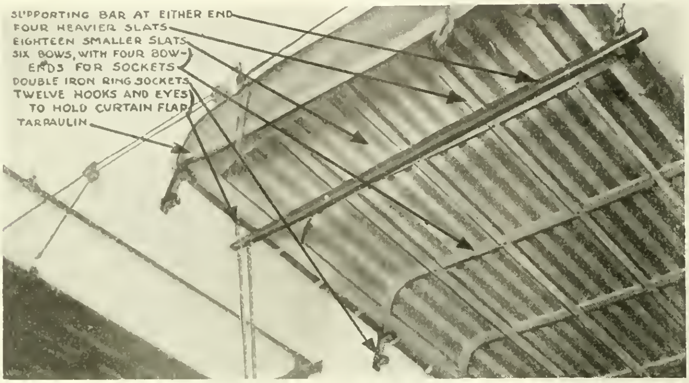
QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION

To
Via
THE MACMILLAN COMPANY
PUBLISHERS
64-66 FIFTH AVENUE, NEW YORK

Forms in use by the MacMillan Co. in handling orders for the deliveries of books. The forms to the left and the lower form on the right are all typed at once and are carbon copies of one another. Note that the lower form on the right includes two labels, one for use ordinarily and the other for use when books are billed to someone other than the consignee. Thus the two names are carboned onto the invoice and other forms

Demountable Tops Cheaper Than Tarpaulins

Save Driver's Time in Handling and Folding


SUPPORTING BAR AT EITHER END
FOUR HEAVIER SLATS
EIGHTEEN SMALLER SLATS
SIX BOWS, WITH FOUR BOW-ENDS FOR SOCKETS
DOUBLE IRON RING SOCKETS
TWELVE HOOKS AND EYES TO HOLD CURTAIN FLAP
TARPAULIN

This shows how the demountable tops used on the Victor Talking Machine Co.'s trucks and trailers are lifted clear to the ceiling of the garage when not in use

TARPAULINS to cover loads 14 ft. long, 6 ft. wide and 6 ft. high, are heavy, unwieldy and consume considerable of the driver's time in placing them over the load and taking them off again at the places of delivery. The Victor Talking Machine Co., Camden, N. J., discovered these facts in the operation of its fleet of twenty trucks and tractors and twenty-seven trailers used in the handling of all of the materials which go into the manufacture of the Victor talking machine.

It also discovered that the tarpaulins could not be kept spic and span because they had to be laid down on the ground, loading platform or garage floor to be folded up. An irregular shaped load covered by a dirty tarpaulin is not an object of the best appearance.

Accordingly, the Victor company decided to save the money previously wasted at handling heavy tarpaulins by spending more money for novel detachable tops, such as shown on these two pages. They are employed on the stake and crate body trucks and the stake body Troy four-wheeled trailers, one of which is shown in the illustration at the bottom of the opposite page.

The tops were made by Rudolph Preisendanz Sons, Camden, N. J., and cost about $150 apiece when ordered in groups of three or four instead of singly. This price, however, includes two side curtains and front and back curtains. The canvas top cover is approximately 14 ft. long with the side curtains 13 ft. 6 in. and the front and back curtains approximately 6 ft. high and 6 ft. wide.

Tops Save Time

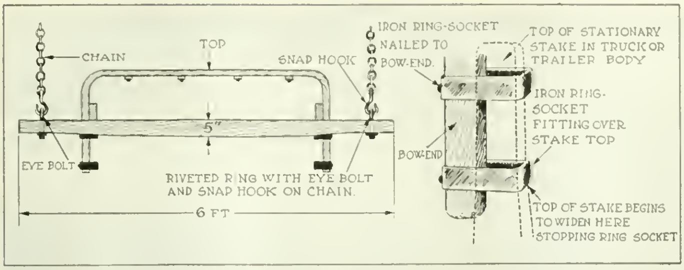
The demountable tops have more than paid for themselves in the time saved the truck drivers and their helpers. This has been the case especially with the truck and trailer outfits working on routes where the number of loads per day is large. While, of course, tarpaulins were not used previously during fair weather, the spreading and removal, including folding up properly, of the large and heavy tarpaulins consumed so much time that fewer trips were made in rainy weather than in dry weather.

In addition, the type of demountable top shown gives a handsome appearance and can be left off the trucks for certain kinds of loads or put on for others.

While there is no wastefulness or extravagance in any of the Victor company's methods, it was not stingy in expenditure for the tops, preferring rather to have the handsomest and best made tops that could be built instead of one of poorer appearance and less ruggedly constructed. The design and method of attachment of the top are shown in the illustrations on these two pages. In the design, six cross bows made of ash are used. Four heavy longitudinal slats with eighteen additional intermediate slats are employed to give longitudinal strength and rigidity. The slats are made of poplar and are screwed to the cross bows to give a flat surface. The slats are 2¼ in. wide, with intervening spaces 1½ in. wide. The tarpaulin covering is tacked down. The side curtains are held in place by twelve hooks and eyes on each side. The curtains are rolled up and fastened with canvas straps.

The Removal Means

To make a demountable top is one thing, but to so construct it that it will stand up under the twisting strains of application and removal is another thing. Accordingly, the tops had to be designed with special reference to the method of taking them off and putting them on. The bows are attached to heavy side rails and re-


CHAIN
TOP
SNAP HOOK
5"
EYE BOLT
RIVETED RING WITH EYE BOLT AND SNAP HOOK ON CHAIN.
6 FT
IRON RING-SOCKET NAILED TO BOW-END.
TOP OF STATIONARY STAKE IN TRUCK OR TRAILER BODY
IRON RING-SOCKET FITTING OVER STAKE TOP
BOW-END
TOP OF STAKE BEGINS TO WIDEN HERE STOPPING RING SOCKET

Details of the crosswise lifting bar and the method of attachment of the bow ends to the tops of the permanent body stakes

inforced with iron pipe on each side. At each end of the top at the corners are two iron ring sockets, one above the other and riveted to the lower ends of the bows which extend down below the bottom of the longitudinal side rails. The same type of sockets are also fitted on the two intermediate cross bows so that there are four sockets on each side of the top.

Four of the stakes on each side of the trucks and trailers are longer than the other stakes and unlike them, cannot be removed. Over these standard or longer stakes, slip the short ends of the bows, the ends of the long stakes entering the sockets, as shown in the illustration at the top of this page. The tops of the permanent stakes begin to flare outward toward the body at a point a few inches below the tops, so that when the sockets are placed over them, there is a wedge action which holds the top securely in place.

But even with this design finished, there remained the problem of removing the tops and keeping them out of the way of the trucks in the garage during fair weather when the tops were not used. This problem was solved by suspending the tops from the ceiling of the garage. They are raised and lowered by use of pulleys and ropes supporting two bars which are placed crosswise beneath the top, as shown in the illustration at the top of page 484. The bars, which vary from 5 ft. 9 in. to 6 ft. 6 in. long, are 3 in. thick and 5 in. wide, and have at each end an eye bolt to which is attached the end of the rope running over the pulleys on the garage ceiling. The work of attaching the ends of the rope to the eye bolts of the lifting bars can be done very quickly because the ends of the rope are fitted with snap hooks. In lifting off the top, it is thus just the work of a minute to lower the pair of suspending bars; unfasten the end of one rope from its eye bolt, pass the bar beneath the top and then raise the complete top by pulling on the ropes running over the pulleys.

The ceiling of the garage is 20 ft. high so that the demountable tops, resting on their lifting bars, give ample space beneath for any incoming or outgoing trucks. The lifting ropes are run to cleats on the columns and the pulleys so spaced that the ropes run vertically along the columns to their tops and then parallel with the ceiling to the point of support.

Roundhouse Maintenance of Newspaper Trucks

(*Continued from page* 479)

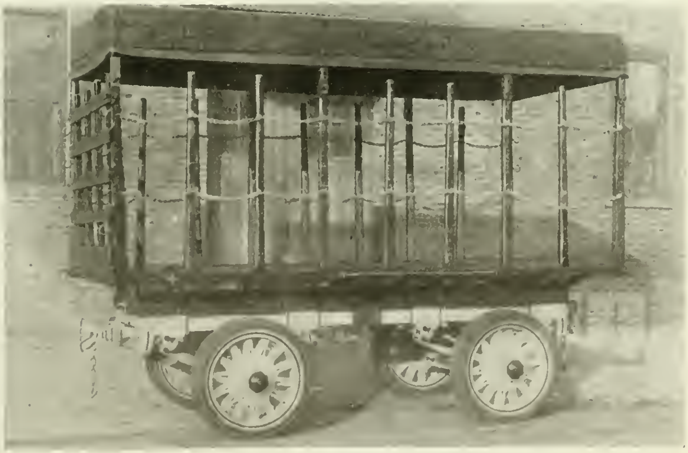
available in stock for emergency.

So that a complete record may be kept of the cost of operation and maintenance of the trucks, a special form on which the daily cost of repair work, etc., is kept for each truck. Space is set aside for each day in the month. A record is kept of the mileage of the tires and the cost per mile. In addition, the record takes in two main divisions, maintenance and operating expenses. The maintenance division takes in the number of hours spent by the repairmen each day on a truck and the cost for that labor and the material taken from the stockroom and that bought from outside companies. The operating division takes in the number of miles covered each day for any class of work, together with the amount of fuel and oil used on each particular piece of work. At the bottom of this report, space is set aside for totaling up the operating and maintenance expenses each month.

Apropos of the use of horses and wagons, it is stated that the Interborough company is contemplating the use of electric trucks to take care of the district deliveries and to act as pick-ups for the gasoline trucks. When that occurs the present space used for the storage of the horses and wagons will be more than enough to house the electrics. It is also figured that the electrics will cover far more territory than the horses and will give better service as a result. Additional information on the operation of the Interborough trucks will be published in a subsequent issue of THE COMMERCIAL VEHICLE.

To Make Truck Cabs

GRAND RAPIDS, MICH., Jan. 12 —Metal cabs for trucks will be manufactured by the Brummeler-Ruggles Metal Products Co. Production will start in the spring.



One of the 5-ton Troy trailers shown fitted with the demountable top. Note the four permanent long stakes on each side to which the top is attached

A general view of the excellent arrangement of the truck exhibits

High Spots of the New York Truck Show

1—Best laid out show in industry's history.
2—Poor owner attendance at conferences.
3—Twenty-two new truck chassis shown.
4—Pneumatics on 133 out of 288 chassis.
5—New Packard 3-tonner built for pneumatics.
6—Tire pump mounting shows much progress.
7—Many excellent bodies and cabs exhibited.
8—Magazine spring bolt oiling shows gain.

EVERY fleet owner who visited the motor truck show held at the Eighth Regt. Coast Artillery Armory from Jan. 3 to 10, came away firmly impressed that the show was one of the best laid out in the history of the motor truck industry. There was ample space; wide aisles; plenty of air but not quite enough heat. The armory floor, 300 ft. by 600 ft., with a clear span from wall to wall without a post, provided sufficient space for arranging the exhibits in the center without crowding and with plenty of space around the sides for exhibitions of parts and accessories.

In the number of exhibits of different makes and number of vehicles shown, the show was larger than any previously held. Seventy makes of trucks, with a grand total of 288 vehicles were on exhibition.

With this finest array of commercial vehicles ever gathered together under one roof for the inspection of the present or prospective truck owner, it seemed a great pity that more truck owners did not attend the Highway Transport Conferences held each evening during the show week. The attendance of fleet owners at these conferences was very poor. This was more to be regretted in view of the fact that practically every one of the addresses contained information which the fleet owner could turn into dollars and cents value in the operation of his motor vehicles.

This small attendance was unfortunate in another respect in that many of the speakers came great distances to present their addresses, only to find a small audience which might be expected at some second rate town but not at a national truck show in the greatest Metropolis in the United States.

Due to the extremely cold weather during the first portion of the show and to the fact that many of the exhibits arrived late, it was a difficult matter to properly heat the armory on account of its huge size. While it was none too warm, either in the show space proper or in the hall in which the Highway Conferences were held, this could not explain the apparent lack of interest in the conferences as expressed by the small attendance.

The small attendance was explained by some and was undoubtedly due to the location of the Armory site, a considerable distance outside the heart of the city proper. However, those fleet owners in the city of New York who were prevented from coming to the conferences by the length of time required to get from their places of business to the armory and back, will find in this issue of THE COMMERCIAL VEHICLE a résumé of the show; brief descriptions of the new vehicles, new parts and accessories exhibited and one of the addresses presented at one of the Highway Transport Conferences.

One of the features of the show was the greatly increased number of vehicles shown mounted on pneumatic tires. Of the 288 chassis exhibited, no less than 133 were equipped with pneumatics. While a great majority of these chassis fitted with pneumatics were of ½-, ¾-, 1- and 1½-ton capacity, several 2-tonners and the new Packard 3-tonner were also equipped with pneumatics. One of the outstanding features of the design of the new Packard is that it is fitted with the Packard engine usually installed in the 5-ton truck. This was made necessary because the power of the 3-ton truck engine is insufficient to give the greater truck speeds which the use of pneumatics makes possible. The pneumatics fitted were Firestones, 38 by 7 in front and 44 by 10 in the rear.

COMING

Articles on

Pneumatic Tires
Tire Pumps
Bodies
Cabs
Hoists

As seen at the New York
Motor Truck Show

Along with the increased use of pneumatics came the development of suitable truck tire pumps to inflate the giant pneumatics when the truck is out on its route or distant from a service station having a pump which provides air at a sufficiently high pressure. There has been a change in gear reduction to prevent overspeeding the engine at the higher vehicle speeds.

In this connection, the method of driving the tire pump either from the truck engine or from the gearset has presented many problems. One of these has been solved by the gearset makers who have provided easy means of attachment. Then again, the tire pump makers have brought out several models of pumps which are particularly designed for truck usage.

Similarly, so many excellent types of bodies, cabs and hoists were shown that separate articles will be published on each of these subjects. Of the 288 vehicles exhibited, 148, or slightly more than half, were fitted with some type of body. In body types, the stake design led, being furnished on thirty-five vehicles; the dump body second, on twenty-eight vehicles; the open express third, on twenty-six vehicles; and the panel type fourth, on twenty-three vehicles. There were many convertible bodies shown. Prominent in this classification was a line of combination bodies offered by the Metropolitan Body Co. of New York, Inc., and the two part dump body of the Lee Loader Co., mounted on an Autocar chassis.

Another oustanding trend in design noticeable at the show was the increased use of the magazine oiling system for spring bolts and shackles as developed by Cornelius T. Meyers, a consulting engineer of Avenel, N. J. No less than six of the chassis shown at the show were fitted with this type of oiling. Several other models were equipped with other forms of wick oilers and still others with the Alemite system of grease lubrication in which the grease is forced into the bearings under pressure by means of a hand pump. The oiling system on the Three Point truck also drew con-

(*Continued on page* 507)

Another view of the exhibits, showing the wide aisles and the absence of pillars or posts

8 NEW TRUCK MODELS

Seen at New York Truck Show

14 Other Models Shown for the First Time at Most Comprehensive Truck Exhibit Ever Held

EIGHT brand new truck models were exhibited at the New York motor truck show held at the Eighth Coast Artillery Regiment Armory from Jan. 3 to 10. These included the 1½-ton Graham, the ¾-ton Bethlehem, the 3½-ton Autocar, the 1-ton Federal, the 6-ton Three Point, the 3-ton Packard for pneumatic tires; the 5½-ton Ward LaFrance and the 3½-ton I. H. C. In addition to these brand new models, several truck makers exhibited models, which, though not brand new, were shown for the first time. These included the Stewart 1-tonner, the 5-ton Master, the 1½-ton Winther, the 3½-ton Jumbo, the 1½-ton Diamond-T, the 3½ and the 1¼-ton Garfords, the Acason 1½-tonner, the Ace 1½ and 2½-tonners, the 1¼ and the 2½-ton Koehlers, the 3½-ton Selden and the 5-ton Schacht. Included under the new parts and accessories that made their first appearance at the New York truck show are the Sterling six-speed gearset used on the 5 and 7½-ton models, the ten-speed gearset used on the 5-ton Schacht, the Parker, Flint, Thompson and Atlas axles, the Aluminum Castings and the Standard Parts truck wheels and the Peters crankshaft grinder.

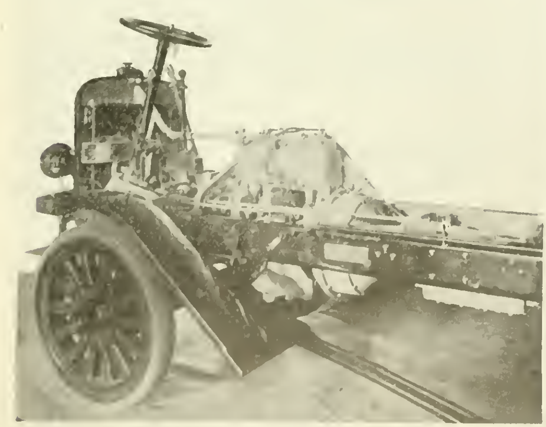
The new 1½-ton Graham, made by Graham Brothers, Evansville, Ind., has been designed for high-speed work for all hauling requirements. The speed of this truck is rated at 25 m.p.h., being equipped with pneumatics and Disteel wheels. Other equipment includes electric head and tail lamps, electric horn, engine-driven tire pump, odometer, motometer and a complete set of tools and a jack. A complete line of body equipment, all built by Graham Bros., includes express, stake-platform, double box, high rack and canopy bodies and cab. The chassis price is $2,295. Any of the body types, with cabs, may be had at an extra price of $175.

Another of the new models is the ¾-ton Bethlehem, a bevel-driven, pneumatic-tired chassis, selling at $1,495, complete, with electric starting and lighting. The truck was engineered by Cornelius T. Meyers and makes use of the Meyers system of magazine oiling of the spring bolts and shackles. It has a unit powerplant with a Detroit clutch and gearset, Ross steering gear and Hotchkiss drive with chrome vanadium springs. The wheelbase is 125 in. The engine, which is of Bethlehem manufacture, has 3½ x 5-in. cylinders, with a removable head. One of the features of the engine is a combination inlet and exhaust manifold, in which half of the manifold is cast in the cylinder block to heat the incoming fuel to give better vaporization.

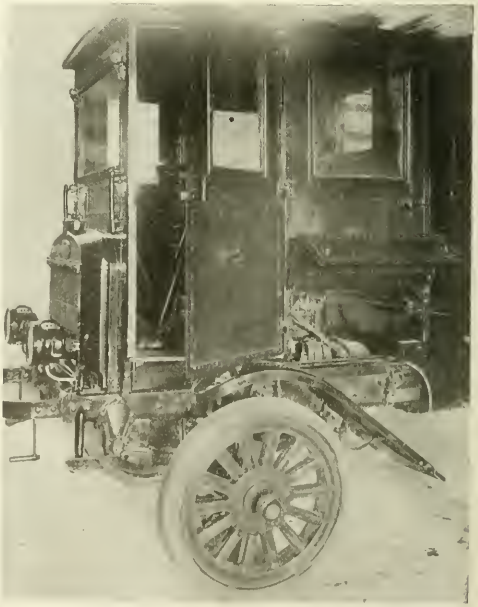
New 3½-Ton Autocar

The new heavy-duty 3½-ton Autocar is equipped with a vertical four-cylinder engine, rated at 29.6 hp. The chassis sells at $4,100. The truck follows previous Autocar

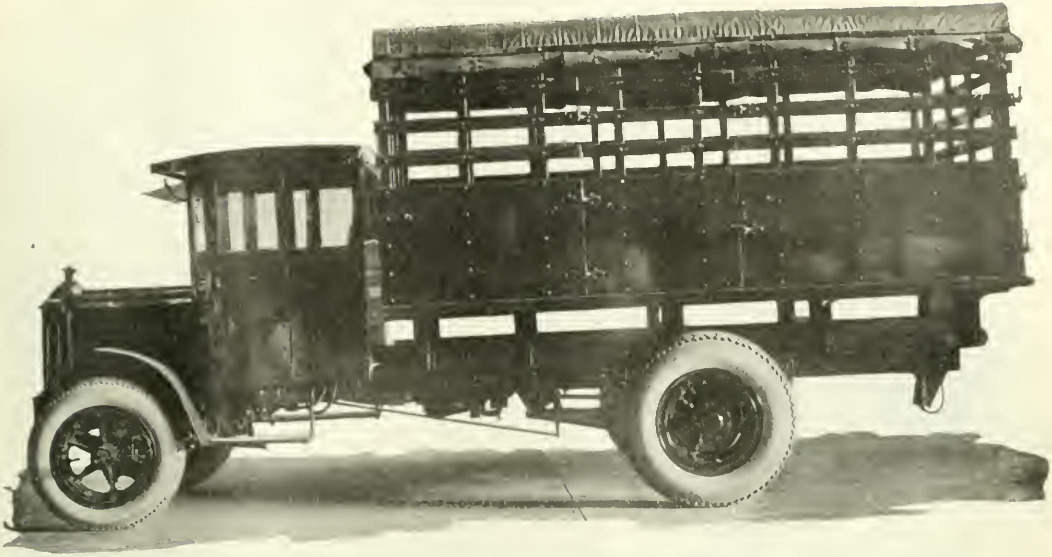
Two Views of New 3½-Ton Autocar



The four-cylinder engine on the new 3½-ton Autocar is mounted under the driver's seat



An all-weather cab mounted on the new 3½-ton Autocar, equipped with a four-cylinder engine



The new 3-ton Packard which has been designed for the use of pneumatic tires. It is equipped with a 5-ton size of engine to give the extra power needed to accommodate the added speed made possible by the use of pneumatics

practice in that the engine is mounted under the seats. It is equipped with solid tires all around, gas headlights and tank, oil taillight, horn and a kit of tools. The wheelbase of the new model is 120 in., the tread being 63 in.

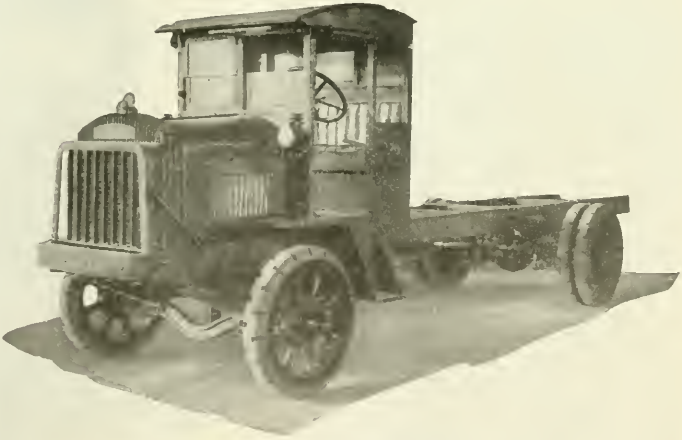
The Federal 1-ton model has been built especially for the use of pneumatic tires. A pressed steel frame, steel seat running boards and dash, disk steel wheels, electric lighting, a transmission-driven tire pump are a few features of this new model. Starting costs $50 more. Loading space in back of the driver's seat is 112 in., the wheelbase being 132 in. and the tread 56. The price is $2,300.

New Three Point Shown

The three point principle is carried throughout on the 6-ton Three Point truck, made by the Three Point Truck Corp., at the Watertown, N. Y., plant of the New York Air Brake Co. The frame is suspended at one point above the center of the front axle on a transverse spring and at two points on the rear axle. All thrusts at the front end of the chassis are taken through three point tubular stay rods with a ball joint at the center of a dropped cross-member in back of the engine. The two stay rods are fixed to the front axle. In the same manner all thrusts at the rear end of the truck are taken through tubular thrust rods with a ball joint at the center of a dropped cross-member placed in back of the gearset. The three thrust rods, two for propulsion and one for torque, are pivoted horizontally to the worm-driven rear axle. The engine and gearset are also mounted at three points.

Another feature of this truck is its lubrication. Two oil cups and four grease cups are all that are used for taking care of the oiling of parts. These are located on the steering knuckles, pump driveshaft and the clutch. No grease or oil cups are needed on the springs, as there are no spring shackles, eyes, bushings, rebound clips to be lubricated. All other parts that are ordinarily lubricated by grease or oil cups are lubricated through the tubular members, such as the tubular stay rods, the tubular knuckle rod, torque rod, thrust rods, etc. Such parts as the pivot on the front axle, the roller bearings on the rear axle and brake slide rods are lubricated from oil reservoirs. The price is $4,650.

The new 3-ton Packard, equipped with pneumatics, has a 5-ton en-



The 5-ton Ward La France is built for heavy duty work after designs by Cornelius T. Myers, consulting engineer. The Ross steering gear is mounted ahead of the front axle instead of behind it to get better steering action

Accessibility is a feature of the new 1½-ton Graham, which has been designed to carry a full 1½-ton load at a speed of 20 m.p.h. Disteel wheels and pneumatic tires are standard equipment

gine to give the extra power needed to accommodate the added speed made possible through the use of giant pneumatics. The new model has a wheelbase of 156 in., the price for the chassis with this length of wheelbase being $5,500 and of that with a 186-in. wheelbase, $5,575. These prices include a power take-off and a Kellogg tire pump. The body costs $500 extra; the cab, $230; starting and lighting, $220; painting, $150; freight, $75, and war tax, $198, the total cost being $6,873.

The new 5-ton Ward LaFrance has been built for heavy duty work after designs by Cornelius T. Myers, consulting engineer, Avenel, N. J. The price, $5,290, includes a radiator guard, bumper, Kelly-Springfield caterpillar solid tires, three-passenger driver's seat, oil side and tail lamps, thermostat, Myers' magazine oiling system for spring bolts and springs, Motometer, radiator shutters, hub odometer, tool kit, jack and horn. Starting and lighting are supplied at an extra cost of $150. A feature of the new 5-ton model is the method of mounting the Ross steering gear ahead of the front axle instead of behind it, in order to avoid a nearly vertical steering column and at the same time get better steering action and practically eliminate from the whole steering mechanism the shocks and stresses unusually set up in these parts when driving over any road inequalities. Another feature is that the steering gear is so mounted in the frame that either it or the engine can be removed without disturbing the other.

The 3½-ton I. H. C. truck, made by the International Harvester Co., Chicago, has been brought out to round out its line of vehicles, which range from 1 to 3½-ton capacities. The new model has the same sized engine as the 2-tonner, differing only in the length of the wheelbase, tire sizes, the number of speeds forward in the gearset and the total gear reduction on high.

The new 1-ton Stewart, made by the Stewart Motor Corp., Buffalo, N. Y., has been built especially to meet the demand for a light delivery vehicle. It is equipped with pneumatics, electric starting and lighting. The loading space is 8 ft. and the price is $1,595.

Accessibility and sturdiness are the big features of the new 5-ton Master. The worm-driven model has been designed for heavy duty work. With the standard wheelbase of 170 in. the price is $4,890; the extra wheelbase of 194 in. adds $100 to this price.

The 1½-ton four-wheel-driven Winther has been designed for farming purposes. The Farm Special model, as it is called, is especially adaptable to rough going in the country districts and is also large enough to take care of most farm work. The price is $2,375.

The careful selection of material and more complete equipment which is going into the newer trucks is very clearly brought out in the new Jumbo 3½-tonner, made by the Nelson Motor Truck Co., Saginaw, Mich. The truck is mounted on solid tires and sells for $4,000. Two wheelbase lengths are provided, these being respectively 165 and 183 in. Throughout, the truck is lubricated by the Alemite system, the 5-lb. grease gun and hose necessary for this system being provided in the tool equipment.

The frame of the Three Point 6-tonner is suspended at one point above the center of the front axle and two points on the rear axle

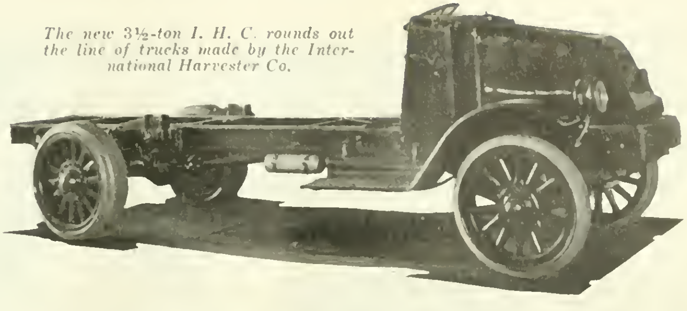
The new 1½-ton Diamond-T truck has been designed to successfully cope with the farmer's varied hauling needs. This model is equipped with an engine of modified Class B truck design. It is worm-driven and sells at $2,445, this price including a combination express, grain-tight and cattle type body, and a cab with side curtains and a windshield.

The Garford Motor Truck Co., Lima, Ohio, has brought out two new models of 1¼- and 3½-ton capacities. The lighter model has been designed for fast delivery work. Pneumatic tires are supplied at extra cost. A curved steel dash is included as standard equipment. The price is $1,890, and the wheelbase is 135 in.

Two New Garfords

The new 3½-ton model has been added in order to further round out the Garford line. This new model is not intended, however, to supplant the former 3½-ton model. Both will be available, the new model having a 162-in. wheelbase and the former a 128-in. wheelbase. The new model, at $3,900, establishes a new price standard for that capacity, as the former model sells at $4,300. It differs from the former model in that the engine is placed forward under the hood instead of under the seat. The former model is being retained on account of its short wheelbase and short turning radius. The new model is for inter-city work, where a great amount of turning is unnecessary.

The new 1½-ton, worm-driven Acason, made by the Acason Motor Truck Co., Detroit, has been designed for fast delivery work, being equipped with pneumatics. It has a wheelbase of 142 in.



The new 3½-ton I. H. C. rounds out the line of trucks made by the International Harvester Co.

The Selden Motor Truck Co., Rochester, N. Y., has brought out a new 3½-ton model, designed for higher operating speed. The former 3½-ton model has been discontinued. The chassis is made in three lengths, and three wheelbases, as follows: Model 3½-A-7, 7 ft. behind the driver's seat, is known as Selden 3½-A tractor and has a wheelbase of 120 in.; Model 3½-A-12½, 12½ ft. behind the driver's seat, has a wheelbase of 162 in., and 3½-A-16, 16-ft. behind the driver's seat, has a wheelbase of 190 in. The rear wheels are mounted optionally with 36 by 10-in. solid tires, or with 36 by 5-in. duals.

The American Motor Truck Co., Newark, which makes the Ace trucks, has completely changed the design of its 1½- and 2½-ton models. Both models are featured by their complete equipment, the smaller one mounted with pneumatics, being designed for light haulage work and the latter for work in the contractor's field. The 2½-ton model sells for $3,500, its equipment including an all-weather cab, electric starting and lighting, steel bumper, odometer, mechanical horn, trailer attachment and cast steel wheels. The headlights are swiveled so as to follow the cut of the wheels. The cab frame is of wood construction and steel covered inside and outside. The doors and windows are of the sliding type. A double windshield is used.

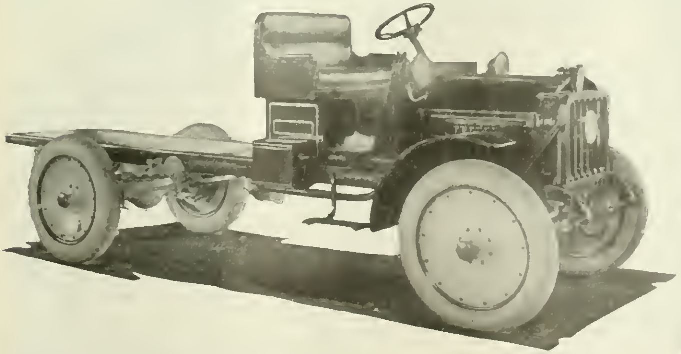
The new Koehler trucks of 1¼- and 2½-ton capacities are radically different in design from the former models. Larger engines have been installed and a number of other important changes have been made to make these models more sturdy and serviceable. Both are equipped with solid tires, the smaller model being priced at $1,765 and the larger one at $2,965. Both are designed to take care of the city and inter-city haulage work in their respective capacities. Equipment includes a bumper, two oil front and a rear lamp, front fenders, running boards and a driver's seat.

Schacht 10-Speed Gearset

The 5-ton Schacht, selling at $4,950, marks a radical departure in truck construction, being featured by its ten-speed gearset. There are eight forward and two reverse speeds with a wide range of power reduction that will not only permit a high rate of speed but also provide great pulling power on low and intermediate gears. The fundamental principle of the Schacht gearset is to enable the 5-tonner to attain a high speed when conditions justify without the dangerous engine speed which has heretofore been the cause of much trouble, especially with heavy capacity trucks. The new model is equipped with a 4½ by 6-in. engine.

Harrisburg Ship-by-Truck Bureau

HARRISBURG, PA., Jan. 12—This city is to be added to the cities which will have a Ship-by-Truck Bureau, according to the branch manager of the Firestone Tire & Rubber Co.



The 1-ton Federal has been built especially for the use of pneumatics. Electric lighting, pneumatic tires, disk steel wheels and transmission-driven tire pump are included in standard equipment. The truck sells for $2,300

New Parts and Accessories at the New York Truck Show

Six- and Ten-Speed Gearsets and Magazine Oiling for Spring Bolts and Shackles Are Features

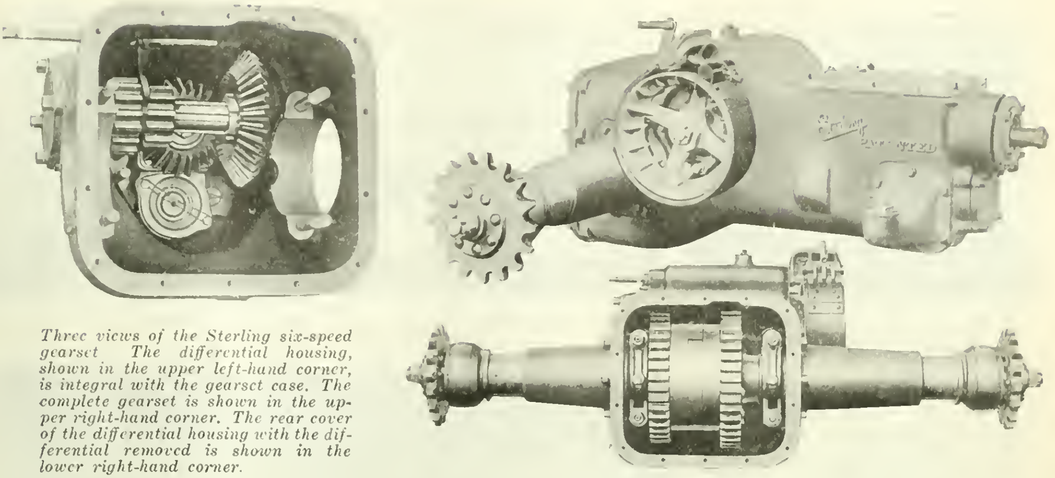
THERE were a number of new parts and accessories designed to increase truck efficiency shown at the recent New York truck show. Among the new features in truck refinements were the Sterling six-speed and the Schacht ten-speed gearsets; the Autocar reservoir system of oiling; the Gramm-Bernstein wick-fed oiler used in its spring bolts; the Alemite grease gun and the Myers magazine system of oiling; the Aluminum Castings aluminum truck wheel and the Standard Parts metal truck wheel; the Flint, Parker, Atlas and Thomson axles; the fabric universal joints between the gearset and the rear axle of the Three Point truck, and the Peters crankshaft grinder. Among the many excellent exhibits of bodies, hoists and trailers the complete new line of the Metropolitan Body Co. of N. Y., Inc., was prominent. The line is designed to cover practically all ordinary body types.

Two ranges of power and speed are given in the six-speed gearset used on the 5- and 7½-ton Sterling trucks. Three speeds of a standard gearset are multiplied by a two-speed jackshaft which gives the truck six graduating speeds forward and two backward. This rouble range—the lower for power and the higher for speed—enables the driver to operate the truck at all times at its greatest efficiency under the varying road conditions.

Sterling 2-Speed Jackshaft

Sufficient power is developed with the lowest of the six speeds for pulling out of gravel pits, running over soft ground and climbing steep inclines. When the going is good, a higher range of speeds may be used. An important advantage of this multiplicity of speeds is the resulting fuel economy. With the truck running on what is called the "high-high," the highest of the six speeds which is a direct drive, a rate of 15½ to 17 m.p.h. may be obtained. The illustration at the top of page 493 shows various views of the Sterling gearset. The complete gearset is shown in the upper right corner of the illustration. Six bolts keep it in place on the chassis. Another feature of this gearset is the mounting of the emergency brake on the intermediate shaft. This gives excellent leverage or braking ability on account of the reduction between the brake and the rear wheels. Note the accessibility of the brake band and also the brake-wheel fins. These fins act as a cooling fan. The Sterling double reduction permits the use of an unusually large jackshaft sprocket with eighteen to twenty-one teeth. The rear cover of the differential housing with the differential removed is shown in the lower right corner. The sliding dual spur gears engage with the two differential side gears, the small spur gear, when engaged, giving low-high, and the large gear giving high-high or maximum speed. These two speeds are both direct drives. But one set of gears is in mesh. It is possible to disengage the gears entirely, so that when coasting there is no connection between the engine and the differential. The two-speed self-locking differential is shown in the left corner. This assembly is integral with the gearset case. The large stub-tooth gears and the accessibility of the differential are features of this unit.

The parts and accessory exhibits occupied the space along the walls at the New York truck show, held Jan. 3 to 10 at the Eighth Coast Artillery Regiment Armory



Three views of the Sterling six-speed gearset. The differential housing, shown in the upper left-hand corner, is integral with the gearset case. The complete gearset is shown in the upper right-hand corner. The rear cover of the differential housing with the differential removed is shown in the lower right-hand corner.

Schacht 10-Speed Gearset

The fundamental principle of the Schacht ten-speed gearset, used on the 5-ton model, is to enable that truck to attain a high speed when conditions justify without the dangerous engine speeds which have heretofore been the cause of the majority of troubles, especially with heavy-capacity trucks. The Schacht truck with the ten-speed gearset, eight speeds forward and two reverse, is capable of attaining a speed of 20 m.p.h at an engine speed of 1000 r.p.m. The main gearset has four speeds forward and one reverse. The secondary gearset provides an extra reduction and can be used in connection with one of the five regular speeds. There are only two movements of the auxiliary gearshift lever, backward and forward. Thus the construction is as simple as with a regular 4-speed gearset.

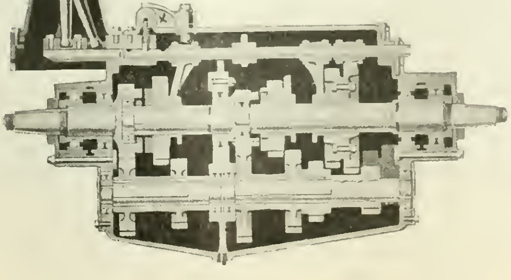
One of the features of the new 3½-ton Autocar shown at the New York truck show was the reservoir oiling system used on the spring shackles. A hollow housing acts as the reservoir. This housing is filled with oil. The oil flows around a ½-in. bolt, which runs through and holds together a hollow shackle pin. The clearance between this bolt and the pin is 1/16 in.

The Gramm-Bernstein trucks are equipped with wick oilers in the spring bolts. The oil is introduced through an opening in the top of the bolt and is then fed to the bearing surface by a wick. The opening from the bolt to the bearing surface is flattened so as to facilitate the flow of the oil. A filler cap band is used to uncover or cover the opening of the bolt when oil is introduced.

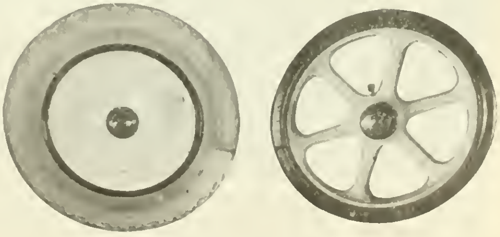
A number of the trucks shown at the New York show were equipped with the Alemite lubricating system, one of these being a Master. The device is used for lubricating the universal joints and such other bearings that require lubrication. By means of the high-pressure compressor it is easily possible to deliver the grease in such a manner that it will reach all parts of close-fitting bearings. The compressor consists of a cylinder which is made of 16-gage steel, knurled to prevent turning in the hand. Attached to this cylinder is a 15-in. flexible steel hose terminating in a bayonet coupling. This complete outfit loaded with grease and ready for instant use, is conveniently carried in the toolbox. The balance of the equipment consists of ball-check valve nipples, both straight and elbow, the latter being used to make inconvenient places more accessible. The nipples are substituted for the old grease cups and oil cups, and plugs are screwed in all places requiring lubrication. When a truck is already equipped with a grease cup integral with the shackle bolt, a cap and nipple is furnished.

Aluminum Truck Wheels

The aluminum truck wheels made by the Aluminum Castings Co. are featured by their lightness. The wheels weigh approximately one-half as much as those of other types. It is claimed by the manu-

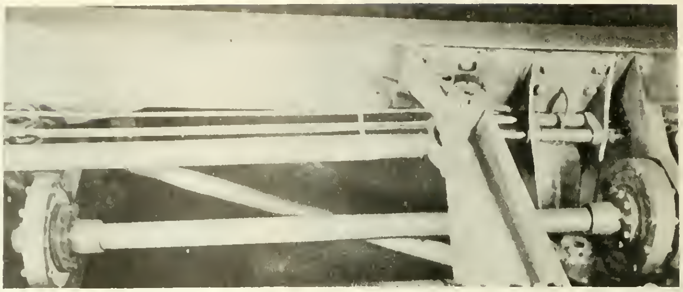


The ten-speed Schacht gearset used on the 5-ton model.

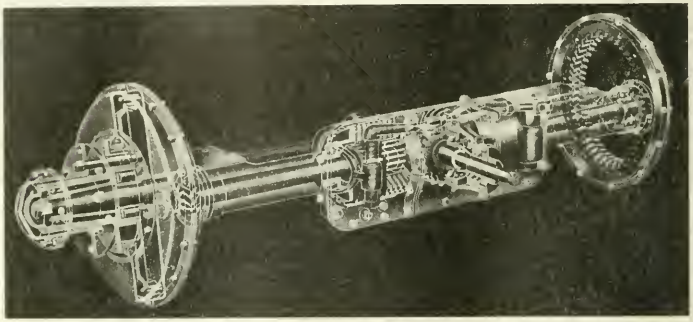


The Lynite aluminum truck wheels made by the Aluminum Castings Co.

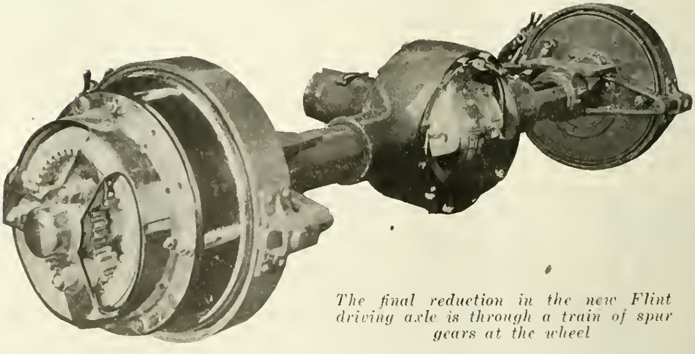
A reservoir oiling system is used on the spring shackles of the 3½-ton Autocar



Three-ply fabric-disk universal joints are used on the Three Point driveshaft between the gearset and the rear axle



A feature of the Parker internal gear-driven axle is its multi-disk brake, completely inclosed within the axle



The final reduction in the new Flint driving axle is through a train of spur gears at the wheel

facturer that these wheels have the advantage of affording easy tire changes for the reason they do not rust. Consequently, the locking ring and the tire are never frozen in place. They are called Lynite wheels and are designed to reduce unsprung weight and to facilitate the operation of wheel-changing. Tests have demonstrated the ability of the wheels to resist fatigue. Further tests have been conducted for the purpose of bringing out the strength of the wheels as regards side thrust and radial compression. The Lynite wheel is a one-piece aluminum alloy casting made in either spoke or disk type type designs. Due to its properties, it materially decreases the weight below the springs, and it is stated that with the use of Lynite wheels tires mileage is increased materially.

A cast steel truck wheel is the latest product of the Standard Steel Castings Co., Cleveland. These are made of electric steel, the fundamental reasons for the selection of this metal being that it has greater density and is free from defects; that its tensile strength is 10,000 lb. per sq. in. greater than open-hearth steel, almost double that of malleable iron and three times that of semi-steel; that its elastic limit is from 5 to 50 per cent greater than other cast steels; and that its yield point is from 20 to 50 per cent greater than other cast steels. Standard steel wheels are made in spoke types for use with solid or pneumatic tires.

In the new Flint driving axle, made by the Flint Axle Co., Flint, Mich., the final reduction is through a train of spur gears at the wheel, three equally spaced pinions being mounted on studs in the hub casings and rotating between a fixed ring gear and the drive gear on the end of the main shaft. Because of this reduction in the hub the bevels and consequently the bevel gear housing in the center of the axle are small, giving high road clearance. The axle is of the full-floating type. The heavy oil used is free to flow from one wheel to another, flooding all the gears.

One of the features of the internal gear-driven Parker axle is its multi-disk brake, completely inclosed within the axle and operating in an oil bath. The design of the axle makes possible an absolute oil-tight, dirt and grit-proof enclosure of all operating parts. The driving bevels, differential and driveshafts operate in an oil bath. A full floating driveshaft makes possible the removal of either brake unit or differential unit, without disturbing the wheels, internal gears or case surrounding these gears.

Internal gear-driven axles for trucks have usually comprised a stationary member for carrying the load and another member external thereto for transmitting power to the driving wheels. In the new Atlas axle, made by the

(*Continued on page* 507)

Loading and Unloading Devices

One of the Addresses to Fleet Owners at the Highway Transport Conference at the New York Truck Show

By *Joseph Husson*

WHEN the wheels of a truck are not turning, it is not making or saving money for its owner. It is not so much the truck as its method of operation upon which the success of any kind of truck transportation depends. While of course the size of a truck, the kind of body fitted and the equipment used in connection with it must be considered, even the highest priced truck with the most complete equipment may be a failure if not operated properly.

Operation includes many important factors, such as routing and dispatching, the training of the drivers, etc. It also includes the method of loading and unloading the goods carried, for no delivery can be completed until goods are loaded and again unloaded.

During these loading and unloading periods the truck is standing idle. It is then not a vehicle but a mere repository for goods. Its wheels are not turning. It is not covering ground, the purpose for which it is built and sold. When the wheels of a truck are not turning, it is not earning profits. The greater portion of the day the truck's wheels are turning the more work is done. The greater the ratio between the idle standing time and the total working time each day, the less is the work done.

Other Addresses on Trucks

OTHER addresses on the various phases of truck operation as given at the Highway Transport Conferences at the New York Truck Show will be published in full, beginning with the next issue. These talks, being based on facts and principles, rather than items of news interest, will be of greater value if published in their entirety instead of digested. Hence the decision to print them in full. Watch for the story in the next issue

It is therefore evident that it should be the aim of every fleet owner to reduce to as great an extent as possible this idle standing time during the loading and unloading operations.

This may be done by the judicious selection of loading and unloading devices. There is a wide diversity of such apparatus, for it is evident that the same apparatus that unloads rolls of print paper would not handle building brick with the same degree of success.

Three Classes of Apparatus

Loading and unloading devices may be grouped under three heads as follows:

1—Those devices by means of which the entire truck load is loaded or unloaded en masse or in one operation.

2—Those devices mounted on the truck itself to unload the goods carried in bulk or piece by piece.

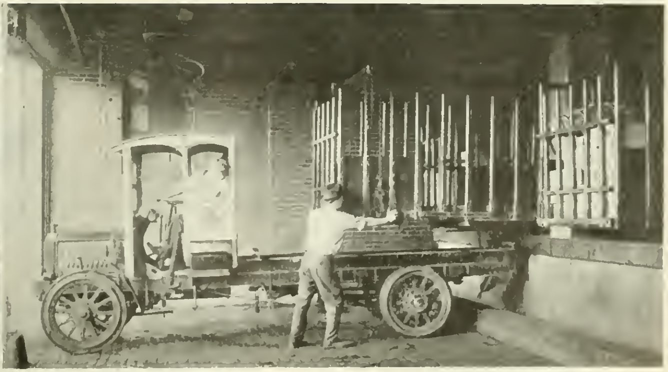
3—Those devices not mounted on the truck itself but on the ground or at some point adjacent to the loading or unloading platforms.

Each of these three main classifications may be further subdivided. The first group may be divided into three subdivisions as follows:

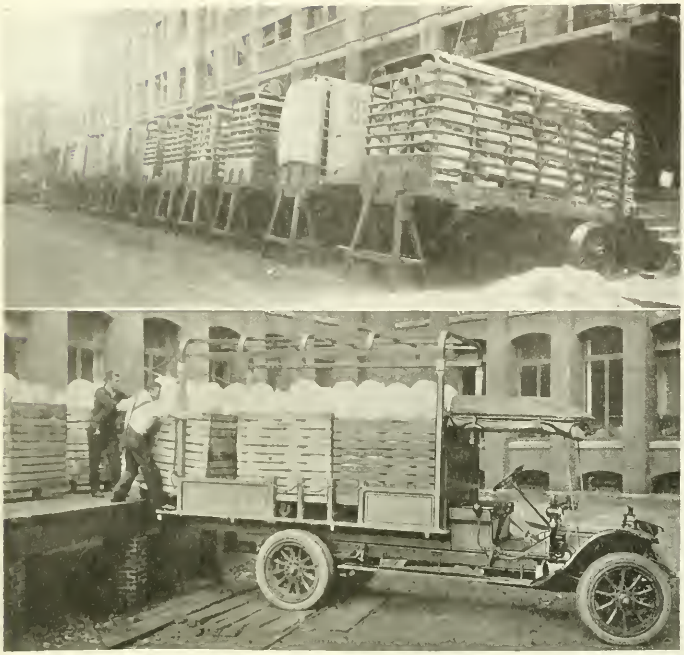
1—Demountable Bodies; 2—Nest Bodies, and 3—Semi-Trailers.

While demountable bodies, nest bodies and semi-trailers are not usually considered loading or unloading devices, they are most commonly used to reduce the idle truck standing time. The great use of such equipment in

One unit of the Baltimore Bargain House demountable body equipment, which cost $15,000 to install and which saves $22,000 a year in truck operation



The Scudders-Gale Grocery Co.'s demountable body outfit, which has cut down the loading time of 2-ton trucks from 30 min to 10 min. In addition, it has saved the labor of two loaders and a checker, an item of $375 a month in wages alone



At the top, a line-up of semi-trailers used by the Atlantic & Pacific Tea Co. With semi-trailers, it takes 8 to 10 min. to load 5 tons of groceries as compared with 1½ to 2 hr. with a fixed truck body. Below is shown a nest body used to load skeins of yarn

practically every industry has resulted in a very large number of applications, almost every one of which differs in some major or minor detail from the others. Because of this great diversity of application, lack of time permits of the mention of only a few installations in each subdivision.

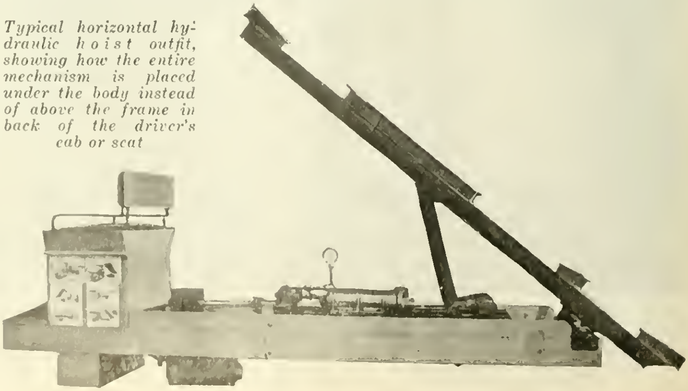
Demountable bodies save the fleet owner money by reducing idle truck time because, by using more bodies than trucks, the trucks may be kept constantly in service while the extra bodies are being loaded or unloaded at one end of the route or the other. The demountable body equipment of the Baltimore Bargain House, Baltimore, Md., is an especially good example of the value of such apparatus because it cost only $15,000 to install and yet saved $22,000 worth of truck time the first year and the same amount each year thereafter. The $15,000 investment is made of thirty demountable bodies. Each cost $200 or $6,000 in all. Fourteen hoists, each of which cost $500 or $7.000 in all and $2.000 for the cost of installation and the changes made necessary at the main store of the company and at the warehouse between which the trucks run.

By the use of these demountable bodies, the average number of loads hauled per truck per day has been increased from four and a half to eight and a quarter. In other words, the same number of trucks with the demountable bodies handles twice the amount of goods as the trucks without them. The Baltimore Bargain House installation is further characterized that the bodies are suspended parallel to the edge of the loading platform instead of perpendicular to it. This procedure was adopted because the loading platform is in a narrow runway which would be blocked if the bodies were suspended perpendicularly to the platform edge.

By means of demountable bodies the Scudders-Gale Grocery Co., one of the largest St. Louis wholesale grocery concerns, has cut the loading time of its 2-ton trucks from 30 min. to 10 min. Two bodies are used with each truck, one being loaded while the other is mounted on the truck delivering to the company's customers. Under the old system of a fixed body on each truck, it took from 30 to 35 min. to back the truck in, load it so as to eliminate round-about routes, extend the drivers' slips, check the goods and get away, the extra time depending on whether the load was billed to one customer or to a number. The use of the demountable bodies has enabled the company to cut the time for receiving, loading and sending out a truck to never more than 10 min. and usually from 5 to 7 min. In addition to this great saving in time, the labor of two loaders and one checker has been done away with, saving the company $375 a month on the item of wages alone.

Five bodies are employed in connection with three 2-ton trucks. Each body a year ago cost $275, or $1,375 in all. The cost of installation was $425, so that the net outlay totaled $1,800.

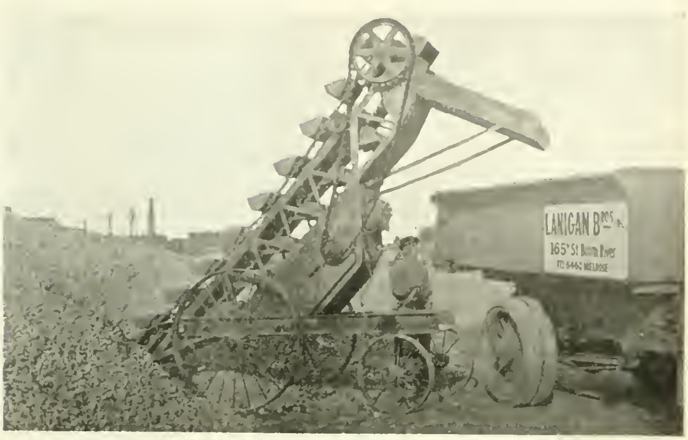
The Curtis Publishing Co., Philadelphia, Pa., was one of the pioneer users of demountable bodies on a large scale. It to-day employs a fleet of eleven electric trucks to haul bags of periodicals from its printing plant to the railroad express platforms, where the bags are mailed to all parts of the country. By the use of these bodies the Curtis company has increased the number of trips which



Typical horizontal hydraulic hoist outfit, showing how the entire mechanism is placed under the body instead of above the frame in back of the driver's cab or seat each truck can make a day so that four trucks with demountable bodies now do the same work of eleven trucks without them. The Curtis installation is unusual in that the great saving effected by the use of the demountable bodies led the railroad company to permit of the installation of hoists on its own property to facilitate the unloading of the bags and eliminate the peak load work thrown upon the railway employes when fixed bodies were used. By removing the demountable stake bodies from the chassis entirely, the body platform serves for carrying large rolls of print paper. Then again, steel gondola-type bodies are employed for carrying coal when the trucks are not engaged in hauling paper or bags of mail.

Where the goods carried are moved by trucks between fixed points, as is the case with partly manufactured material moved from one plant to another, the use of nest bodies simplifies the truck loading and the handling of the goods after they have been unloaded. A good example of the use of nest bodies in this class of work may be seen at the Arlington Mills, Lawrence, Mass., where the skeins of wool are loaded into small crates mounted on wheels. It is a simple matter to roll these crates into the truck bodies and to similarly discharge them at the end of the route.

The development of the chain-store idea for selling groceries, meats, drugs, etc., has been built up by the use of motor truck equipment, which is more certain and much quicker than shipping by freight or express. While trucks with conventional bodies were formerly used almost exclusively for this work, it was found that the wheels of the trucks were standing idle for too long a proportion of the working day, because it took from 1½ to 2 hours to load 5 tons of groceries or drugs. This was due to the large number of small packages which had to be handled individually. By the use of semi-trailers, however, this loading time has been cut considerably. In one instance, that of the Great Atlantic & Pacific Tea Co., the use of semi-trailers and tractors has cut the time of loading to eight minutes. Thirty-seven of the semi-trailers are used in conjunction with twenty tractors, so that there is always a loaded semi-trailer waiting for each tractor when it returns to the plant.



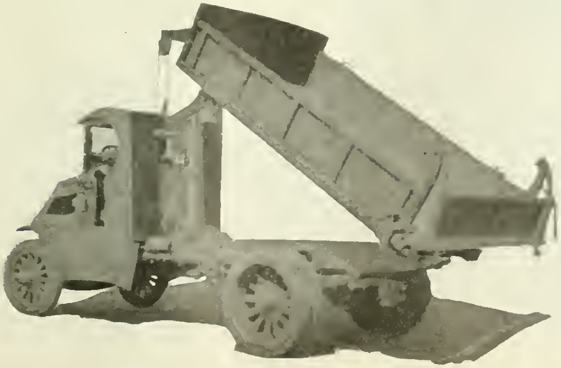
This mechanical truck loader will load 2½ yards of gravel, sand or coal from the ground in 4 min. as compared with 10 min. for eight laborers shovelling by hand. The cost by machine varies from one-sixth to one-half that by hand

The second classification of devices mounted on the truck itself to unload the goods carried in bulk or piece by piece may also be subdivided for bulk unloading into vertical hoists and horizontal hoists of both the power and hand-operated type and also vertical lift bodies in addition to those which are raised about the rear end.

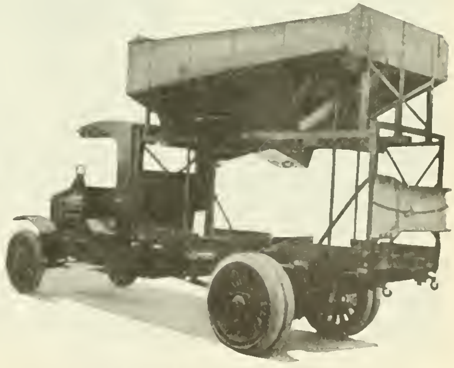
Side-dump bodies so well balanced that they can be tipped by hand, have come into favor to a considerable extent during the past year. Some of these bodies are made in two parts so that two different classes of bulk material may be carried at the same time.

On the larger size motor trucks of from 2- to 5-ton capacity, the hydraulic type of hoist costing between $400 and $500 is most generally employed and driven off the truck gearset because of the heavy weight which must be lifted. There are now two types of hydraulic hoists in general use. One

(*Continued on page 504*)



A typical vertical hydraulic hoist operated off the truck gearset to tip the body about the rear end for unloading of bulk material



A comparatively new type of quick-unloading body which is mechanically lifted vertically to permit unloading of bulk material by gravity

READ HOW

Hand Trucks and a Ramp Save Loading Time

ONE MAN SYSTEM AND SAMPLE CHART SAVE TIME AND ERRORS IN FILLING WALL PAPER ORDERS

THE loading system is the connecting link between the factory or warehouse and the delivery fleet. On this connecting link depends, in a large measure, the efficiency of the whole delivery system in a business where retail deliveries are made by motor truck.

If the loading system is a poor one—if it is slow and open to confusion and congestion—the whole delivery system will be open to confusion and congestion; the trucks will get away slowly and irregularly on their routes and the drivers will be in a constant state of irritation and discontent. More important still, deliveries will be late or irregular and customers will be annoyed accordingly. And every business man knows that an annoyed customer is not a good repeater.

On the other hand, if the loading system is quick, efficient and well adapted to the class of business involved, the whole system is apt to take the same tone and increase in efficiency and good service to the firm's customers.

Broadly speaking, the loading system may be taken to include the collection of goods ordered, the transportation of those goods to the loading platform and the loading of the goods onto the trucks themselves. This article deals with the loading system installed by Richard E. Thibaut, Inc., whose business slogan is "The Largest Wall Paper House in the World." The manner in which various loading devices, appliances and methods have been adapted to the needs of the business has had much to do with the success of the firm and the steadily increasing volume of business which it handles.

How Orders Are Handled

The Thibaut wall papers are not supplied to customers entirely from one store or warehouse. Regular customers are located all through Greater New York and the surrounding towns in Westchester County, New Jersey and Long Island.

Deliveries to such widely scattered points by motor truck would prove costly and somewhat slow even with modern motor trucks, if an attempt were made to make them from a single central point in New York. The company has, therefore, established retail showrooms and warehouses in suitable central points round about New York, in addition to the central warehouse on Tenth Avenue and Thirty-seventh Street. These smaller warehouses, situated respectively in the Bronx, Brooklyn, Jersey City, Newark and Long Island, have from two to five trucks attached to each of them, serving customers in the neighborhood of each warehouse. The branch warehouses and salesrooms are supplied from the central warehouse, the goods being transported on horse wagons, but the delivery system to customers is the same from the central warehouse and from the branch warehouses. For the purpose of this article it will, therefore, be sufficient to describe the loading system in vogue at the central warehouse, as this applies equally to the others.

Orders for goods may be received either at the main warehouse or at the main offices in Madison Avenue. In the former case the order is typed at once on a separate order form, one form to each order. If the order is received at the main offices, it is either 'phoned through to the warehouse, when the order is a rush, in which case it is at once typed on a separate order form at the warehouse, or is typed on a separate order form at the main offices, included in a batch of others and delivered by messenger to the central warehouse.

The order is made out in duplicate, one copy being filed immediately for purposes of inventory and checking. The other copy, when received at the warehouse, is handed to one of the floor men always on duty on the ground floor shipping room adjacent to the offices.

The shipping room is equipped with a large number of hand trucks of varying types, suitable for handling different classes of papers and different weights of loads. The man to whom the order is handed selects one of these hand trucks, pushes it to an adjacent elevator and is carried up to the stock floors above. Here he selects the paper

The ramp leading from the shipping room floor to the truck tailgate in front of the Richard E. Thibaut main warehouse. Note the different types of hand trucks available for transporting different loads to the trucks

One of the Richard E. Thibaut delivery Autocars. The goods are loaded loosely in the truck in the case of a small load, but are packed on end and tiered up in three tiers where a large load is to be carried

or papers called for on the order, loads his hand truck and returns with it to the ground floor in the same way. Here he checks his load once more against the order and then wraps it up securely. He then pastes on the parcel the label supplied him by the traffic superintendent.

This label is copied from the order by the traffic superintendent or the shipping clerk himself and handed over with the order, the traffic superintendent having indicated on label and order the manner in which the parcel is to be conveyed to the customer and whether the parcel is charged or C. O. D. The parcel is then placed in a certain part of the stock floor, corresponding to the route on which it is to be delivered.

If the parcel is to be delivered by express it is placed below the ramp in the illustration shown here, where the expressmen can readily lay their hands on it. The space for these express shipments is in the immediate right foreground in the illustration, while parcels for shipment by the company trucks are stacked on the shipping room floor at the top of the ramp, either in piles on the floor or piled up on hand trucks and sorted according to delivery routes. When the parcel has been placed ready for loading, the order is turned in to the traffic superintendent and filed by him according to route, or in the express file.

No Unnecessary Handling

When a single order is almost large enough to fill a hand truck, the hand truck is pushed to the section of the shipping room floor concerned and left there with the goods on it ready to be pushed out to the tailboard of the truck when the latter is ready to load. As shown in the illustration, there are sufficient hand trucks to permit this being done without wasting a considerable amount of time in loading and unloading.

It will be noted in connection with this system of collecting goods that from the time the order is made out until the goods are wrapped and ready for shipment, the entire collection and allocation according to route of the goods ordered are in the hands of one man. By this system not only is the responsibility for any error fixed at once, but the possibility of error is reduced to a minimum. There is no opportunity for misunderstanding, because there is no verbal transmission of the order from the shipping room to the stock floor, or from the shipping room clerk to the stock floor clerk. The stock floor clerk collects the goods in person, his order in his hand, and they do not leave his hands until they are wrapped and ready for shipment.

In this connection it should be remarked that different sizes, patterns, types and qualities of wall-papers are all indicated by a system of letters and numbers. A large stand or chart of samples in the shipping room corresponds with a similar chart on the stock floors above. The stock men and shipping room men know the designation of the different papers by heart, but they can refresh their memories at any time by referring to this chart. Also, any new man who is taken on to work in either shipping room or stock room above, can teach himself and grow familiar with the designations of the stock by means of this chart without taking up the time of the other men.

The shipping room is laid out in such a way that the elevators, the wrapping table, the hand trucks not in use, the sample chart and the different route floor spaces are all conveniently adjacent, one to another. In this way the retracing of steps by the shipping floor

(Continued on page 506)

Part of the Richard E. Thibaut fleet of Autocars drawn up in front of the main warehouse ready for loading. The loading ramp leads onto the street immediately back of the trucks shown here, while the retail department can be seen at the right. Note the type of body on all the trucks

SPECIAL ROUTING

Required for Deliveries in Business Districts

Drivers and Bonus System Play Big Part in Delivering Big Volume of Paper Drinking Cups

THE distribution of small articles, all alike, to customers located in all parts of a big city and the surrounding districts involves the solution of special trucking problems — problems which will vary somewhat from those of other fleet owners. In the first place, trucks making deliveries of this class will be routed differently from the trucks of a department store, for example, because the latter make their deliveries mainly in the residence districts. The above class of deliveries, involving truck routing through the financial district, the commercial district and others, brings the trucking department face to face with unusual delivery conditions, which must be handled differently from those in the residence districts.

In many other ways such a manufacturer's trucking methods will differ slightly from the average run of fleet owners making retail deliveries, because only through such variations can the highest efficiency be obtained in adapting the trucking fleet to the work it is to do.

In view of the above, the unusual system of handling deliveries installed by the Lily Cup Co. has a peculiar interest for such a manufacturer, aside from the general hints otainable from a description of the company's well-thought-out and highly efficient delivery methods. In this and subsequent issues of THE COMMERCIAL VEHICLE will be published articles dealing with the various angles of the trucking system installed by Mr. Errett of the Lily Cup Co. The present article deals with the routing and delivery methods now in use by the company.

The Company Fleet

The Lily Cup Co.'s delivery fleet had a quite recent and humble beginning. Four years ago the fleet consisted of one horse and wagon. But if the beginning was humble, the growth of the business was not.

At that time the company was selling in New York City a few thousands weekly of the now famous Lily drinking cup. To the few progressive customers who first did business with the company, deliveries were made by the one-horse wagon, running between the downtown district, the financial district and to he heart of the theatrical district, at Forty-second Street. But within a year of his start Mr. Errett had bought his first motor truck and within another year others had been added, one truck per month, until the fleet had grown to a substantial size. At the present time the fleet consists of some eight Ford trucks, with unusually attractive bodies and fittings; a 2-ton Pierce-Arrow truck and a ¾-ton Reo.

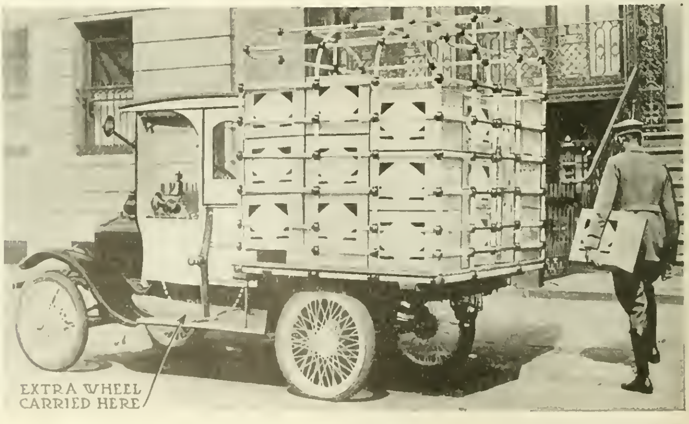
All these trucks are engaged in delivering Lily cups. From the time when the cups first came on the market, the demand for them has steadily increased, not only among business men in downtown offices but practically everywhere where a large number of people are brought together for long hours at a time. The convenience of the cups, as well as their sanitary value, has led their use to be adopted by widely different people in widely different places and to all these people and places the trucks of the company penetrate with their deliveries.

At the present time the number of cups delivered in New York per truck per week is very seldom less than a quarter of a million. In many cases it is much more than this. Bearing these figures in mind, it should also be remembered that widely different kinds of customers mean different delivery conditions. For example, the richest and most expensive hotels buy Lily cups for their patrons and their employees, because of the neatness and sanitary value of the cups. Dentists buy Lily cups because of their sanitary value. Theaters install Lily cups. Business houses in the financial district and publishing and other houses uptown use them. On the other hand, the cheapest of cheap Italian restaurants use Lily cups occasionally because of their cheapness.

Routing by Districts

A moment's consideration of the above list of customers will indicate the different localities and the different conditions in which the Lily Cup Co.'s trucking fleet makes its deliveries.

In view of the above, Mr. Errett



One of the Lily Cup Co.'s Ford trucks making a delivery. Note the smart fittings on the truck, the special body, the driver's uniform and the generally good appearance from the advertising standpoint has made an original general division of the territory covered by his delivery fleet.

When orders are received at the central office in the Equitable Building, they are typed by the clerical staff in accordance with an order, goods and cash checking system which will be described in a subsequent article. The stubs of the separate orders for a certain route are pasted onto the driver's card and the latter filed ready for the driver. This filing is done by slipping the card with the stubs on it into one section of a radial distributor, which stands in a convenient place for the driver to reach it. If the order is a C. O. D., the bill for the order is also attached to the driver's card and handed by him to the customer when the delivery is made. Each section of this radial distributor corresponds with a district in New York.

For the purposes of his business Mr. Errett has divided the city in the following manner: The first delivery section extends from the Battery to the City Hall. This section is called the financial district and has a section so named and indicated in the radial distributor. The district includes the big downtown office buildings, most of whose tenants install drinking water for their employees and with the drinking water install Lily cups also. The section also includes a number of restaurants and public buildings using Lily cups.

The next delivery section extends from the City Hall north to Twenty-third Street, and is called the mercantile district. This district includes a large number of manufacturers, such as cloak and suit manufacturers, a few restaurants and hotels and a few large department stores.

The next delivery section extends from Twenty-third Street north to Fifty-ninth Street, and is called the theatrical district. This district includes the theaters, almost all the big hotels and restaurants as well as smaller restaurants, a large number of businesses of various kinds using Lily cups, and a certain number of private and professional purchasers of Lily cups.

Other districts are the upper West Side, the Bronx and two districts in Brooklyn, divided according to whether the truck passes over the Brooklyn Bridge or the Williamsburg Bridge. Each of these districts has a corresponding section in the radial distributor from which the driver on that route obtains his orders for deliveries.

Suburban Deliveries

Deliveries are also made in Queens and other outlying sections. When these are at some distance, it is Mr. Errett's usual practice to send out the Pierce-Arrow truck and make a number of other deliveries at the same time. This truck makes runs to Trenton, Newark, Bear Mountain and as far as Oyster Bay. At first glance this might seem an expensive method of making long distance deliveries because the Pierce-Arrow uses considerably more gas than the Fords. But it has been Mr. Errett's experience that, in addition to orders handed to the driver of the truck on these trips, orders will come pouring in to the office from points along the route for weeks after the big truck has passed that way. This advertising question as regards trucks will be fully dealt with in another article, but it is so important and the service to customers is so important, that Mr. Errett finds it advisable to keep the whole trucking system of the company in his own hands.

Delivery Problems

The most important delivery problems which Mr. Errett has to face show themselves in the downtown or financial district. Here the streets are narrow and congested with all kinds of traffic, including surface cars, private cars and delivery trucks. On this account, traffic regulations are numerous and complicated and, owing to the number of one-way streets, routing a trip without running over the same ground twice is a complex business. Moreover, as the deliveries are mainly to individual businesses in big office buildings, the goods cannot be left at the door of the building but must be carried by hand to the office concerned, which usually entails a trip up in the elevator for the driver making the delivery.

Under these circumstances, Mr. Errett has found it necessary to put his best trained and most reliable drivers on duty in this district. He has also found that the best way to route each truck within this district is not to route it at all—in other words, he leaves all routing of individual trucks to the driver himself, and where well trained drivers are concerned this has proved the best method. Just here, however, another system installed by Mr. Errett enters into the question and increases the routing efficiency of the drivers. Mr. Errett pays his drivers a regular bonus, not on the hours they work but on the number of deliveries they make over a certain number. Therefore, a driver soon learns to save time by good routing and so makes more deliveries in a day.

As regards the actual delivery problems in these districts, the drivers soon learn where they must not park their trucks in the downtown district when making deliveries. For example, if a driver leaves his truck pulled up to the sidewalk in front of a bank, the probabilities are that some millionaire will drive up in his limousine and expect to be pulled up in front of the bank. When this happens some one in the bank is likely to notice that the truck is in the way and then there follows trouble for the driver with the bank doorman or some other individual in the bank.

Again, if the truck pulls up immediately in front of a restaurant of a certain type and remains there for more than a moment or two, there will probably be trouble with the restaurant owner, who does not want his customers impeded in any way and wants his sign to be always visible from across the street. Points like these are soon learned by the drivers operating in these districts and stops of this kind avoided.

Driver Leaves Truck

Where parking in general is concerned, there is very little difficulty experienced by the drivers in the downtown district. The fact that there is no helper attached to the Ford trucks necessitates the truck being left unattended while the driver is making a delivery in an office building. The downtown traffic policemen, however, have so many cases of this kind to deal with, though generally with private cars, that the vast majority of them have come to regard the business somewhat from the car and truck owner's point of view. Therefore, if a driver has to enter a building to make a delivery he is seldom molested, even if his truck is parked somewhere against regulations, unless he consumes a great deal of time in making his delivery. Just here the bonus system enters in and makes him hurry up his delivery on his own account.

When making deliveries in big office buildings on main streets in the financial district, the driver is instructed to park his truck on one of the small one-way streets at the side.

Protecting Deliveries

In the Publishing Business

FOUR SAFEGUARDS AGAINST BOOKS BEING DAMAGED DURING DELIVERY

1—Careful Packing
2—Special Loading
3—Special Truck Bodies
4—Consignee's Signature

AT first glance, perhaps, a book would not appear to be a particularly fragile commodity. It is neither perishable nor brittle nor awkward to pack, nor is it extraordinarily susceptible to changes of temperature. Yet from a sales point of view, a very slight injury will render a book practically valueless, except for sale as a remnant.

A very slight blow on one corner of a book bound in cloth will be sufficient to bend or crease the cardboard side, under the cloth cover, causing it to telescope slightly. Although it may be straightened again, the telescoping of the board will show as a jagged crease in the tightly stretched cloth cover. Such a crease renders a book unsightly. No customer will buy it and the bookseller or customer will of course return it and claim credit for it, if the book was damaged before it reached him.

In the same way, a single drop of water on the cover of a cloth bound book dissolves the dye and raises a blister which renders the book unsalable.

The MacMillan Co., one of the largest book publishing firms in the world, turns out yearly several millions of copies of the titles on its list. About 25 per cent of these books are shipped direct from the binders to the firm's customers. The remaining 75 per cent are shipped from the binders to the company offices and storerooms on Fifth Avenue, these freight shipments being collected by the company's fleet of trucks. As orders are received, the books are collected from the stock floors and shipped out again. They are thus handled twice by the delivery fleet.

Books which may be returned to the publishers are classed under three heads as follows:

1—Books on sale or on consignment. That is, books shipped out with the understanding that those not sold may be returned to the publishers.

2—Imperfect books. That is, copies which are imperfectly printed or bound.

3—Damaged books. That is, books which have been damaged in storage or transit before they reached the customer.

For any books in the above three classes the publishers allow credit when they are returned.

To handle these credits the MacMillan Co. maintains a large claim department. Books in the first category do not concern us here. But in the second and third class perhaps 5,000 or 6,000 books are returned yearly to the MacMillan Co. and credit allowed for them. Of these about 2,000 probably are books damaged in transit from the publisher to the customer or the retailer.

This in itself is not a high percentage of damage on so easily damaged an article. But it must not be understood that this represents damage done by the MacMillan Co.'s trucking department. In the last year there has not been a single case of a book or books being damaged while in the hands of the company's delivery fleet.

There are four safeguards which have helped the company to attain this desirable efficiency in its delivery organization.

Careful Packing

A glance at the accompanying illustration will indicate the care with which books are packed in the MacMillan Co.'s shipping room. When books are to be shipped in large quantities they are packed in heavy wooden cases. The cases are carefully built so as to be close-fitting and as nearly as possible watertight. But in addition they

An everyday scene in the MacMillan Co.'s shipping room, showing the large volume of shipping handled all the time by the delivery organization and the company trucks. Note the heavy wrappings on the parcels in the foreground and in process of packing

The 2-ton Packard which handles most of the larger parcels of books other than cases shipped out by the MacMillan Co. Note the heavy curtains running the entire length of the truck body which can be unrolled to protect the books in inclement weather

are lined, first with heavy oiled paper, then with heavy paper and finally with finer paper or excelsior. The lining serves the double purpose of protecting the books from water and acting as a soft buffer between them and the sides of the case, when the latter is jolted in transshipment.

Books packed for smaller consignment are wrapped in much the same way, in very heavy paper, as can be seen in the foreground of the illustration of the shipping room.

The special loading device illustrated on this page has been fully described in an earlier issue of THE COMMERCIAL VEHICLE. But the device is not only valuable as a time and labor saver. It also serves to safeguard books during the unloading process.

Before the gangway shown on this page was installed, trucks were unloaded at the curb edge by tipping the cases off the truck and easing them to the sidewalk. This easing was described by one of the company's drivers as a matter of knack in easing the case so that it struck the sidewalk with one entire surface at once. When this was accomplished the case was not damaged.

Special Loading

It will be readily seen, however, that one man guiding a 250 or 300 lb. case so that it falls exactly at a certain angle must be highly skilled if he is to attain his object four out of five times. Even so, the fifth time the case will fall on one edge or corner and probably break open or at least start every nail and probably crack several boards. These cases are often shipped out again without being opened, and a case in this condition would not last long in a railroad freight yard.

With the new gangway, the cases are run from the truck body to the sidewalk on hand trucks without the slightest damage, and so into the shipping room to be opened or re-shipped.

Special Truck Bodies

Most of the books packed in cases are collected or delivered on 3-ton Packards which are fitted with stake bodies for convenience in loading. But in inclement weather heavy tarpaulins can be pulled over the load and fastened down, thus protecting the cases from getting wet through.

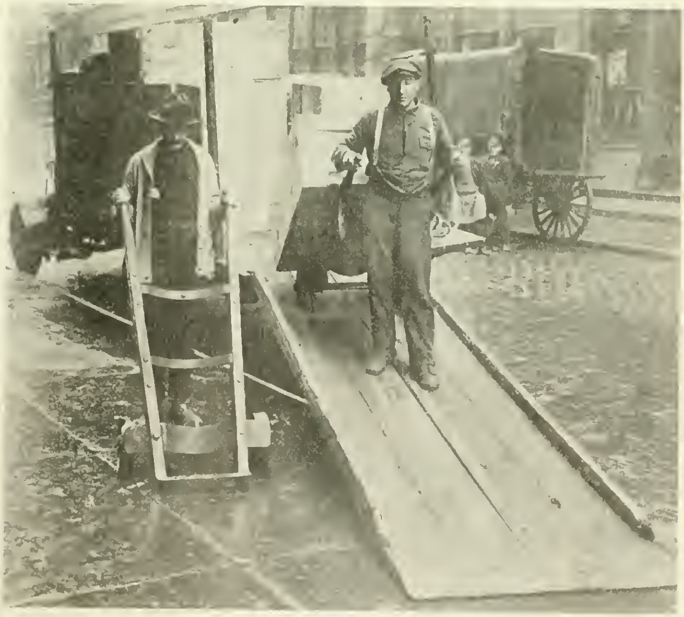
Other package shipments are handled by the 2-ton Packard, the body of which has screen sides and a screen back. But this truck is also fitted with heavy curtains which are rolled down, entirely enclosing the body and protecting the load in wet weather.

Consignee's Signature

Every MacMillan Co. truck driver takes with him on his delivery trips a delivery sheet on which are listed the deliveries which he is to make. The sheet is headed:

Received from The MacMillan Co.—in Good Condition

The driver obtains on this sheet the signature of the customer or shipping agent to whom the goods are delivered. When the sheet is turned in at night it is inspected to see that all necessary signatures have been obtained and when this has not been done the driver must explain why it has not been done. This makes the driver take pains to see that his packages are in good condition when delivered.



The loading device which has saved the MacMillan Co. much time and labor and has served as a safeguard against damaging books in unloading. With this device, cases of books are run with hardly a jar from the truck body to the shipping room, the old crashing impact on the sidewalk being entirely eliminated. Such a runway can be made by the average carpenter

Loading and Unloading Devices Save Truck Time

(Continued from page 497)

is the vertical or slanted type mounted directly aft of the driver's cab. With this type of hoist it is possible to dump a 5-ton load in from 15 to 30 seconds, depending upon the condition of the bulk material such as dirt, gravel, coal, ashes, etc. The advantage of a power-operated hoist over a hand-manipulated type is its greater speed of operation, especially when the loads carried are above 2 tons. After the commodity is dumped, it is not necessary to keep the truck at rest, for the driver can start on his return trip while the body is being lowered into its normal position.

For small trucks of 1-ton capacity, the hand-operated vertical hoist costing about $250 is most popular because of its cheapness and the comparatively small time required to raise a dump body with a light 1-ton load.

A comparatively new type of horizontal hydraulic hoist has gained much favor in the last few years because with this type of hoist mounted underneath the body, the full loading length of the chassis may be used to increase the length of the body or reduce the overhang about the rear axle. With the horizontal type of hoist the truck bodies are from 18 to 24 inches longer and have lower sides than bodies of equal capacity when used with the vertical or slanting type of hoists. These types of hoists vary in price from $300 for loads up to 3 tons, to between $400 and $500 for maximum loads of 7 tons.

In addition to the type of truck body pivoted at its rear end and raised at the front to dump its load, several makes of vertical lift bodies are now offered the fleet owner in either the hand- or power-operated types. In these the entire body is raised vertically to give the necessary height to permit the material to be unloaded by gravity through the use of steel chutes. These bodies on the average cost from $600 for a 2-ton

Too Late To Classify 1920

				FRAME			TIRES			WHEELS		ENGINE								IGNITION			ELEC. SYSTEM		
								Size in Ins.							COOLING										
																Radiator									
																CASE		CORE							
Name and Model	Tons Capacity	Chassis Price	Wheelbase, Inches	Make	Materia	Type	Kind	Front	Rear	Make	Type	Make	No. Cyl Bore and Stroke—N.A.C.C. Hp.	Cylinders Cast	Water Circ.	Make	Type	Make	Type	Type	Make	Spark Advance	Type	Make	Extra Cost $
tlas 20	¾	$1,260	118	Prsh	p-stl	flex .	pnu.	32x4½	32x4½	E&O.	wd. .	Lyc.	4-3½x5 -19.6	4	ther..	own.	prs . .	ms.	el. .	ing..	A-Knt	hand.	s&l-2..	Bijur..	none
ependable . . . C	1½	2,150	128	P&B	p-stl.	flex .	sol...	34x3½	34x5	Bim...	wd...	Buda..	4-3¾x5¼-22.5	4	cent.	cst.	Lng.	fin . .	Lng.. .	sing..	Spltf..	hand..	s&l-2.	West..	150
ependable . . . E	2½	2,750	147	P&B.	p-stl..	flex...	sol...	36x4½	36x7	Bim...	wd...	Buda..	4-4¼x5½-29.0	4	cent.	cst.	Lng.	fin . .	Lng....	sing..	Spltf..	hand.	s&l-2.	West..	150
umbo 15	1½	2,595	144½	Drt..	p-stl .	s-flex..	sol...	36x3½	36x5	. . . . .	wd...	Buda..	4-3¾x5¼-22.5	4	cent...	own.	cst. .	G.&O..	pln. . . .	sing..	N-E..	hand.	s&l. .	. . . .	none
umbo 20	2	2,795	144½	Drt..	p-stl..	s-flex..	pnu...	35x5	38x7	. . . . .	wd...	Buda..	4-3¾x5¼-22.5	4	cent...	own.	cst. .	G.&O..	pln. . . .	sing..	N-E..	hand.	s&l . .	. . . .	none
umbo 25	2½	3,095	152½	Drt.	p-stl..	s-flex..	sol...	36x4	36x7	Day..	mt....	Buda..	4-4¼x5½-29 0	4	cent...	own.	cst. . .	G.&O..	pln. . . .	sing..	Eismn	hand..	lghtg..	. . . .	none
umbo 30	3	3,590	152½	Drt..	p-stl..	s-flex..	pnu...	36x6	42x9	Clk..	mt...	Buda..	4-4¼x5½-29 0	4	cent...	own.	cst. .	G.&O..	pln. . . .	sing..	Eismn	hand..	lghtg..	. . . .	none
umbo 35	3½	4,300	165	Drt..	p-stl..	s-flex..	sol...	36x5	36x10	Day..	mt...	Buda..	4-4½x6 -32.4	4	cent...	own..	cst.. .	G.&O..	pln. . . .	sing..	Eismn	hand..	lghtg..	. . . .	none
umbo 40	4	4,875	165	Drt..	p-stl..	s-flex..	pnu...	38x7	44x10	Clk...	mt...	Buda..	4-4½x6 -32.4	4	cent..	own..	cst.. .	G.&O..	pln. . . .	sing...	Eismn	hand..	lghtg..	. . . .	none
oebler . . . . MT	6	3,095	142	P&B	p-stl.	. . . . .	sol...	36x4	36x7	Way..	wd...	Her...	4-4 x5⅝-25.6	4	cent...	own...	cst. . . .	Lng..	fin.	sing..	Eismn	fixed..	none..	none..	none
atriot Lincoln	1½	. . . .	140	Drt...	p-stl..	rigid .	sol* . .	34x3½	34x3½d	Bim...	wd...	Hink..	4-4 x5½-26.6	4	cent...	own...	cst. . . .	Brem..	fin. . . .	sing..	Spltf..	hand..	. . . . .	. . . .	. . . .
atriot Washington	2½	. . . .	156	Drt...	p-stl..	rigid..	sol*...	36x4	36x4d	Bim...	wd...	Hink..	4-4½x5½-32.4	4	cent..	own...	cst. . . .	Brem..	fin. . . .	sing...	Spltf..	hand..	. . . . .	. . . .	. . . .
eynolds	1½	2,650	140	own...	rol-c..	flex . .	sol...	36x3½	36x6	Sth...	mt....	own...	4-4 x5¼-25.6	4	cent...	own...	cst. . . .	own...	fin. . . .	sing..	Eismn	hand..	s&l-2..	Vesta	none
eynolds	2½	3,350	152	own...	rol-c..	flex...	sol...	36x4	36x8	Sth...	mt....	own...	4-4¼x5½-29.0	2	cent...	own...	cst. . .	own...	fin. . . .	sing..	Eismn	hand..	s&l-2..	Vesta.	none
eynolds	3½	4,350	165	own..	rol-c..	flex . .	sol...	36x5	36x5d	Sth...	mt....	own...	4-4½x5½-32.4	2	cent..	own.	cst. . . .	own...	fin. . . .	sing.	Eismn	hand.	s&l-2..	Vesta.	none
eynolds	5	5,350	165	own...	rol-c..	flex...	sol..	36x6	36x6d	Sth...	mt....	own...	4-4½x5½-32.4	2	cent..	own...	cst. . . .	own...	fin. . . .	sing.	Eismn	hand..	s&l-2..	Vesta.	none

ABBREVIATIONS—Types of Construction

*—other options
amid—amidship
auto—automatic
bevl—bevel
cel—cellular
cent—centrifugal
chn—chain
cst—cast
ctr—center
cylinders cast, 2 in pairs
cylinders cast, 4 in block
cylinders cast, 3 in threes
cylinders cast, 1 singly
cyl-ends—cylinder-ends
d—dual
d-d—dry-disk
d-p—dry-plate
dplx—from both motor and driveshaft
d-rd—double reduction
d-s—drive-shaft
elec—electric
ext-d-s—external drive-shaft
ext-f-w—external front wheel
ext-g—external gear
ext-jst—external jack-shaft
ext-r-w—external rear wheel
fab—fabric
fin—finned tube
flex—flexible
fric—friction
g-p—gear pump
grv—gravity
gset—from gearset
hyd—hydraulic
ind-c—individual clutch
int-g—internal gear
int-g-4—internal gear drive on 4 wheels
int-r-w—internal rear wheel
jst—unit with jackshaft
l—left
l-b—loose ball
lghtg—lighting only
motr—unit with motor
mt—metal (wheels)
mtl—metal (universal joint)
opt—optional
pist—piston pump
plan—planetary
pln—plain tube
pnu—pneumatic
pres—pressure
prog—progressive
prs—pressed steel
p&s—pneumatics in front, solids in rear
p-stl—pressed steel
r—right
r&c—right and center
r-rd—radius rods
rol-c—rolled channel
rol-I—rolled I-beam
selec—selective
s-flex—semi-flexible
sht—sheet
s&l—starting and lighting
sl&l-2—starting, lighting and ignition, 2 unit
sol—solid
sprgs—springs
sq-t—square tube
start—starting only
t-arm—torque arm
ther—thermo-syphon
t-p—two-point
t-t—torsion tube
vac—vacuum
wat-tube—water tube
wd—wood
w-d—multiple disk in oil
w-p—plate in oil
wr—wire
zz-t—zig-zag tube

ABBREVIATIONS—Makers of Parts

*Other Options
Acme—Acme Universal Joint Mfg. Co.
A-Knt—Atwater-Kent
Al-Ch—Allis-Chalmers
Aley—Alloy Steel Spring
Amer—American Magneto Co.
Arch—Archibald
Arvac—Arvac Co.
Aut-L—Auto-Lite
Auto—Auto-Wheel Co.
A-W-W—Automotive Wire Wheel Co.
B&B—Ball & Ball
B-Beck—Borg & Beck
Berlg—Berling
Bet—Betts Spring Co.
Bim—Bimel
B-Lipe—Brown-Lipe
Blood—Blood Bros.
Brem—Bremer
Bvr—Beaver Mfg. Co.
B&W—B & W Mfg. Co.
Can—Candler Radiator
Cant—Canton-Cleveland
Carl—Carleton Co.
Cart—Carter Carburetor
Cas—G. M. Castle
CAS—C. A. S. Products
Chgo—Chicago Mfg. Co.
Chic—Chicago-Standard
Chmp—Champion Auto Spring Co.
Chy—Cheney
Clrk—Clark Equipment
Col—Columbia Axle Co.
Con—Continental Motor
Conn—Connecticut
Coop—Cooper
Crn—Crane & MacMahon Co.
C-S—Christopher Simpson Iron Co.
Day—Dayton
Del—Delaney
Detlaf—Detlaff

size, up to $900 or $1,000 for the 6-ton size, when furnished with power-operating mechanism. The bodies are lifted by means of vertical threaded shafts or by a vertical hydraulic hoist. In the latter type the hoist is mounted at the front end and is provided with cables which run along the top of the side frame members of the chassis to the rear body supports so that both ends of the body rise at the same rate of speed. By this means the floor of the body remains horizontal during its ascent.

Where heavy loads have to be lifted from the ground to the truck body, special cranes or derricks, such as that shown in one of the accompanying illustrations, may be mounted and driven from the truck engine. When the loads are especially heavy, some form of outriggers must be employed to help distribute the concentrated load at the base of the crane.

Winches and drums may also be mounted on the truck chassis and operated by power from the engine for all sorts of rigging work including the setting up of poles of all descriptions, boiler stacks, engines and raising safes or pianos into the upper stories of buildings.

In the realm of unloading devices mounted on the loading or unloading platform instead of on the truck itself, there are many different applications, all differing according to the commodity being handled. For loading and unloading rolls of print paper the Curtis Publishing Co., Philadelphia, Pa., employs electric hoists which permit 4 tons of paper to be unloaded and lowered 30 feet into the subbasement of the building in 10 minutes. Similarly, the use of the same type of device at the point of loading enabled the same tonnage of paper to be loaded in 14 minutes. If this tonnage were loaded by hand it would take from ½ hour to 1 hour at each end.

Then there is the mechanical truck loader for lifting bulk materials such as sand, gravel and coal from the ground directly into the truck body. These unloaders consist of small four-wheeled vehicles, either hand- or self-propelled, with an inclined framework and a bucket conveyor. While it takes eight laborers about 10 minutes to load 2½ yards of gravel into an average truck body, the mechanical loader will do the same work in 4 minutes at one-sixth of the total cost.

In lumber yard work, truck time may be conserved by, first of all, loading the lumber on a four-wheeled trailer. This can be moved about from point to point by hand. When the different sizes or kinds of lumber in one order are thus collected, the truck is only held up 2 or 3 minutes while the load is transferred through the use of rollers turned by hand cranks.

Motor Truck Specifications

ENGINE									TRANSMISSION										BRAKES		CONTROL			UNIVERSALS		
GOVERNOR			SPEED		FUEL SYS.		CLUTCH		GEARSET				FINAL DRIVE								STEERING GEAR					
Type	Make	Drive	Motor in r.p.m.	Truck in m.p.h.	Carbureter Make	Fuel Feed	Type	Make	Type	Make	Placed	Speeds	Type	Rear Axle Make	Total Gear Reduction	Propulsion Taken By	Torque Taken By	Springs Make	Foot	Hand	Placed	Make	Levers	Type	Make	Name and Model
none	none..	...	1500	..	Schblr.	grv..	d-p..	B-Beck.	prog..	own...	motr	3	bevl..	....	4 75	sprgs.	sprgs..	.....	ext-r-w.	int-r-w	l...	CAS.	ctr..	mtl..	Arvac..	Atlas 20
cent.	Pierce.	motor	1050	16	Zenith..	vac.	d-d..	Fuller..	selec.	Fuller	motr.	3	worm	Wsc...	8.25	sprgs.	sprgs.	Tuth..	int-r-w.	int-r-w	l..	Ross..	ctr..	mtl.	Acme..	Dependable C
cent..	Pierce.	motor.	1050	12	Zenith..	vac ..	d-d..	Fuller..	selec..	Fuller..	amid.	4	worm	Wsc...	8.66	sprgs..	sprgs..	Tuth..	int-r-w..	int-r-w	l...	Ross..	ctr..	mtl.	Acme..	Dependable ....E
none	none...	....	1500	..	Zenith..	grv..	d-d...	Fuller..	selec..	Fuller..	motr.	3	int-g..	Clrk..	1.10	sprgs.	sprgs.	S-P.	ext-r-w.	int-r-w	l...	Jacox	ctr..	mtl.	Arvac..	Jumbo 15
none	none..	..	1500	..	Zenith.	grv ..	d-d	Fuller	selec..	Fuller	motr..	3	int-g..	Clrk..	1.10	sprgs.	sprgs..	S-P..	ext-r-w..	int-r-w	l...	Jacox	ctr..	mtl.	Arvac.	Jumbo 20
cent.	Dplx...	dplx	1250		Zenith..	grv ..	d-d..	Fuller.	selec...	Fuller..	motr.	4	int-g..	Clrk..	1.10	sprgs..	sprgs..	Dtr...	ext-r-w..	int-r-w	l...	Jacox	ctr..	mtl.	Arvac.	Jumbo 25
cent..	Dplx...	dplx	1250	..	Zenith..	grv..	d-d..	Fuller..	selec...	Fuller.	motr..	4	int-g..	Clrk...	1 10	sprgs..	sprgs..	Dtr...	ext-r-w.	int-r-w	l...	Jacox	ctr..	mtl.	Arvac.	Jumbo 30
cent..	Simp.	motor.	1000	..	Zenith..	grv..	d-d..	B-Lipe.	selec...	B-Lipe.	motr.	4	int-g..	Clrk...	1.10	sprgs..	sprgs..	S-P...	ext-r-w..	int-r-w.	l...	Jacox	ctr..	mtl.	Arvac.	Jumbo 35
cent..	Simp..	motor.	1000	...	Zenith..	grv..	d-d..	B-Lipe.	selec...	B-Lipe	motr	4	int-g.	Clrk...	1.10	sprgs..	sprgs..	S-P...	ext-r-w..	int-r-w	l...	Jacox	ctr..	mtl.	Arvac..	Jumbo 40
cent..	Dplx...	motor.	1200	14	Zenith..	grav..	d-d..	B-Lipe.	selec..	B-Lipe.	amid.	4	worm.	Timkn	9.25	sprgs..	sprgs..	Mth..	int-r-w..	int-r-w	l...	Lavn..	ctr..	fab..	Spicer..	Koehler ....MT
.....	....	....	....	..	Stmbg..	vac...	d-d..	Covert.	selec..	Covert.	amid.	4	worm	Empire.	7.25	sprgs..	sprgs..	Coop..	int-r-w.	int-r-w	l...	Ross..	ctr..	fab.	Sneed.	Patriot ... Lincoln
.....	....	...	....	.	......	vac.	d-d..	Covert.	selec...	Covert.	amid..	4	worm	Empire	10.66	sprgs..	sprgs..	Coop..	ext-r-w..	int-r-w	l...	Ross..	ctr..	fab..	Sneed..	Patriot ..... Washington
cent..	Hink..	motor	1400	..	Stmbg..	grv..	d-p..	own...	selec...	own...	amid.	4	worm.	own...	7.75	sprgs..	sprgs..	own...	int-r-w.	int-r-w	l...	own...	ctr..	fab*..	Therm*	Reynolds ....
cent..	Hink..	motor	1400	.	Stmbg..	grv .	d-p..	own...	selec..	own...	amid.	4	worm.	own...	7.75	sprgs..	sprgs..	own...	int-r-w.	int-r-w	l...	own...	ctr..	fab*..	Therm*	Reynolds ....
cent..	Hink...	motor.	1400		Stmbg..	grv...	d-p..	own...	selec...	own...	amid.	4	worm	own...	8.75	sprgs..	sprgs..	own...	int-r-w.	int-r-w	l...	own...	ctr..	fab*..	Therm*	Reynolds ....
cent..	Hink...	motor.	1400	..	Stmbg..	grv..	d-p..	own...	selec...	own...	amid..	4	worm.	own...	10.25	sprgs..	sprgs..	own...	int-r-w..	int-r-w	l...	own...	ctr..	fab*..	Therm*	Reynolds ....

ABBREVIATIONS—Makers of Parts—(Continued)—

Detrt—Detroit G. & M.
Ditw—Ditwiler Mfg. Co.
Dneto—Dyneto
Drt—Detroit Pressed Steel Co.
Dtr—Detroit Products
Dtrt—Detroit Lubricator
Dun—Dunbar Mfg. Co.
Dur—Durston Gear Corp.
E&M—English & Mersick
E&O—Eberly & Orris
Eismn—Eisemann
Ens—Ensign Carburetor
Eric—Ericsson Mfg. Co.
Eurk—Eureka
F&H—French & Hecht
FAC—F. A. Chapper
Fed—Fedders
Flx—Flexo Mfg. Co.
Frank—Francke Co.
G&D—Gray & Davis
G&O—G & O Mfg. Co.
GCS—Garden City Springs
Gem—Gemmer
G-Lees—Grant-Lees
Grn—Greens Car Wheel
H&D—Hoopes Bros. & Darlington
Har—Harrison
Hart—Hartford
Harv—Harvey
Hay—Hayes Wheel Co.
Her—Hercules
Hig—Higgins
Hink—Hinkley
Hol—Holley
H-Shaw—Hele-Shaw-
H-S—Herschell-Spillman
Hyd—Hydraulic
Idl—Ideal
Ind—Indestructible
Iron—Iron City
Jacox—Jackson-Church-Wilcox
Jck—Jackson Auto
Jms—Jamestown
Jns—Phineas Jones & Co.
John—Johnson Co.
Kal—Kalamazon
Kel—Kelsey Wheel Co.
Ken—Kenosha
Knz—Kuntz
Lavn—Lavine
LeR—Le Roi
Lght—Light Mfg. Co.
L-N—Leece-Neville Co.
Lng—Long
Lvgn—Livingston
Lyc—Lycoming
Marvl—Marvel
Mas—F. C. Mason & Co.
Mast—Master
McCn—McCanna
M&E—Merchant & Evans
McC—McCord
Mech—Mechanics Mach. Co.
Merl—Merrill Spring Co.
Miller—H. A. Miller
Mnrch—Monarch
Mod—Modine Mfg. Co.
Mot—Mott Wheel Wks.
M-R—Marlin-Rockwell
MSC—Massillon
Mth—Mather
Mut—Mutual Wheel Co.
Nat—National Spring
Natl—National Can Co.
N-E—North East
Nich—Nichols Elec. Co.
P&B—Parish & Bingham
Perk—Perkins
Pet—Peters Mach. Co.
Pfx—Perfex Radiator
Phil—Philadelphia
Phro—Pharo Mfg. Co.
Prsh—Parish Mfg. Co.
Prud—Prudden
Rayfld—Rayfield
Rem—Remy
Rowl—Wm. H. Rowland
Roy—Royer Wheel Co.
R-T—Rome-Turney
Rugl—Ruggles
Rus—Russel Car & Fdry.
Russl—Russel Axle Co.
Rut—Rutenber
R&V—Root & VanDervoort
Sag—Saginaw
Sal—Salisbury
Savg—Savage Arms
Sch—Schwarz Wheel Co.
Schblr—Schebler
Shel—Sheldon
Simp—Simplex
S-J—Shotwell-Johnson
S-M—Stand. Malleable
Smh—A. O. Smith
Sth—Smith Steel Wheel
S-P—Standard Parts Co.
Spltf—Splitdorf
Sp-P—Spring Perch Co.
Stan—Standard Radiator
Stand—Standard Steel Spring Co.
Sterl—Sterling Bearings
Stmbg—Stromberg
Stn—Standard Wheel Co.
S-W—Sparks-Withington
Sum—Sumter Elec. Co.
Therm—Thermold
Timkn—Timken
Torbn—Torbensen
Tuth—Tuthill
Unlvl—Universal Prdts.
Unv—Universal
Unvsl—Universal Mach.
U. S.—U. S. Spring Co.
Wag—Wagner
Warn—Warner
Wau—Waukesha
West—Westinghouse
Wil-B—Wilcox Bennett
Wis—Wisconsin Parts
W-L—Ward-Leonard
W&L—Waterhouse & Lester Co.
Way—Wayne Wheel Co.
Wol—Wohlrab
Wsc—Wisconsin
Yng—Youngstown Pressed Steel Co.

If You Own Fords, Read This Story

How to Prevent Breaking Ford Crankcases

DAIRY SOLVES PROBLEM BY SIMPLE DEVICE

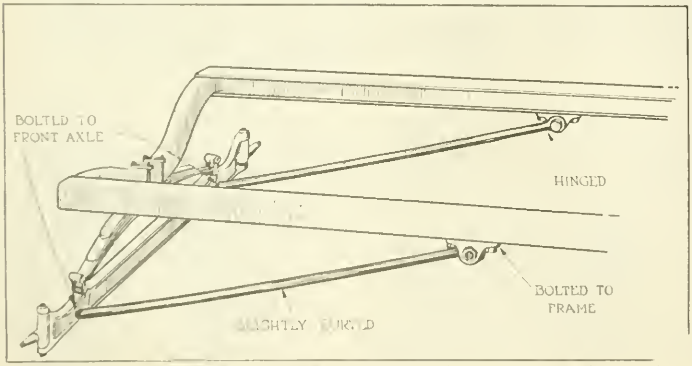
IF you operate Ford 1-ton trucks and are troubled with the breaking of the engine crankcases or engine support brackets, the simple device shown on this page will help you to overcome your difficulty. It is employed on the fleet of ten Ford 1-ton trucks used by the Wawa Dairy Farms, Philadelphia. In the 6 weeks in which these devices have been used, not one chankcase has been broken. Before the device was used, the breakage of the crackcases sometimes reached four a month on the fleet of ten Fords.

The Fords of the Wawa company are used to deliver milk every day in the week over routes which average 35 miles in length. They are not overloaded in that their load is but 2000 lbs. including thirty-three milk cases and 100 lbs. of icing. In winter the load is even less, for little or no ice is used if the temperature is around the freezing point.

Easy to Make

At first the breaking of the crankcases could not be accounted for until it was decided that the crankcases of the usual type were not strong enough or rather too brittle to stand the sudden and frequent shocks and to run over the 35-mile routes every day. The sum and substance of the verdict of the men and management is: "The Ford crankcase will not stand the pounding and keep whole."

The device, as shown in the sketch below, is easy to make and as easy to install. It is made up of rods much like radius rods on the average truck except that they are attached to the front axle instead of the rear. The front ends of the rods are bolted to the front axle while the rear ends are hinged to the frame at a point just in back of the engine support by means of two clamps, one bolted to the under side of the frame flange on either side. The two side rods are parallel with the frame and help to transmit road shocks to the frame instead of to the engine.



Sketch of the device used on the Wawa 1-ton Fords to prevent engine crankcase breakage The device is easy to make and to install

Using a Ramp to Save Time

(*Continued from page* 499)

men has been reduced to a minimum. The square and roomy layout of the shipping room obviates the necessity of the men getting in each other's way while at work.

Loading the Trucks

In the illustration at the bottom of page 499, part of the Thibaut truck fleet is shown drawn up in front of the shipping room, which is at the side of the retail store entrance on the right. It would have been possible for the company to build an indoor loading platform at the shipping room entrance. This, however, would have necessitated backing the trucks across the sidewalk in a main street, and would have entailed endless difficulties. Moreover, the goods handled are not highly perishable and when wrapped are not affected by being slightly wet. In heavy rain the tarpaulins are let down on the sides of the truck and small hand tarpaulins are drawn over the hand trucks when they are being pushed to the tailgates of the trucks.

For the loading itself, three assistants are maintained in the shipping room all the time, and these men load each truck rapidly and efficiently from the orders, according to the sequence of delivery. The orders corresponding to the goods on the truck are then handed to the driver and he is ready to start on his route. The goods for a single truck are loaded by the assistants onto hand trucks, unless already on these, and pushed down the shipping room ramp to the sidewalk and the truck tailgate. The trucks are loaded each morning with goods ordered the previous day. This practice of getting all of the loads ready the night before saves considerable of the driver's time and also helps to reduce the idle standing time of the truck during the loading operatoin. This is of the greatest importance because it oftimes enables one of the trucks to make extra trips without having to work overtime.

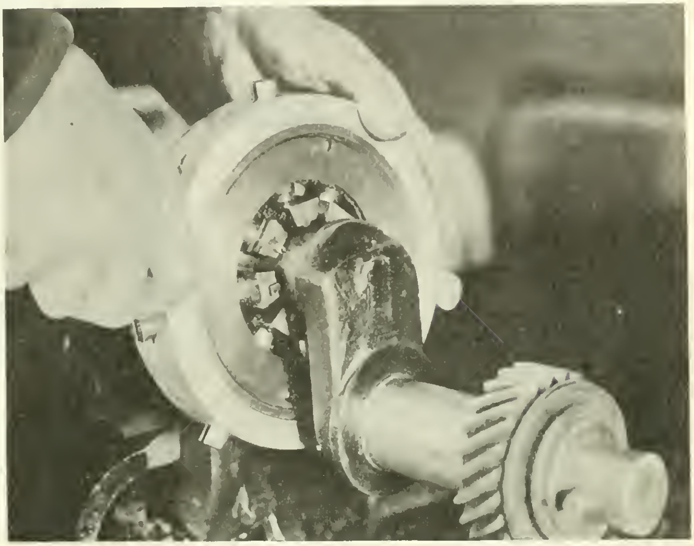
New Parts and Accessories At the Show

(Continued from page 494)

American Machine Co., Newark, Del., this practice is changed, in that the power shafts are located within the hollow carrying member. The load-carrying member or axle housing is made of malleable iron, and is of box girder construction. It is a one-piece casting, of extreme stiffness, extending from hub to hub, the wheels being carried on detachable spindles of chrome vanadium steel.

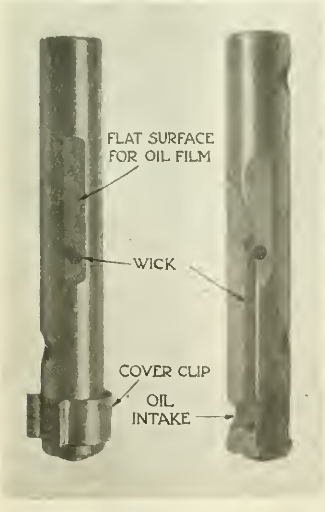
In the new Thomson axle, made by the John Thomson Press Co., New York City, the housing is a one-piece malleable casting with longitudinal ribs placed to give maximum strength with minimum weight. In tests under hydraulic presses when supported on spring pads, 60 to 75 tons' pressure at the center was required to spring the 2-ton housing ½ in. The differential housing is an assembled, well-contained unit, carrying the worm and worm gear.

On account of the straight line and parallel shaft drive used in the Three Point truck, the designers of that truck have been given the opportunity of using three-ply fabric disc universal joints on the driveshaft between the gearset and the rear axle. As a result, no attention is needed to the lubrication of these joints. There are no metallic joints or splined fittings, or any bearings to be lubricated.



The Peters grinder removes only the high spots on a crankpin that is out of round. The tool is split and hinged. The price is $75.

The feature of the Peters grinder, made by the Aluminum Brazing Solder Co., Philadelphia, is that it is so constructed that it removes only the high spots on a crankpin that is out of round, thus saving metal in the shaft with a resultant greater strength and considerably reducing the necessity for rebabbitting. The tool is split and hinged so that it can be put on and taken off the pin. The cutters are operated by a screw plate which moves all of them in or out at the same time and to the same amount. There are eight silver steel cutters which are ground at the ends to allow for the fillet. The cutters extend far enough to prevent chips from clogging and scratching the surface of the pin. The price is $75.



The Gramm-Bernstein wick oilers in the spring bolts.

The Alemite lubricating system, used on the Master trucks.

Truck Show Resume

(Continued from page 487)

siderable attention because the oil was carried through hollow truss rods and radius rods.

Two other products of interest to the fleet owner and shown for the first time at the show were an aluminum truck wheel and a new metal for rear axle worm wheels. The new light weight aluminum wheel is called the Lynite, is made by the Aluminum Castings Co., Cleveland, and weighs less than half of other forms of previous metal wheels. The new substance for worm wheels is called Huron metal and has been developed by the Bausch Machine Tool Co., Springfield, Mass. A claim is made that worm wheels of Huron metal will greatly outlast those of the bronze variety.

Better Truck Repair and Maintenance

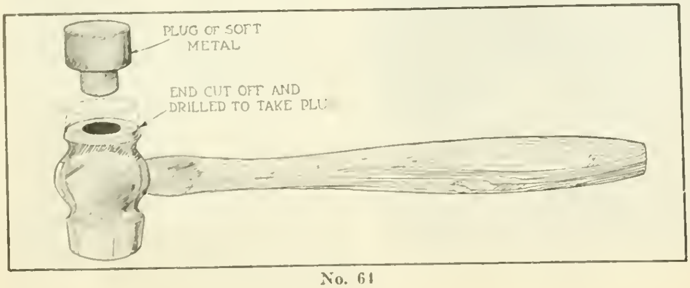
TO help motor truck owners and operators to save money in the maintenance and repair of their trucks. THE COMMERCIAL VEHICLE *prints on these two pages better methods of maintaining trucks and the latest ideas in making quick repairs.*

—

THE COMMERCIAL VEHICLE will pay $1 for each new idea which it accepts on better truck maintenance or good repair jobs you have made, or as much above that amount as the idea is worth. Simply tell us exactly how it is done and send a rough pencil sketch showing clearly the method employed or the device used.

No. 64—Making a Soft Metal Hammer

THERE are many occasions in motor truck repair shop work when the use of a soft metal rather than a hard metal hammer is much more convenient if not absolutely essential. Such a hammer may easily be constructed by softening one head of a double-headed hard hammer. This softened head should then be cut off with a hacksaw and a hole drilled in the hammer surface so left. This hole should be square shouldered and drilled about ½ in. deep. A plug of soft metal should then be made, with a lug which will fit tightly into the hole drilled in the hammer. In this way the hammer is fitted with one soft face and one hard face. The soft metal used may be lead, copper or brass. It can easily be replaced when worn down.—*Motor World*—J. H. MOORE, Toronto, Can.

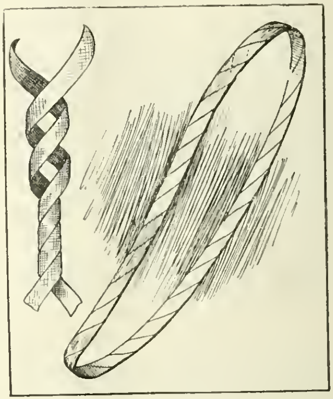


No. 64

No. 65—How to Replace a Broken Fan Belt

TRUCK drivers on long runs often have to struggle with a broken fan belt, cutting new holes in the leather and endeavoring to connect the broken ends with bits of copper wire. This is not always possible, however, and as a great deal of damage may be done, especially in hot weather if the truck is run without a fan belt, the driver has to risk this damage or sit down and wait until someone at the shop comes to his rescue with a new fan belt.

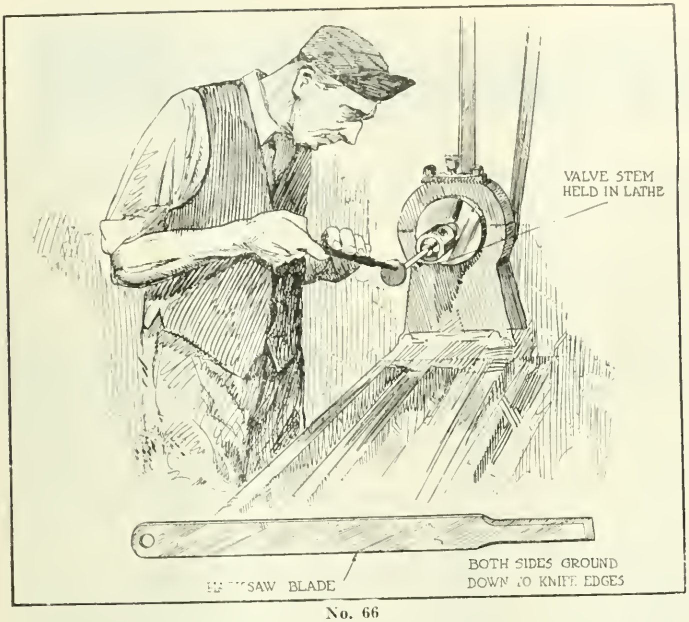
However, mending the old belt is not the driver's only resource in a case of this kind. He should supply himself with plenty of electrical tape which should be carried always in the tool box. In order to replace a broken belt he can cut off two lengths of this tape, each a little longer than the broken belt. These lengths should be twisted together in the manner shown in the accompanying illustration. The two ends of each section of the tape should meet as far as possible away from the junction of the ends of the other section of tape, so that the middle of each section supports the junction of the other. When the belt is twisted into a complete whole, with the ends of each section overlapping each other slightly and pressed tightly together, the whole should be dusted over with French chalk so that the tape will not stick to the shafts on which it plays. Ordinary road dirt may be used for this purpose if no chalk is available. An emergency belt, constructed in this manner, will be found to serve until the driver has finished his route, or until another belt can be obtained.—*Motor World*—J. J. MCINTYRE, Bridgeport, Conn.



No. 65

No. 66—Cleaning Engine Valves in a Lathe

HOW often have you chipped and scraped away at the scaly carbon deposit on the upper surface of the engine valves when overhauling and cleaning a truck engine? Many mechanics fix the valves to be cleaned in a vise, gripped not too tightly so that there is no tendency to flatten the



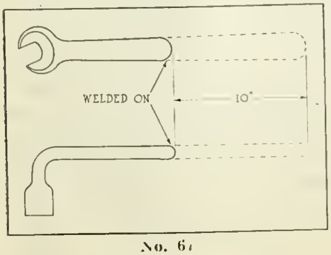
No. 66

valve stems. The result is an effort to get a good scraping purchase on a somewhat wobbly surface. Moreover, unless the valve is constantly loosened and refastened in the vise, which takes time, you have to move all around it in order to get at every part of the surface.

In order to save all this trouble and inconvenience it is only necessary to fix the valve to be cleaned into the chuck of a lathe or a drill press, the head of the valve being left in the air. With lathe or drill press in motion and the head of the valve revolving rapidly, it is a simple matter to scrape all dirt and carbon from the head evenly and entirely by holding a tool against the head while it is revolving. An old hacksaw blade, ground down on both sides at one end, makes a convenient tool for this purpose. Failing this, any mechanic can adapt any spare tool.—*Motor World*—BUICK MOTOR CO., New York City.

No. 67—Longer Wrenches Used on Spring Clips

THE usual offset socket wrench and engineer's single-end wrench, while satisfactory for most purposes, are too short in the handle for convenient use on spring clips. The accompanying illustration suggests a simple method of transforming standard wrenches into ideal spring clip wrenches. To the ends of the handles of each type of wrench should be welded additional metal sufficient to increase the length of the handle by 10 in. With this additional length of handle, the wrench will be found entirely convenient for use on spring clip bolts and nuts. The cost of welding these extra lengths on the wrench handles is inconsiderable, while the cost of replacing a broken spring leaf is very much the reverse.—GEORGE HERON, The Boston Store, Chicago.



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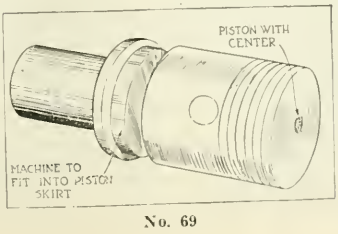
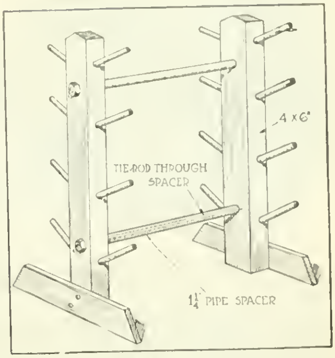


No. 69



No. 68

No. 68—Rack for Holding Rods, Pipes, Etc.

IN truck garages in which such material as spring steel, rods, shafts, etc., is kept on hand, it is often a problem to avoid piling this material on the garage floor because of lack of proper storage facilities. A handy rack for storing this material is made from two wooden uprights with 1¼-in. pipe spacers, the uprights being provided with cross foot pieces to prevent them from falling over. Holes are bored at intervals in the sides of the uprights, these holes being at an angle and filled with short pipe plugs. Pieces of pipe and shafts, rods, exhaust pipes, etc., are then laid on these pipes, extending from one upright to the other.—*Motor World*, R. FOREST, Syracuse, N. Y.

No. 69—Machining Pistons Fitted with Centers

AN old crankshaft flange end or or an axle shaft flange end will be found very handy when it is desired to machine a piston which is fitted with a center. The old crankshaft or axle shaft with a flange should be machined down on one side and square shouldered to fit into the piston skirt as shown in the accompanying illustration. The other side can then be attached to the spindle by means of the lathe dog. The far end is then centered in the lathe and the piston is in position and is held firmly for machining. The largest part of the flange plate should not be greater in diameter than is the piston, so that the entire surface of the piston may be machined without cutting into the plate.—GEORGE HERON, The Boston Store, Chicago.

The Editor's Viewpoint

Get Your Odometers

IT is impossible to keep any kind of motor truck costs unless each truck in a fleet is equipped with a hub odometer, a speedometer or other mileage measuring device. It is just as important to know the mileage covered by a truck as it is to know the tonnage carried. These two factors, mileage and tonnage, are the fundamentals upon which any reliable set of cost figures must be based.

Unfortunately, many fleet owners who pride themselves on knowing the cost of their truck operation, prefer to guess at the daily truck mileage instead of knowing it accurately. This is a great mistake because with any question about the accurate mileage, set of cost figures so determined is open to suspicion.

As an example, the cost per ton carried is no fair indication of the truck's work ability unless the distance which the goods are moved is known. If a 4-ton truck costing $11.64 a day to operate, exclusive of any general overhead expense as supervision, office cost, advertising, etc., covers a daily mileage of 25, it would show a cost per ton of $2.91, provided a full 4-ton load was delivered on the full 25-mile trip. If, however, the truck made a 100-mile trip, the corresponding cost per day would be increased to $24.77. If the same 4 tons were carried on this 100-mile trip, the cost per ton would be $6.19, thus showing that the cost per ton is no good indication of the truck work unless the mileage is also taken into account.

The determination of the correct truck mileage is also of importance in figuring items other than the total truck cost per day or the cost per mile. No good judgment can be passed on the wearing quality of pneumatic or solid tires unless the actual mileage run is known. It is not good enough to guess at the mileage.

There are several reliable makes of truck mileage measuring devices on the market and no fleet owner really desirous of knowing what it costs to deliver goods by trucks can afford to be without one of them on each of his trucks.

Preventing Spring Breakage

MORE truck springs are broken because of improper lubrication of the spring bolts and shackles than because of imperfections in the spring leaves, sudden shocks or overloading. Improper lubrication of these parts may be due to a great many causes. When the grease cups or oil cups fitted have to be turned up or filled daily, the driver may neglect this work unless the maintenance superintendent makes it a special point to see that it is done.

One of the most important developments from a close examination of the chasis exhibited at the recent New York truck show was the large number of vehicles equipped with a new form of magazine oiling system with resevoirs sufficiently large to hold enough oil for 2 months' lubrication. With such a system, the work of the driver or the man in charge of the spring bolt lubrication is greatly reduced.

Many fleet owners have neglected spring bolt and shackle lubrication because they have not readily understood the tremendous strains which the spring bolts and shackles have to sustain, especially with Hotchkiss driven trucks in which the springs are called upon to take the torque and propulsion in addition to carrying the load. It is not generally known that the bearing pressure on the projected area of spring bolts and shackles is equal to the pressure on the main engine bearings.

This in a measure helps to explain the rapid growth of the magazine oiling system in which wicks are employed to feed the oil to the bearings by capillary attraction only when the truck is in motion. Owners who have experienced any trouble with this form of oiling can probably trace it to the wicks being too loose in the hollow passageways. If they will make these wicks fit snugly, they can overcome any tendency of the oil to feed too rapidly.

The Fleet Owners' Forum

Load Measurers Made by Two Concerns

To the Editor, Commercial Vehicle:

Will you please give us the names and addresses of concerns which manufacture apparatus for determining the amount of load carried in a motor truck body?—S. A. M., New York City.

The two following concerns manufacture load indicating devices:

Loadometer Co., Baltimore, Md.;
Cammen Laboratories, New York City.

The Loadometer was described and illustrated on page 32 of The Commercial Vehicle for July 15, 1918. The Carsafe load governor as made by the Cammen Laboratories was described and illustrated on pages 38 and 39 of The Commercial Vehicle for June 1, 1919. Both of these devices indicate the load carried through the use of the principle that the deflection of the load springs is in proportion to the load carried.

The Loadometer consists of three main parts, including one part attached to the under side of the truck body with a cable attached to the rear axle; a battery and voltmeter casing mounted on the dash and an electrical connection carried in a flexible metal conduit between the two parts. The cable is wound up as the chassis drops nearer the ground when the load is applied, and this revolves a contact arm on the rheostat so that the resistance of the rheostat is increased or decreased according to the distance between the chassis and the rear axle. This resistance is then shown and converted into tons capacity on the voltmeter dial by means of an electrical contact provided between the rheostat and the voltmeter by closing the circuit through a push button switch.

While the Carsafe device registers through the deflection of the springs, the registering is obtained through the means of a special shackle. In addition, the device is equipped with a circuit breaker to cut out the ignition current when any load is placed on the truck which is in excess of that which should be carried.

The use of either of these two devices will enable motor truck owners to determine accurately the loads carried on their trucks. This is a step in the right direction to prevent overloading which is perhaps most aptly expressed as a sure means of motor truck suicide.

Devoted to topics pertinent to commercial vehicle operation, design and maintenance. Open to the use of all readers. Communications must be accompanied by the sender's name and address, confidential if preferred. No charge is ever made for this service.

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Bus Stories Published Recently in This Magazine

To the Editor, Commercial Vehicle:

Will you give us a list of articles which have appeared in The Commercial Vehicle recently which deal with the subject of bus installations.—Paige & Jones Chemical Co., Hammond, Ind.

Several articles on the operation of bus lines have been published in The Commercial Vehicle. A short synopsis of these articles, together with the dates when they were published is given below:

Five-Year-Old Rural Motor Truck Express Line Is Still Paying Good Dividends, Sept. 15, 1918, pages 5 to 7. The successful operation of a passenger bus line running between Guiderland and Albany, N. Y., is told of in this article. This bus line is operated on a three-trip-a-day schedule, and carries on the average of 100 passengers during the course of a day.

Three-Story Garage of Fifth Avenue Coach Co. Has No Elevators, March 15, 1919, pages 16 to 21. The layout of the garage and the methods employed in the garage of the Fifth Avenue Coach Co., New York City, are given in detail in this article.

One of the Big 8 in Truck Operation, Gasoline, June 1, 1919. The Commercial Vehicle published a series of eight articles on the eight essentials in truck operation and the method used by the Fifth Avenue Coach Co. to conserve gasoline is told of in this article.

How One Fleet Owner Saved $6,000 in Gasoline in 10 Weeks, Sept. 15, 1919, pages 128 to 130. The Fifth Avenue Coach Co. held a contest among its drivers for saving gasoline. This contest is told of in the above-mentioned article. This article also tells how the interest of the drivers can be kept to a high pitch by changing the form of the contest.

Motor Truck Odometer Made by Veeder Co.

To the Editor, Commercial Vehicle:

In reading over the article entitled "Three Companies Making Hub Odometers," as published on page 432 of The Commercial Vehicle for December 15, 1919, I notice that no mention is made of the Veeder Mfg. Co., Hartford, Conn., as a maker of odometers for motor trucks. Will you please tell me if the Veeder company is still manufacturing motor truck hub odometers?—J. Schaefer, New York City.

The Veeder Mfg. Co., Hartford, Conn., is still manufacturing hub odometers for motor trucks, and the fact that its name was omitted from the list published in the article referred to above was an oversight. We are glad to make this correction so that fleet owners desirous of purchasing hub odometers may know that the Veeder company is still offering such a device.

Bearing Pressures On Spring Bolts

To the Editor, Commercial Vehicle:

In a recent issue of The Commercial Vehicle I noticed the statement that the bearing pressures on spring bolts and shackles were equal to the pressures on the main engine bearings. Will you please explain how these spring pressures are calculated and show how this pressure is equal to that on the main engine bearings. I also noticed in the same connection that mention was made of a new magazine oiling system designed to prevent some of the previous lubricating difficulties with spring bolts and shackles. Will you please give me the name of the manufacturer of this magazine oiling system, and if possible the names of the trucks on which it is used?—J. B., New York City.

The answers to your questions in the order given are as follows:

1—The bearing pressure on spring bolts or shackle pins is calculated on the projected area of the pin. The pressure on the main engine bearing varies from 600 lb. to 1000 lb. per square inch. To show how the bearing pressure on the spring bolts and shackles is equal to this amount, take the example of a 5-ton truck, which weighs approximately 20,000 lb. complete, including chassis, body and load. While the unsprung weight of front and rear axles, springs and wheels should rightfully be deducted from this total of the weight supported on the [illegible] it can be counterbalanced for the sake of simplicity by any possible overloads which might be carried by the truck. With four spring bolts or shackles on each side of the truck there are eight bearings in all. Dividing the 20,000 lb. total weight by 8 gives a total weight supported, per pin, of 2,500 lb. If each pin is 1 in. in diameter and 4 in. long, it has a projected area of 4 sq. in. obtained by multiplying the pin diameter by its length, or 1 × 4. Dividing the 2,500 lb. load per pin by 4 gives a unit bearing pressure of approximately 600 lb. to the square inch. If the size of the pin is decreased in either dimension this unit pressure is naturally increased and on some trucks reaches as high as 1000 lb. for the square inch. When the high pressures which the spring bolts and shackles have to withstand is better understood, fleet owners will undobutedly pay more attention to the lubrication of these parts.

2—The magazine oiling system mentioned is that developed by Cornelius T. Myers, a consulting engineer of Avenel, N. J., and first used on the Class B war truck. The Myers magazine system of oiling is patented, and the Chassis Lubricating Co., Inc., New York City, has been organized to co-operate with truck engineers to work up designs of the system for particular chassis.

3—Trucks on which the Myers magazine oiling system is used include the Class B war truck, the Fageol truck, two Ward LaFrance models, two Bethlehem chassis, two Service trucks and one Diamond-T chassis.

Successful Delivery, Cost and Bonus Systems

To the Editor, COMMERCIAL VEHICLE:

Will you kindly give us a list of articles which have been published in THE COMMERCIAL VEHICLE from time to time regarding cost systems, bonus systems and delivery systems which have been found satisfactory in operation.—J. Van Orsdale, Philadelphia, Pa.

Below is a list of articles which have been published in THE COMMERCIAL VEHICLE on the three topics mentioned in your letter. Each group of articles is listed under its special head.

BONUS SYSTEMS

Oct. 15, 1919, A Square Deal Basis of Successful Bonus System for Drivers, pages 5 to 9.

Oct. 1, 1918, Good Truck Drivers Must Be Paid Good Wages in Order to Remain Good Truck Drivers, pages 22 and 23.

Jan. 1, 1919, How to Hire Motor Truck Drivers to Insure Reasonable Degree of Success, pages 34 and 35.

Sept. 1, 1919, How to Train Your Truck Drivers, giving discussions of the value of: 1—Bonus Systems; 2—Closed Cabs; 3—Vacations; 4—Overtime Pay; 5—Clean Garages; 6—Clean Trucks; 7—Commissions; 8—Driver Partnerships; 9—Weekly Meetings, pages 102 and 103.

Sept. 15, 1919, How One Fleet Owner Saved $6,000 in Gasoline in 10 Weeks, Results Obtained Through Contest Made Up in Form of Baseball Game to Get and Hold Drivers' Interest, pages 128, 129 and 130.

DELIVERY SYSTEMS

Dec. 15, 1917, Trucks Save Pittsburgh Coal Dealer $37,000 in About 3 Years, pages 5 and 9.

Nov. 1, 1918, Cost of Savannah Package Delivery Is Reduced 25 Per Cent by Co-operative System, pages 43 to 46.

Dec. 1, 1918, Southwestern Dry Goods Store Finds Own Trucks Superior to Delivery by Contract, pages 5 to 8.

June 1, 1919, Simple Method of Charging the Department Store Delivery Cost to Various Departments, pages 28 to 31.

June 1, 1919, Trucks Make Possible Direct Deliveries of Cooked Delicatessen Products, pages 5 to 9.

July 1, 1919, Problems Which the Fleet Owner Doing Overland Haulage Work Must Solve, pages 5 to 7.

Aug. 15, 1919, 3 Ways to Truck Success, pages 41 to 43 and 70.

Sept. 1, 1919, Installing Trucks in Package Deliveries, pages 88 and 89.

Sept. 1, 1919, Delivering Bread by Trucks on the Zone System, pages 96 to 98.

Sept. 15, 1919, How to Handle Peak Loads in Department Store Deliveries, pages 126 and 127.

Sept. 15, 1919, How a Paving Contractor Solved the Problems of: 1—Preventing Body Leakage of Hot Asphalt; 2—Dispatching His Trucks by Legible Numbering; 3—Keeping Drivers' Record Cards Clean; 4—Checking Drivers' Cards by Service Records, pages 136 to 139.

Oct. 1, 1919, System for Allocating Truck Loads, page 164. This story tells how the truck loads are made up the night before and how envelopes are used to give the drivers their instructions.

Oct. 1, 1919, Eliminating Sidewalk Loading Saves One Department Store Over $15,000 Yearly in Idle Truck Time, pages 174 and 175.

COST SYSTEMS

April 15, 1919, The Big 8 in Truck Operation, pages 26 to 28.

April 15, 1919, How Fleet Owners May Keep Their Motor Truck Costs in Simple Yet Adequate Manner, pages 32 and 33.

May 1, 1919, Motor Truck Costs May Be a Delusion if They Are Not Properly Obtained and Used, pages 28, 29 and 40.

June 1, 1919, What a Truck Cost System Will and Will Not Do, page 11.

Aug. 15, 1919, More About the Ton-Mile, pages 44, 45 and 57.

Sept. 15, 1919, How to Keep Motor Truck Costs, pages 121 to 123.

Useful Articles in Starting Drivers' School

To the Editor, COMMERCIAL VEHICLE:

We are contemplating starting a truck driver's school. We expect to give a 10 week's course for 1 night a week for the benefit of truck owners. As this is a new thing with us, we thought possibly you could give us some data by which we could outline the course of instruction which would cover a general knowledge of the upkeep of a truck.—B. B. Cameron, Wilmington, Del.

Below is a list of articles which we believe will prove helpful to you:

April 15, 1918, page 8, How to Train Your Truck Drivers. This is a story of how The Motor Haulage Co. trains its drivers.

May 1, 1918, pages 22 and 23, Government Outlines Course for Truck Drivers, tells of the course which is outlined in the bulletin of the Federal Bureau of Vocational Guidance on Emergency War Chauffeurs.

March 15, 1919, page 25, Two Cold Weather Hints for Motor Truck Owners. On this page devices for starting cold engines and preventing radiators from freezing are described.

April 15, 1919, pages 26, 27 and 28, The Big 8 in Truck Operation. In this article the eight big items of truck operation are given and in the following eight stories are elaborated upon:

May 1, 1919, One of the Big 8 in Truck Operation, the Driver, pages 24-25.

May 15, 1919, One of the Big 8 in Truck Operation, Tires, pages 24 to 27.

June 1, 1919, One of the Big 8 in Truck Operation, Gasoline, pages 24 to 27.

June 15, 1919, One of the Big 8 in Truck Operation, Overhauling, pages 26 to 30.

July 1, 1919, One of the Big 8 in Truck Operation, Depreciation, pages 10 and 11.

July 15, 1919, One of the Big 8 in Truck Operation, Insurance, pages 14 and 15.

August 1, 1919, One of the Big 8 in Truck Operation, Interest, pages 10 and 11.

August 15, 1919, Poor Garage Layout Causes Serious Truck Delays, Garage, pages 60 to 65.

March 1, 1919, pages 24 and 25. S. A. E. Discusses Truck Engineering—Use of Pneumatics—Maintaining Army Trucks. These are papers which were presented before the S. A. E. meeting.

June 15, 1919, page 25. Ask Your Drivers These Eight Questions. A list of eight questions which the driver of any truck should be able to answer and the answers to which every driver trained at the Packard school must know.

July 15, 1919, page 9, It Pays to Take Off Tires When Worn Down to 1 Inch of Rim. The proper time to remove a solid tire is told in this story.

Sept. 1, 1919, pages 84, 85 and 98. Five Ways to Buy Oil. Methods for testing oil are given in this comprehensive article.

Sept. 1, 1919, pages 102 and 103, How to Train Your Truck Drivers. This story discusses the value of bonus systems, closed cabs, vacations, overtime pay, clean garages, clean trucks, commissions, driver partnerships and weekly meetings.

Oct. 1, 1919, pages 161, 162, 163 and 181. Maintenance Charts Insure Proper Truck Inspection. A story on the Atlantic & Pacific Tea Co.'s trucks and the methods by which they are operated and maintained.

Oct. 1, 1919, pages 176, 177 and 178. Cold Weather Hints in Truck Operation. Methods by which the fleet owner can save time and money and avoid much worry are outlined.

Oct. 15, 1919, pages 212-214. Cold Weather Hints in Truck Operation. The care of the cooling and lubricating systems is outlined.

Essential Features in Determining Bonus System

To the Editor, COMMERCIAL VEHICLE:

We are thinking about giving a bonus to the truck drivers who can secure the lowest cost per ton-mile. We would be glad if you could tell us of any bonus systems which are being operated successfully to-day.

We operate nine trucks of 1-, 1½-, 2-, 2½-, 3-, 3½-, 5- and two 4-ton capacities. We should like to have a system which would be fair to the drivers of all of these trucks.—HOWARD CO., New Haven, Conn.

First of all, it is evident that no one bonus system can be applied to your different sized trucks if they are engaged in different classes of work. However, you do not tell us what work your trucks are engaged in, so we will assume that they are all doing the same kind of work.

One of the first requisites of any successful bonus system is that it be fair to all of the drivers. The items which should be taken under consideration in the determination of a bonus system are of course settled to some extent by the particular business in which the trucks are engaged.

In determining upon a bonus system it is absolutely necessary to include only items which are under the driver's control. The items for which the driver is responsible to a large extent and which therefore should be included in the total cost used in a bonus system to determine truck efficiency are: 1—Miles traveled; 2—Pounds, tons or packages carried; 3—Time consumed; 4—Wages of driver and helper, if any; 5—Tire expense; 6—Maintenance and repair expenses; 7—Cost of gasoline, oil, grease and waste; 8—Time in service, and 9—Time waiting for loading and unloading. While several of these items are only contributory to the determination of the final cost, they have some effect upon it and should therefore be considered.

A system which was installed by a large axle company and which has proved successful was this: The company determined a standard cost per commercial ton-mile and then established a maximum cost per commercial ton-mile slightly in excess of the standard cost. The drivers and helpers were then offered a bonus of 50 per cent of the savings they could effect between the standard cost per ton-mile and the maximum cost. The efficiency of the truck performance was then determined easily by dividing the standard cost per commercial ton-mile by the actual cost.

Another bonus system in use is that of a large department store in Newark, N. J. That concern uses three makes of trucks, electrics for city work; 800-pound converted passenger cars for parcel work within a 10-mile radius of the store and 2-ton trucks for package and furniture deliveries beyond the 10-mile circle. Three separate prizes are offered, one for each class of vehicle. The bonus in each case is awarded to the truck showing the lowest cost of maintenance, based on labor, material, tires and cost of repairs due to accidents. The bonuses are offered twice a year. The age of the vehicles is taken into consideration in determining who should receive the prizes. The percentage points given are shown in the table below.

	Trucks less Than 6 Months Old, Points	Trucks from 6 Months to 1 Year Old, Points	Trucks from 1 to 1½ Years Old, Points	Trucks from 1½ to 2 Years Old, Points
Labor	30	25	22½	20
Material	30	25	22½	20
Tires	25	25	25	25
Accidents	15	15	15	15
Total	100	90	85	80

For vehicles more than 2 years old, the percentage points charged to labor and material are reduced 1 per cent for every 6 months during the life of the vehicle.

In addition to the above bonus, the Newark department store also awards prizes for minimum number of days absent; minimum amount of broken merchandise; minimum amount of lost merchandise; minimum number of complaints received and neatness in personal appearance.

A New York department store has still a different method. Five men from among the ranks of the drivers and helpers themselves are chosen as a committee and they award the prizes for good deportment, personal appearance, number of complaints received, percentage of C. O. D. packages delivered, total number of packages delivered, merchandise damaged, condition of the truck, number of accidents or breakdowns, amount of gasoline or current consumed, absent without leave, number of times late, trips missed and the number of extra loads taken out. Awards are made in two sets, one monthly and the other each three months.

From the above you can see that it is evident that the truck user desirous of introducing a bonus system for his drivers should first of all make a complete study of the conditions under which his equipment must operate. If the system is to be based on cost of maintenance, he should first of all find the average cost of maintenance for each class and make of vehicle in each particular kind of work to determine what should be a fair maintenance cost in each case.

If the system is to be based on the tonnage or packages delivered and the mileage covered, the owner should make a time study of the trucks in each class over an extended period. He should determine the average actual running time and the standing time. The average mileage covered and the tonnage or packages delivered should also be determined and the basis for any bonus contemplated should be a unit which will take into account both the tonnage or packages delivered and the mileage, such as the commercial ton-mile or the package-mile.

Refrigerating Bodies Made on Special Order

To the Editor, COMMERCIAL VEHICLE:

Will you give us a list of companies which manufacture refrigerating bodies. —E. T., New York City.

Refrigerating bodies are made on special order but from time to time they have been described in THE COMMERCIAL VEHICLE in connection with a story of the fleet of trucks used by some butcher or provision company. A list of these articles is given below:

Trucks Make Possible Direct Deliveries of Cooked Delicatessen Products, June 1, 1919, pages 5 to 9. Pictures are shown of the bodies of the trucks used by the Otto Stahl provision company.

Fresh Meat Distributed Overland by Trucks, Jan. 1, 1919, page 33. The trucks of the Sullivan Packing Co., Detroit, and Morris & Co., Chicago, are illustrated.

All-Metal Construction in Columbia Jobs, July 15, 1918, page 24. This is a body which is specially furnished with hooks for hanging up meat and is made entirely of metal.

First "Hot Dog" Truck from California, Sept. 1, 1917. This truck is equipped with a stove, kitchen, ice box and six bunks.

Gasoline Prices Up 1 Cent in East

Wholesale Price 26½ Cents in New York and New England —Kerosene Higher

NEW YORK CITY, Jan. 16—Gasoline prices soared another cent a gallon in the New York and New England districts this week.

The Standard Oil Co. of New York has advanced the price to 26½ cents, wholesale. This is the second advance of 1 cent within a few days in these districts. In the first increase the entire Atlantic Seaboard, from New Jersey to Florida, was affected. The Standard Oil Co. of Indiana, the largest marketer of gasoline in the country, has not announced an advance in price yet.

The Texas Co. also announced an advance in gasoline of 1 cent a gallon in Alabama, Florida, Georgia and Mississippi. Kerosene prices were advanced 1 cent in the same district.

The increase is believed to be due to the fact that the refiners along the Atlantic seaboard have to buy their crude oil on a day-to-day basis and are not stocked with crude at former low prices.

Detroit Automotive School

DETROIT, Jan. 12—An automotive technical school to cover 15 acres and to cost $1,500,000 will be established in Detroit by the Michigan State Auto School. The institution, with a capacity of 5000 students, will be on Grand River Avenue and plans for the buildings have been completed. Separate buildings will be devoted to truck and engine mechanics, welding and tire repairing, according to Arthur G. Zeller, president of the school. Attendance at the Woodward Avenue school now is 1700 and the flood of applications from prospective students made expansion imperative. The new school will have two dormitories, each containing 600 rooms, a gymnasium, mess hall, administration building, garage, repair shop, power plant and other buildings for engine block tests.

Michigan Transport Course

ANN ARBOR, MICH., Jan 13—The University of Michigan has realized the need of good roads and their relation to highway transportation, and as a result, is the first one in the country to provide courses of instruction in highways transport engineering. Of particular interest to fleet owners is a short 1-week course in highways transport during the first week in February. This course is offered by the state of Michigan in the interests of the entire nation. Professor Arthur H. Blanchard is in charge of this course, which starts Feb. 2 and ends on Feb. 6.

A consideration of the following subjects will be included in the course:

1.—History of American transportation and rural development. English highway transport methods. Inter-relationship of highway, railway and waterway transportation. Inter-relationship of highway transport, good roads and rural development.

2.—American highway traffic legislation: National, state, county, township and municipal laws, covering speeds, weights and dimensions of motor trucks, trailers and motor buses.

3.—Fundamentals of highway engineering affecting economic highway transport, including: Administration of highway departments; traction and effects of different types of traffic on the several kinds of roads and pavements.

4.—American highway transport methods: Municipal haulage, rural motor express, return loads bureaus, plant and factory haulage, and army transport methods. Efficient methods of packing, handling, loading and unloading. Organization of motor haulage companies.

5.—Transport surveys, being investigations of highway routes, highway transport legislation, traffic regulations, rural and urban transportation opportunities.

6.—Motor truck, motor bus, tractor and trailer mechanism, operation, inspection, maintenance, repairs and cost data.

Philadelphia Mechanics' School

PHILADELPHIA, Jan. 12—A night course in truck repair work has been started by the Board of Public Education at the Frankford High School. The class meets three times a week. Practical and theoretical study will be taken up. The course consists of seventy-two lessons, and when it is over each student will have been taught how to assemble and disassemble engines, grind valves, etc.

Delivery Forms That Save Truck Time

(*Continued from page* 483)

the invoice, goes to the customer and insures him that the goods have been correctly shipped, in accordance with his instructions.

The Driver's Receipt

The second problem is solved still more simply. The driver's sheet, which appears at the top and to the right in the illustration, reads: "Received from the MacMillan Co.—In Good Condition." The driver obtains the consignee's (or shipping agent's) signature on this sheet, which thus protects the company against claims for damages caused by other shipping agencies.

Passenger - Carrying Buses Taxed $20

Vehicles Carrying Less Than Seven Passengers for Hire Are Taxed $10 a Year

WASHINGTON, Jan. 13—The special Federal tax applying to motor trucks used for carrying passengers for hire will be $20 for each truck used. The tax applies only to those trucks that have a seating capacity for more than seven persons. In computing seating capacity the driver's seat must be included. Another tax rate also applies to a person operating a hotel bus for carrying passengers between railroad stations and hotels if a separate charge is made for this service. The tax is $10 for each vehicle with a seating capacity for two and not more than seven passengers.

The special tax stamp issued must cover the total liability of the taxpayer at the time the stamp is taken out. If the taxpayer adds to the number of trucks he operates subsequent to the issuance of the stamp, he must pay the additional special tax at the increased rate for the balance of the fiscal year beginning with the first day of the month in which his tax liability was increased and ending the following June 30. Receipt for this payment will be evidenced with a form which must be posted with the special tax stamp in the taxpayer's place of business. The taxpayer does not incur an increased liability to tax if he replaces the vehicle with a new one unless the new vehicle has a larger seating capacity than the replaced one and is subject to the $20 tax.

Trucks on which the tax has been paid may be operated in any section of the United States as long as the owner of the truck remains the same. When the stamp is issued the engine number of the truck or trucks covered by the stamp are registered with the Internal Revenue Collector, who, in addition to issuing the stamp, will issue a receipt card for each truck which will bear a number corresponding to that of the engine of the truck for which issued. This receipt must be carried by the operator at all times.

Eaton Axle Starts Construction

CLEVELAND, Jan. 6—The internal gear-driven truck axle made by the Eaton Axle Co., this city, will be in production this summer. Work on its plant has been started.

36,488,447 Carried in 5th Ave. Buses

8,022,026 Miles Covered by 279 Buses During Year Ended June 30, 1919

NEW YORK CITY, Jan. 13—The Fifth Avenue Coach Co., in its report for the year ended June 30, 1919, showed a net income of $843,958.52 for the operation of its 279 buses in New York City. This exceeds the net income of the preceding year by $501,140.80. The buses carried 36,488,447 passengers over 8,022,026 miles. The increase in the number of passengers carried was 10,374,871 and in the number of miles covered 281,200. Forty more buses were operated than during the previous year. The annual report will be thoroughly analyzed for other bus owners in the Feb. 1 issue of THE COMMERCIAL VEHICLE.

Bumper Allowances on Insurance

NEW YORK CITY, Jan. 13—The use of bumpers on all types of automotive vehicles soon may be considered on a par with fire extinguishers with regard to insurance allowances.

The first step in this direction was taken recently by the Bankers & Shippers Insurance Co., New York City, in the announcement that a special indorsement, covering the use of bumpers on trucks would be attached to collision insurance, on request.

The indorsement provides allowances as follows:

Full Collision Coverage—Front bumper 10 per cent of collision premium. Front and rear bumper, 15 per cent of collision premium.

$50 Deductible Collision Coverage—Front bumper 5 per cent of collision premium. Front and rear bumper, 10 per cent of collision premium.

$100 Deductible Collision Coverage—Front bumper 2½ per cent of collision premium. Front and rear bumper, 5 per cent of collision premium.

To Build Truck Bodies

SUMMIT, PA., Jan. 13—Motor truck bodies will be manufactured by the Connell-Erben Body Corp., which will start production this month in a local plant.

Truck School at Mich. College

DETROIT, Jan. 9—A truck school will be conducted at the Michigan Agricultural College in February and March. The school will be conducted under the auspices of the farm mechanics department and a dozen different trucks will be used during the course. The first course will start Feb. 2 and the second March 1. Ignition, valve and spark timing, carburetor adjustments, brake and fuel consumption tests, etc., will be among the subjects discussed. Actual adjustments and repairs on trucks will be a part of the course.

S.A.E. to Discuss Pneumatics

CHICAGO, Jan. 12—A meeting of the Society of Automotive Engineers will be held on Jan. 28 at the Hotel LaSalle, Chicago, to discuss truck subjects. Among the papers tentatively scheduled for presentation at the meeting are the following: "Design of Pneumatic Tired Truck" by P. W. Litchfield, and "Effects of Tire Equipment on Truck Designs" by S. V. Norton.

Retail Delivery Ass'n Conference March 1

Delivery Equipment Used by Department Stores Will Be on Exhibition

NEW YORK CITY, Jan. 12—The Fourth Annual Conference of the International Retail Delivery Association will be held from March 1 to 4 at the Hotel Hollenden, Cleveland. One new feature of the conference this year will be the showing of exhibits of delivery equipment used outside of the department store as well as inside. The outside exhibits will include pictures, specifications and other data of motor trucks and the various parts and small accessories which are used in connection with motor trucks employed in department store service. The exhibits on inside equipment will include pictures and data on such materials as conveyors of various types, routing tables, etc.

A considerable portion of the time of the conference itself will be given over to the discussion of the use of motor trucks for delivery purposes. Joseph Husson, editor of THE COMMERCIAL VEHICLE, will present a paper, entitled "Your Duties to the Truck and Its Duties to You," at the morning session on March 3. Mr. Husson will discuss the following topics:

1—Purchasing the correct type; 2—Supervision of trucks; 3—Lubricating of trucks; 4—Inspection of trucks, and 5—The life of trucks.

In addition there will be papers tracing the package from the sales desk to the driver's route bin and other papers tracing it from the driver's route bin to the home of the purchaser.

Keeping Track of a 136-Truck Fleet

(*Continued from page* 482)

memorandum at the bottom from dirt. This visible catalog system is a patented outfit, called the C. O. C. Style Kardex, made by the American Kardex Co., of Tonawanda, N. Y., with sales branches at New York City, Boston, Philadelphia and Chicago.

As for the record board, of course it is purely a home-made affair, with the exception of the buttons. They looked around quite awhile before they found something that just suited them for this purpose. Finally they discovered saddle tacks, which they are using and think are just right. They have a head about ⅝ in. in diameter, and ⅛ in. thick. This is big enough to carry the painted code and number so that it can be seen easily at a distance of 6 or 8 ft. The thickness of the heads makes them easy to handle. Each head is firmly attached to a nail about 1¼ in. long and a little over 1/16 in. diameter. They can be purchased at saddlery stores.

The use of these records not only assists quick reference to desired information in the general files, but promotes the kind of knowledge of the extent and disposition of the fleet which makes it possible for those at the head office of the department to check any tendencies toward the purchasing and assigning of a larger number of trucks and cars of other types than are necessary for the essential motor transportation in the department or in any one of its divisions.

27 Trucking Firms in Big Merger

Depot System Established by U. S. Trucking Corp. of New York City

NEW YORK CITY, Jan. 12—A merger of 27 trucking companies under the firm name of the United States Trucking Corp. has been effected here. Both motor trucks and horse wagons will be used. The company is capitalized at $2,000,000. By the terms of the merger, the company comes under the control of the United States Distributing Corp., formed three months ago to operate forwarding interests in the coal, ice, and building material lines.

Three hundred motor trucks and about 3500 horses will be kept in service. No change in the rates charged for hauling is at present contemplated. The objects of the trucking concern, it is stated, are to better traffic conditions in New York and expedite the delivery and forwarding of goods. It is hoped that a considerable economy in labor and vehicles will be effected, for the separate concerns, it is explained, were suffering from unnecessary duplication in hauling work.

By the establishment of a system of depots in various parts of the city an effort will be made to do away with running trucks empty and the number of trucks and men employed will be reduced by a large percentage. The separate trucking companies taken over include the Meade Transfer Co., Oscar S. Brummer, Inc., Monahan's Express, Healey & Callahan, Edward F. Kelly, S. Hannon, Halvey Bros., H. L. Sweet, Daniel & Kennedy, D. Gilroy & Sons, J. Laurence, R. J. Mulligan, James F. Stanton, J. J. Sullivan, J. J. Gillan & Co., R. H. Thornberry, Matthew J. Sullivan, John F. Lange, P. Reardon, Inc., Paul Viani, Richard Fitzpatrick and Korwin Bros.

The president of the new organization is J. J. Riordan of Monahan's Express. The managing directors include J. S. Reardon of P. Reardon, Inc., W. J. McCormack of J. J. Gillan & Co., George Daniels of Daniels & Kennedy and Edward F. Kelly. G. F. Getz is chairman.

Steinmetz to Make Electric

NEW YORK CITY, Jan. 13—Charles P. Steinmetz, chief consulting engineer of the General Electric Co., Schenectady, and recognized as one of the world's greatest electrical men, has designed a new electric truck for light delivery and industrial plant use. In this new truck he is claimed to have eliminated excessive weight, increased the load carrying capacity as well as the operating radius and also reduced the operating cost. The Steinmetz Motor Car Corp. has been chartered with a capital of $2,000,000.

Myers Oiling System Patented

NEW YORK CITY, Jan. 12—Cornelius T. Myers has been granted a patent for his magazine oiling system for spring bolts and springs consisting of hollow shackles and brackets consisting of 2 months' of supply of oil which is fed by capillary attraction only when the truck is in motion. The system prevents moisture and dirt from getting into the pin bushings. The Chassis Lubricating Co., Inc., New York City, has been organized to cooperate with engineers in working up designs for particular chassis. Eight chassis exhibited at the show were equipped with the Myers magazine oiling system. These included two by the Ward La France Truck Co.; two by the Bethlehem Motors Corp.; two by the Service Motor Truck Co.; one by the Diamond-T Motor Car Co., and the well-known Class B Liberty truck chassis.

Scranton Concern Makes Bodies

SCRANTON, PA., Jan. 12—H. G. Smith & Bro. will manufacture truck bodies, wheels and springs, as well as carrying on a truck repair business in a new factory that will be opened in the near future.

Coming Events

Jan. 10-17.....	Philadelphia. Motor Truck Show, Commercial Museum Motor Truck Assn. of Philadelphia.
Jan. 17-24.....	Hartford, Conn., Motor Truck Show, State Armory. First Regiment, Connecticut State Guard.
Jan. 19-25.....	Milwaukee, Motor Truck Show.
Jan. 24-31.....	Chicago, Motor Truck Show, International Amphitheater, Stockyards
Jan. 29........	Chicago, Convention of National Highway Traffic Assn., International Amphitheater, Stockyards.
Feb. 9-14.....	Louisville, Ky., American Good Roads Congress.
Feb. 14-21....	Brooklyn, N. Y., Motor Truck Show, 23rd Regiment Armory.
Feb. 14-21....	Detroit, Motor Truck Show, Ford Service Bldg.
March 1-4....	Cleveland, Convention of International Retail Delivery Assn., Hotel Hollenden.
March 1-6....	St. Joseph, Mo., Motor Truck Show, Auditorium.
March 13-20...	Boston, Motor Truck Show, Mechanics Bldg.
March 22-27...	Wilkes-Barre, Pa., Motor Truck Show, Armory.

Ford's Street Car May Compete

May Make Inroads on Business of Bus Operators Throughout the Country

DETROIT, Jan. 7—Bus operators throughout the United States may be affected by the introduction of a Ford gasoline street car, which is making its initial appearance on the streets of Detroit. An ordinance is now before the city council of Detroit asking for a bond issue of $15,000,000 to establish a municipally-owned street car system to be voted on by the citizens in April. Experiments with the Ford street car have proved that the gasoline street car is no longer a dream. Figures submitted by Ford showed an annual saving in operating cost of $909,647 on the present street car mileage basis.

Ford's figures show that the cost of operation of the gasoline-driven trolley would be 31.41 cents a car-mile, whereas the figures submitted by the company operating the present electric system were 33.08 cents a car-mile. Figures also showed that the original cost of the Ford street car would be 50 per cent less than that of the electric cars.

Passage of the ordinance seems certain and ratification, by an overwhelming vote, is assured the plan for the municipally-owned system, which will relieve present congestion and serve a wide territory now without street cars. The consensus appears to favor giving the Ford street car a trial, though that question will be left until after the election.

Price Changes

NEW YORK CITY, Jan. 12—The Sandow Motor Truck Co., Chicago, has raised the prices of its 1-, 1¼-, 2-, 3½-, and 5-ton models, as follows:

Capacity, Tons	New Price	Old Price
1	$1,895	$1,795
1¼	2,190	.....
2	2,375	.....
3½	3,995	3,975
5	4,775	4,750

Tower Service in Greenville

GREENVILE, MICH., Jan. 12—The Tower Motor Truck Co. has opened a service station in this city at 1160 Brush Street pending the erection of a garage of its own which will be ready for occupancy by spring. Weekly inspection of Tower trucks in this vicinity will be given throughout the first year of ownership without charge.

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